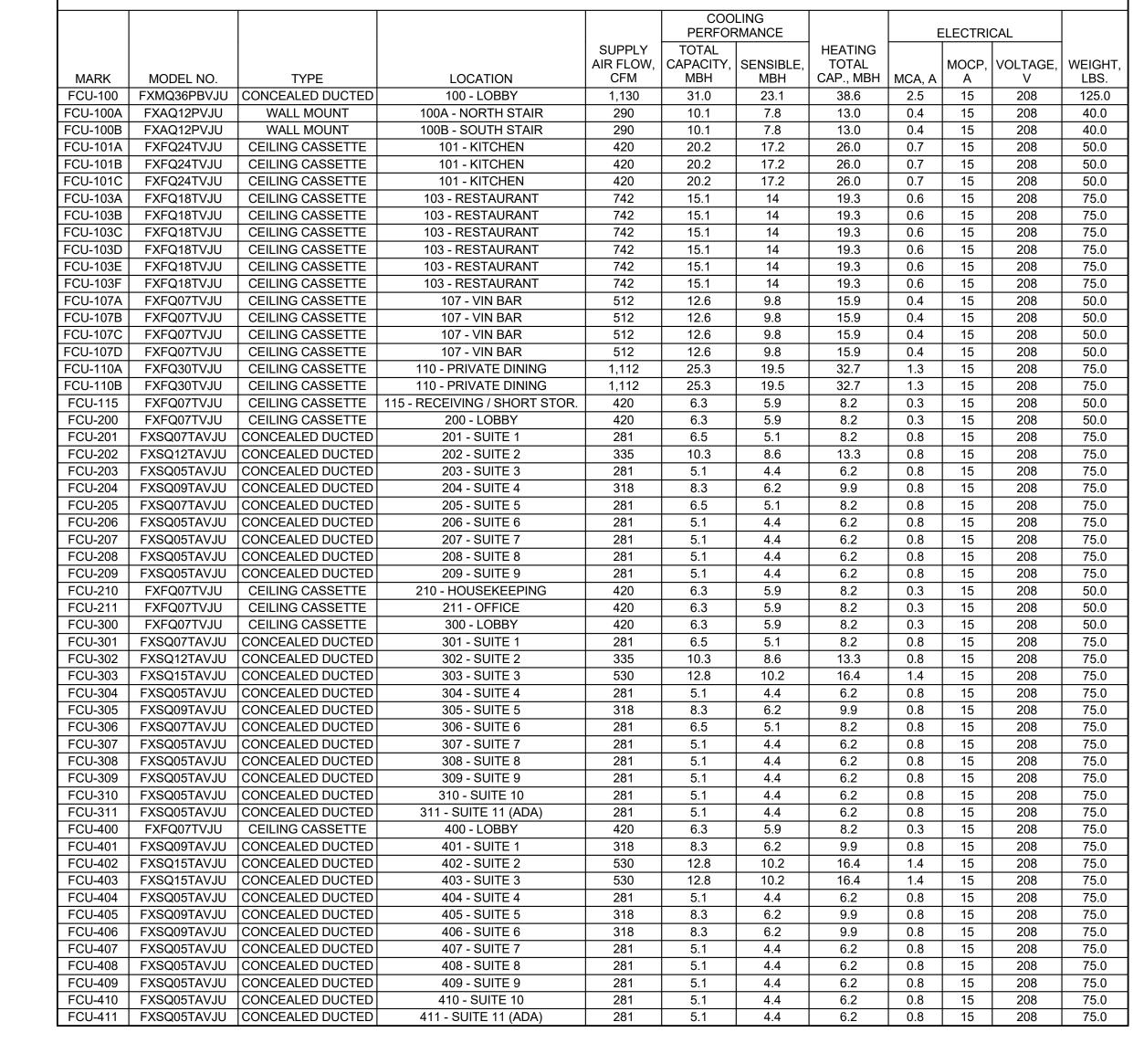
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VRV INDOOR UNITS - DAIKIN

				,	VRV OL	ITDOOR UNITS	S - DAIKIN						
			COOLING PERF	ORMA	NCE	HEATING		REFRIG	ERANT		ELECTRI	CAL	
MARK	MODEL NO.	COMPRESSOR TYPE	TOTAL CAPACITY, MBH	EER	IEER	TOTAL CAPACITY, MBH	SOUND PRESSURE, dBA	TYPE	CHARGE, LBS.	MCA,	MOCP,	VOLTAGE, V	WEIGHT LBS.
CU-1	REYQ120AATJA	INVERTER SCROLL	117.5	12.4	23.5	97.0	61.0	R-410A	25.8	36.5	40	208	750.0
CU-2	REYQ144AATJA	INVERTER SCROLL	134.8	12.0	22.5	124.0	65.0	R-410A	25.8	47.8	50	208	850.0
CU-3	REYQ120AATJA	INVERTER SCROLL	113.7	12.4	23.5	96.8	61.0	R-410A	25.8	36.5	40	208	750.0
CU-4	REYQ120AATJA	INVERTER SCROLL	112.5	12.4	23.5	96.7	61.0	R-410A	25.8	36.5	40	208	750.0

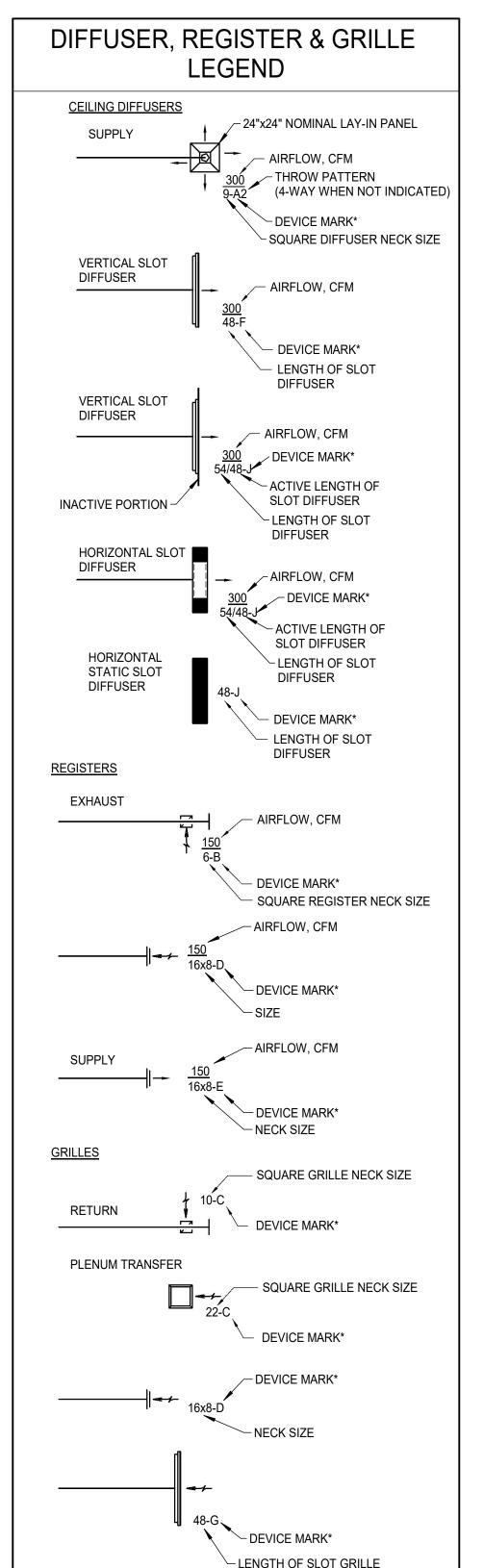
WINE COOLER UNIT - WC-1

WINE COLLER UNIT SHALL BE WINE GUARDIAN HORIZONTAL MODEL D050, AIR COOLED, FULLY DUCTED. MINIMUM COOLING CAPACITY SHALL BE 3880 BTUH. UNIT SHALL BE COMPLETE WITH CONDENSER FILTER, EVAPORATOR FILTER, INTEGRAL POWER SWITCH, AND DRAIN PAN WITH TRAP.

- OPTIONS SHALL INCLUDE: HUMIDIFIER WITH MAKEUP WATER CONNECTION AND DRAIN.
- LOW ABMIENT CONTROLS. COMBINATION WIRED THERMOSTAT/HUMIDISTAT, WALL MOUNTED (INSIDE WINE CLOSET).
- REMOTÉ INTERFACE CONTROLLER FOR MOUNTING ON WALL OUTSIDE WINE CLOSET.
- EXTENDED COMPRESSOR WARRANTY.
- 2 SPARE SETS OF FILTERS. UNIT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

	VRV BRANCH CONTROLLERS - DAIKIN										
		QTY. OF	ASSOCIATED		ELECTRICAL						
MARK	MODEL NO.	BRANCHES	UNIT	UNIT MCA, A MOCP, A VOLTAGE, V							
BC-1	BSF6Q54TVJ	6	CU-1	0.6	15	208	100.0				
BC-2	BSF6Q54TVJ	6	CU-2	0.6	15	208	100.0				
BC-3A	BSF8Q54TVJ	8	CU-3	0.8	15	208	100.0				
BC-3B	BSF6Q54TVJ	6	CU-3	0.6	15	208	100.0				
BC-3C	BSF6Q54TVJ	6	CU-3	0.6	15	208	100.0				
BC-4A	BSF6Q54TVJ	6	CU-4	0.6	15	208	100.0				
BC-4B	BSF6Q54TVJ	6	CU-4	0.6	15	208	100.0				
BC-4C	BSF6Q54TVJ	6	CU-4	0.6	15	208	100.0				

	AIR DISTRIBUTION TERMINAL DEVICE SCHEDULE - PRICE								
MARK									
Α	RCG	SIDEWALL SUPPLY, REVERSIBLE CORE	N/A	WHITE					
В	70	SURFACE	OBD	WHITE					
С	SMDA	CEILING DIFFUSER WITH PATTERN ADJUST	OBD	WHITE					
D	SDS	(4) 1/2" SLOTS	PC	CUSTOM					
Е	60FH	SURFACE MOUNT - FILTER GRILLE	N/A	WHITE					
F	APDN	PERFORATED FACE - SURFACE MOUNT	N/A	WHITE					



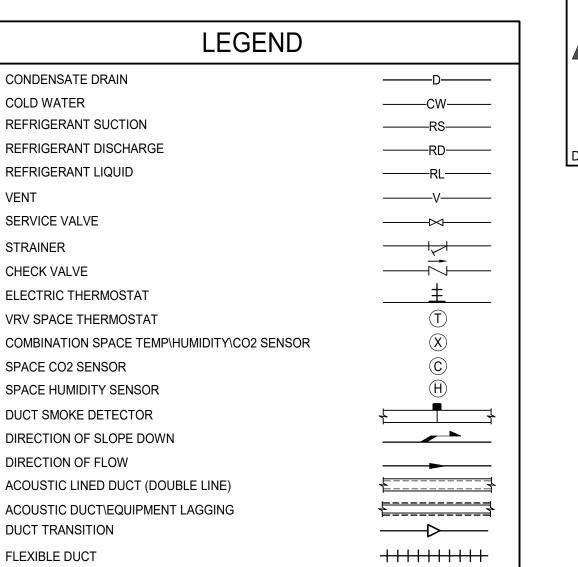
GENERAL EQUIPMENT NOTES:

WINTER DB - 75°F.

*REFER TO AIR DISTRIBUTION TERMINAL DEVICE SCHEDULE

- ACCORDANCE WITH MANUFACTURER'S INSTRUCTION.
- INDOOR VRV UNITS TO BE EQUIPPED WITH BIPOLAR IONIZATION. BRANCH CONTROLLERS AND INDOOR UNITS SHALL BE EQUIPPED WITH SHUTOFF VALVES. . ACCESS DOORS

VRV SYSTEM CAPACITIES BASED ON: SUMMER DB/WB - 75°F / 62.5°F, VRV CONDENSER UNIT AMBIENT TEMPERATURES BASED ON: SUMMER DB/WB - 95°F / 76°F, WINTER DB - 0°F. ALL REFRIGERANT PIPING TO BE SIZED AND ROUTED IN STRICT



CONDENSATE DRAIN

REFRIGERANT SUCTION

REFRIGERANT LIQUID

ELECTRIC THERMOSTAT

VRV SPACE THERMOSTAT

SPACE HUMIDITY SENSOR

DUCT SMOKE DETECTOR

DIRECTION OF SLOPE DOWN

FLEXIBLE DUCT CONNECTION

ACOUSTIC LINED DUCT (DOUBLE LINE)

ACOUSTIC DUCT\EQUIPMENT LAGGING

SPACE CO2 SENSOR

DIRECTION OF FLOW

DUCT TRANSITION

WATERTIGHT DUCT

FLEXIBLE DUCT

NEW WORK

SERVICE VALVE

STRAINER

CHECK VALVE

REFRIGERANT DISCHARGE

COLD WATER

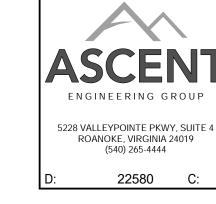
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	STANDARD AE	BBREV	IATIONS
Ø	DIAMETER	HP	HORSEPOWER
x/x	FLAT OVAL	HR	HOUR
ABV	ABOVE	HZ	HERTZ
AFF	ABOVE FINISHED FLOOR	IN	INCH(ES)
APD	AIR PRESSURE DROP	KW	KILOWATTS
ARRGMT	ARRANGEMENT	LAT	LEAVING AIR
AUTO	AUTOMATIC		TEMPERATURE
AAV	AUTOMATIC AIR VENT	LBS	POUNDS
AUX	AUXILIARY	LVD	LOW VOLTAGE MOTOR
BEL	BELOW		OPERATED DAMPER
BTU	BRITISH THERMAL UNIT	MAV	MANUAL AIR VENT
BTUH	BTU PER HOUR	MAX	MAXIMUM
CAP	CAPACITY	MBH	THOUSAND BTU
CFM			PER HOUR
CMU	CONCRETE MASONRY UNIT	MECH	MECHANICAL
CO	CLEANOUT	MFG	MANUFACTURER
CONC	CONCRETE	MIN	MINIMUM
CONN	CONNECT	MOD	MOTOR OPERATED
CONT	CONTINUATION		DAMPER (LINE VOLTAGE)
CR	CONTROL RELAY	MP SW	MOTOR PROTECTIVE
CRD	CEILING RADIATION DAMPER		SWITCH
CTR	CURRENT RELAY	MTD	MOUNTED
CW	COLD WATER	MVD	MANUAL VOLUME
DB	DRY BULB		DAMPER
dB	DECIBEL	NC	NORMALLY CLOSED
DDC	DIRECT DIGITAL	NIC	NOT IN CONTRACT
	CONTROL	NO	NORMALLY OPEN
DIM	DIMENSIONS	NTS	NOT TO SCALE
DISC	DISCONNECT SWITCH	OA	OUTSIDE AIR
DP	DOUBLE POLE	OAT	OUTSIDE AIR
DN	DOWN		TEMPERATURE
EXST	EXISTING	OBD	OPPOSED BLADE
EA	EACH		DAMPER
EAT	ENTERING AIR	occ	OCCUPANCY or
	TEMPERATURE		OCCUPIED
ELEC	ELECTRIC	PD	PRESSURE DROP
EQUIP	EQUIPMENT	PLP	PHASE LOSS
ENT	ENTERING		PROTECTION
EWT	ENTERING WATER TEMP	RA	RETURN AIR
ESP	EXTERNAL STATIC	RECT	RECTANGULAR
	PRESSURE	SDR	DUCT SMOKE DETECTOR
EXST	EXISTING	SDPR	SMOKE DAMPER
۰F	FAHRENHEIT	SS	STAINLESS STEEL
FA	FIRE ALARM	S/S	START-STOP
FDPR	FIRE DAMPER	SUSP	SUSPENDED
FSDPR	COMBINATION FIRE/SMOKE	SW	SWITCH
	DAMPER	TEMP	TEMPERATURE
FIN FL	FINISHED FLOOR	TYP	TYPICAL
FL	FLOOR	V	VOLT
FLA	FULL LOAD AMPS	VERT	VERTICAL
FP	FREEZE PROTECTION	W	WATTS
FR	FROM or FAN RELAY	WB	WET BULB
FS	FIRESTAT	WC	WATER COLUMN
FT	FEET	WG	WATER GAUGE
H20	WATER COLUMN or	WS	WATER STOP
	WATER GAUGE	WT	WEIGHT
HOA	HAND-OFF-AUTOMATIC	w/	WITH

COORDINATION NOTE

ALL DUCTWORK AND PIPES SHALL BE COORDINATED WITH OTHER DUCTS, PIPES, LIGHTS, STRUCTURAL SYSTEM, CEILING SUPPORTS AND FRAMING BEFORE INSTALLATION. MINOR DUCT OFFSETS AND TRANSITIONS SHALL BE PROVIDED AS REQUIRED. WHERE TRANSITIONS ARE REQUIRED, CROSS SECTIONAL AREA OF DUCT SHALL NOT BE REDUCED. MEASUREMENTS FOR VERTICAL CLEARANCES OF DUCTWORK SHALL BE TAKEN AT THE JOB SITE BEFORE FABRICATION OF ANY DUCTWORK.

IDENTIFICATION KEY LETTER INDICATES SECTION. NUMBER INDICATES **ELEVATION OR DETAIL.** - INDICATES SIMILAR DRAWING NUMBER WHERE REFERENCED VIEW ELEVATION, SECTION, OR - DRAWING NUMBER WHERE DETAIL IS TAKEN. — ELEVATION, SECTION, OR DETAIL IS DRAWN. SECTION, ELEVATION, OR DETAIL SYMBOL



1. ALL WORK SHALL BE

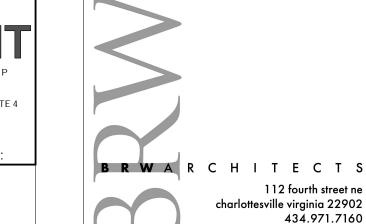
ACCORDANCE WITH THE

VEC 2018, VUSBC 2018, NEC

FOLLOWING CODES:

2017, AND IBC 2018.

PERFORMED IN



THE HAYNES

brw-architects.com

2221 CRYSTAL SPRING AVE SW ROANOKE. VA 24014

FOR

VAN THIEL



JOB NUN	/IBER	22011
DATE		08/30/24
DRAWN	BY	JC, BH
APPROV	ED BY	ВН
2017	©	brwarchitects,

CONSTRUCTION SET

REVISIONS								
09.13.2023	Permit Comments							

MECHANICAL LEGEND, SCHEDULES, AND NOTES

														DEDICAT	ED OUTDO	OR AIR SY	STEMS (DC	DAS) - GREE	NHECK														
	SUF	PLY FAN	TOTAL ENER	GY RECOVI	ERY WHE	EL			HEAT PU	MP COOLII	NG COIL			HOT GAS	REFRIG	SERANT	HEAT P	UMP HEATIN	NG COIL		SEC	CONDARY GAS	HEATING			EXHAUST FAI	V	AIR	FILTERS	ELECTR	ICAL		
			SUMMER		WINTER	₹							1	REHEAT					LEAVING	i													'
SUPPLY /	EXT.		OUTSIDE RETURN SUPP	_Y					E	NTERING	LEAVING	LEAVING		COIL	1			ENTERING	AIR					MIN. GAS		EXT.	TOTAL					MAX.	
OUTDOOR	S.P.,	MAX MA	X EAT EAT LAT	OUTSIDE	E RETURI	N SUPPLY	ERR., C	APACITY, E	ENTERING A	JR TEMP.,	AIR TEMP.,	AIR TEMP.,		CAP.,		CHARGE,	CAPACITY,	, AIR TEMP.,	TEMP.,	INPUT,	OUTPUT,		FUEL	PRESSURE AI	RFLOW,	S.P.,	MAX	MAX		MCA, MOCP,	VOLTAGE,	WEIGHT,	
MARK AIR, CFM	IN. H20 ⊢	IP BHP RP	M °DB/°WB °DB/°WB °DB/°\	VB ∣ EAT °DE	$B \mid EAT \circ DE$	B LAT °DB	%	MBH	AIR, °DB	°WB	°DB	°WB	ISMRE	MBH.	TYPE	LBS.	MBH	°DB	°DB	MBH	MBH	MODULATION	TYPE	IN. W.G.	CFM	IN. H20 HP	BHP	RPM TYPE	EFFICIENCY	' A A	V	LBS.	MODEL
DOAS-1 1,855	1.10 1	.5 1.14 1,1	70 95/76 72/59.9 78.9/6	5.7 0	72	48	67.9	89.3	78.9	65.7	49.9	49.7	7.6	52.2	R-410A	13	29.8	48.0	62.9	100.0	80.0	16:1	NATURAL	6	1465	1.25 1	0.76	1,150 PLEATED	MERV-13	39.3 50.0	208	3,500	RVE-40-36C-7.5A-C-A1
DOAS-2 1,280	1.00	1 0.62 1,2	30 95/76 72/55.6 78/6	5 0	72	50.3	72.5	67.7	78.0	65.0	46.9	46.7	7.9	45.8	R-410A	13.1	28	53.6	73.8	100.0	81.0	16:1	NATURAL	6	1280	0.75 1	0.5	1,180 PLEATED	MERV-13	30.0 40.0	208	3,200	RVE-40-30D-5A-C-A1

1.01 MECHANICAL GENERAL SPECIFICATIONS:

- A. CONTRACTOR SHALL PROVIDE A COMPLETE AND OPERATING SYSTEM, INCLUDING ALL REQUIRED ACCESSORIES. ALL SYSTEMS SHALL BE FULLY CLEANED, TESTED, BALANCED AND READY FOR OWNER OCCUPANCY, WITH COMPLETE CERTIFIED TESTING AND BALANCING REPORT. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS TO THE ENGINEER FOR APPROVAL, FOR ALL EQUIPMENT INDICATED BY [S]. CONTRACTOR SHALL PROVIDE OPERATION AND MAINTENANCE MANUALS FOR ALL EQUIPMENT MARKED WITH [O/M], BOUND IN A SINGLE BINDER, COMPLETE WITH INDEX, TO THE ENGINEER FOR REVIEW AND TRANSMITTAL TO THE OWNER.
- B. THE COMPLETED MECHANICAL INSTALLATION AND ALL MATERIALS AND EQUIPMENT SHALL CONFORM TO ALL LOCAL ORDINANCES, CODES, AND OTHER REGULATIONS AND STANDARDS THAT ARE APPLICABLE. THESE ARE INTENDED AS A MINIMUM AND SHALL BE EXCEEDED IF REQUIRED BY THE SPECIFICATIONS OR THE DRAWINGS. IN THE EVENT OF CONFLICT BETWEEN THE CODES, STANDARDS, OR REGULATIONS AND INFORMATION CONTAINED IN THE CONTRACT DOCUMENTS, THE APPLICABLE CODE, STANDARDS, OR REGULATION SHALL TAKE PRECEDENCE.
- C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION AND PROPER RELATION OF THE MECHANICAL WORK TO THE WORK OF OTHER TRADES AND TO ACTUAL BUILDING CONDITIONS. NO ADDITIONAL COMPENSATION NOR EXTENSION OF COMPLETION TIME WILL BE GRANTED FOR
- EXTRA WORK CAUSED BY THE LACK OF COORDINATION. D. ALL CUTTING AND PATCHING FOR THE INSTALLATION OF NEW WORK SHALL BE DONE BY THE CONTRACTOR INSTALLING THE WORK. PATCHING SHALL
- BE DONE BY SKILLED TRADESMEN AND FINISH SHALL MATCH ADJACENT AREAS. E. EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS TO CONFORM WITH THE DETAILS AND APPLICATION
- F. PROVIDE NECESSARY SUPPORTS FOR ALL EQUIPMENT AND APPURTENANCES AS REQUIRED.
- G. IDENTIFICATION FOR HVAC:
- 1. DUCT LABELS SHALL BE SELF-ADHESIVE MULTI-COLOR FLEXIBLE VINYL WITH PERMANENT ACRYLIC PRESSURE SENSITIVE ADHESIVE. LOCATE LABELS NEAR POINTS WHERE DUCTS ENTER INTO CONCEALED SPACES AND AT MAXIMUM INTERVALS OF 50 FEET IN EACH SPACE WHERE DUCTS ARE EXPOSED OR CONCEALED BY REMOVABLE CEILING SYSTEM.
- 2. ACOUSTICAL CEILING GRID MARKER SHALL BE PLASTIC TAPE A MINIMUM OF 0.003-INCH THICK (3.0 MILS) WITH PRESSURE-SENSITIVE, PERMANENT-TYPE, SELF-ADHESIVE BACK. ATTACH TAPE WITH INDICATED TEXT TO T-BAR GRID BELOW ITEM OR EQUIPMENT. TAPE SHALL BE CENTERED ON THE GRID AND VISIBLE FROM THE SPACE.
- PROVIDE FOR ALL CONCEALED VALVES, CONTROLS, DAMPERS, JUNCTION BOXES, EQUIPMENT, OR ANY ITEM REQUIRING ACCESS. DOORS SHALL BE OF SUFFICIENT SIZE AND SO LOCATED THAT THE CONCEALED ITEMS MAY BE SERVICED OR COMPLETELY REMOVED AND REPLACED. DOORS REQUIRED FOR MECHANICAL WORK SHALL BE FURNISHED AS A PART OF THIS DIVISION TO THE GENERAL CONTRACTOR FOR INSTALLATION. THE MECHANICAL CONTRACTOR SHALL PROVIDE LOCATIONS OF ALL ACCESS DOORS SUCH THAT SERVICE MAY BE SAFELY PERFORMED FROM A LADDER, LIFT, OR PLATFORM WITHOUT THE NEED FOR SUPPORT FROM THE CEILING SYSTEM. DOORS IN ACOUSTIC TILE CEILINGS SHALL BE FURNISHED IN MULTIPLES OF TILE SIZES. DOORS ARE NOT REQUIRED IN EXPOSED GRID TYPE CEILINGS WHERE TILES ARE REMOVABLE. DOORS SHALL BE METAL ACCESS DOORS WITH CAM LOCK, STYLE TO MATCH CEILING OR WALL CONSTRUCTION. DOORS OCCURRING IN RATED CONSTRUCTION SHALL BE FIRE RATED U.L. LABELED ACCESS DOORS CORRELATED TO PRESERVE THE INTEGRITY OF THE RATED CONSTRUCTION. DOORS LEADING TO CONCEALED SPACES SHALL BE PROVIDED WITH MEANS TO OPEN FROM THE INSIDE. DOORS SHALL BE PRIME FINISH STEEL EXCEPT THOSE IN TOILETS, SHOWER ROOMS, LOCKER ROOMS, KITCHENS AND OTHER SIMILAR AREAS SHALL BE STAINLESS STEEL WITH BRUSHED FINISH.

HEATING, VENTILATING AND AIR CONDITIONING

2.01 DOAS UNITS [S] [O/M]

- A. GENERAL: AIR UNITS SHALL BE GREENHECK OR ACCEPTED EQUAL FACTORY FABRICATED AND ASSEMBLED, SINGLE-ZONE HEAT RECOVERY TYPE AND SHALL BE COMPLETE WITH AIR TIGHT INSULATED CASING, FANS, MOTOR, ADJUSTABLE V-BELT DRIVE, BELT GUARDS, ACCESS DOORS, INTERNAL SPRING VIBRATION ISOLATORS, DRAIN PAN, COOLING COILS, GAS HEATING SECTION, HOT GAS REHEAT COILS, ENERGY RECOVERY WHEEL, FILTERS, PACKAGED CONDENSING SECTION, AND OUTSIDE AIR AND EXHAUST AIR DAMPERS AS REQUIRED BY THE MODEL NUMBER
- AND APPLICATION INDICATED. EACH UNIT SHALL HAVE PHYSICAL DIMENSIONS SUITABLE TO FIT SPACE ALLOTTED TO UNIT. B. CASING SHALL BE 18 GAUGE GALVANNEALED STEEL REINFORCED WELDED CONSTRUCTION WITH HEAVY GAUGE ALUMINIZED STEEL FLOOR WELDED THROUGHOUT. DRAIN PANS SHALL BE NOT LESS THAN 22 GAUGE ALUMINUM, COATED WITH A NON-COMBUSTIBLE WATERPROOFING MATERIAL. ENTIRE CASING INCLUDING WALLS, FLOORS AND CEILINGS SHALL BE INSULATED AT THE FACTORY, ACOUSTICALLY AND THERMALLY, INTERNALLY WITH NOT LESS THAN 1.5 LB. DENSITY FIBROUS GLASS INSULATION MATERIAL. ACCESS DOORS SHALL BE DOUBLE WALL, GASKETED, INSULATED, HINGED DOORS PROVIDED IN EACH CASING SECTION. CASING SHALL HAVE GALVANIZED OR BAKED ENAMEL FINISH. INTAKE AND EXHAUST OPENINGS SHALL BE PROTECTED WITH WEATHER HOODS AND BIRD SCREEN. THE UNIT BASE SHALL BE ALL WELDED CONSTRUCTION WITH
- ADEQUATE CROSS BRACING TO SUPPORT THE SYSTEMS. C. HEATING SECTION SHALL BE INDIRECT GAS FIRED, SST HEAT EXCHNAGER SUITABLE FOR 100% OUTSIDE AIR, WITH MODULATING CONTROLS.
- D. COOLING COILS SHALL BE DX COILS AS HEREINAFTER SPECIFIED. E. CONDENSING SECTION SHALL BE COMPLETE WITH COMPRESSOR-MOTOR UNIT, CONDENSER COIL, WELDED-WIRE OR STAMPED SHEET METAL CONDENSER COIL HAIL GUARDS, CONDENSER FANS, MOTOR STARTERS, CONTROLS AND PIPING ENCLOSED IN A SHEET STEEL ENCLOSURE RECOMMENDED FOR OUTSIDE INSTALLATION. CONDENSER FANS SHALL BE VERTICAL OR HORIZONTAL DISCHARGE AS SHOWN. INTAKE AND DISCHARGE OPENINGS SHALL BE PROVIDED WITH WELDED-WIRE OR STAMPED SHEET METAL COIL GUARDS. CONDENSING UNIT CONTROLS SHALL PROVIDE AUTOMATIC CAPACITY MODULATION AND CONDENSER AND EVAPORATOR PRESSURE CONTROL. PROVIDE CONTROLS AS REQUIRED FOR
- ENTHALPY ECONOMIZER. CRANKCASE HEATER SHALL BE PROVIDED IN COMPRESSOR BODY. COMPRESSORS SHALL BE DIGITAL SCROLL TYPE WITH INTERNAL THERMAL OVERLOAD PROTECTION AND MOUNTED ON THE COMPRESSOR MANUFACTURER'S RECOMMENDED SPRING VIBRATION ISOLATORS. COMPRESSORS SHALL BE MOUNTED IN AN ISOLATED COMPARTMENT TO PERMIT OPERATION OF THE UNIT WITHOUT AFFECTING AIR FLOW WHEN THE DOOR TO THE COMPARTMENT IS OPEN. COMPRESSORS SHALL BE ISOLATED -ROM THE BASE PAN AND SUPPLY AIR. THE REFRIGERANT SYSTEM SHALL BE EQUIPPED WITH THERMOSTATIC EXPANSION VALVE TYPE REFRIGERAN FLOW CONTROL. THE REFRIGERANT SYSTEM SHALL BE EQUIPPED WITH AUTOMATIC RESET LOW PRESSURE AND MANUAL RESET HIGH PRESSURE REFRIGERANT CONTROLS. EACH SYSTEM SHALL BE EQUIPPED WITH SCHRADER TYPE SERVICE FITTINGS ON BOTH THE HIGH PRESSURE AND LOW PRESSURE SIDES. EACH COMPRESSOR SHALL BE EQUIPPED WITH SUCTION AND DISCHARGE SERVICE/ISOLATION VALVES. UNIT SHALL BE EQUIPPED
- WITH REFRIGERANT LIQUID LINE DRIERS. UNIT SHALL BE FULLY FACTORY CHARGED WITH R-410A REFRIGERANT G. FILTERS SHALL BE UL APPROVED TWO-INCH OR FOUR-INCH THICK, PLEATED, THROWAWAY TYPE WITH MINIMUM MERV 13 EFFICIENCY. FILTERS SHALL BE COMPLETE WITH FILTER FRAMES, HOLDING RACKS AND CLIPS AND SHALL BE PROVIDED IN BOTH THE EXHAUST AND SUPPLY AIR UPSTREAM OF THE ENERGY RECOVERY MODULES. FILTERS SHALL BE REMOVABLE FROM EITHER SIDE OF UNIT. FILTER FACE VELOCITY SHALL NOT EXCEED 500
- H. SUPPLY AND EXHAUST AIR FANS SHALL BE CENTRIFUGAL HEAVY DUTY, BACKWARD INCLINED OR AIRFOIL PLENUM FAN, AMCA CERTIFIED, AND SHALL HAVE EXTENDED GREASE FITTINGS. THE SUPPLY FAN AND THE EXHAUST FAN SHALL BE IN THE DRAW THROUGH POSITION. FAN, SHAFT, BELT DRIVE AND MOTOR SHALL BE STATICALLY AND DYNAMICALLY BALANCED AND ALL MOUNTED ON AN INTERNAL STRUCTURAL VIBRATION ISOLATION SUB-BASE WITH SPRING ISOLATORS HAVING MINIMUM 1" DEFLECTION AND SLIDE RAILS FOR MOUNTING OF MOTORS. BEARINGS SHALL HAVE AN AVERAGE LIFE OF 200,000 HOURS. BELT DRIVES ARE TO BE UTILIZED HAVING A 1.5 SERVICE FACTOR. PROVIDE FLEXIBLE DUCT CONNECTIONS TO ISOLATE THE FAN FROM THE CABINET HOUSING AS REQUIRED. MOTORS SHALL BE TEFC TYPE, FACTORY PREWIRED TO A UNIT TERMINAL STRIP. THE MOTORS SHALL BE EQUIPPED WITH GREASABLE BALL BEARINGS AND SHALL BE MOUNTED ON ADJUSTABLE SLIDING TYPE BASES.
- ENERGY RECOVERY WHEEL: WHEEL SHALL BE OF THE ENTHALPY TYPE FOR BOTH SENSIBLE AND LATENT HEAT RECOVERY AND BE DESIGNED TO INSURE LAMINAR FLOW. ENERGY TRANSFER RATINGS MUST BE ARI CERTIFIED TO STANDARD 1060 AND BEAR THE ARI CERTIFICATION SYMBOL FOR ARI AIR- TO-AIR ENERGY RECOVERY VENTILATION EQUIPMENT CERTIFICATION PROGRAM BASED ON ARI 1060. RATINGS "IN ACCORDANCE WITH 1060" WITHOUT CERTIFICATION ARE NOT ACCEPTABLE. DESICCANT SHALL BE SILICA GEL FOR MAXIMUM LATENT ENERGY TRANSFER. WHEEL SHALL BE CONSTRUCTED OF LIGHTWEIGHT POLYMER MEDIA TO MINIMIZE SHAFT AND BEARING LOADS. POLYMER MEDIA SHALL BE MOUNTED IN A STAINLESS STEEL ROTOR FOR CORROSION RESISTANCE
- 1. WHEEL DESIGN SHALL CONSIST OF REMOVABLE SEGMENTS FOR EASE OF SERVICE AND/OR CLEANING. SILICA GEL DESICCANT SHALL BE PERMANENTLY BONDED TO WHEEL MEDIA TO RETAIN LATENT HEAT CAPABILITY AFTER CLEANING. WHEELS WITH SPRAYED ON DESICCANT COATINGS ARE NOT ACCEPTABLE. WHEELS WITH DESICCANT APPLIED AFTER WHEEL FORMATION ARE NOT ACCEPTABLE. ENERGY RECOVERY DEVICE SHALL TRANSFER MOISTURE ENTIRELY IN THE VAPOR PHASE.
- ENERGY RECOVERY DRIVE BELT MATERIAL SHALL BE HIGH STRENGTH URETHANE AND SHALL BE FACTORY INSTALLED IN A PRE-STRETCHED

TEMPERATURE OF 55 DEGREES F. DURING FROST CONTROL, AN OUTDOOR AIR SENSOR AND WHEEL PRESSURE DROP SENSOR SHALL TRIGGER

- STATE, ELIMINATING THE NEED FOR FIELD BELT TENSION ADJUSTMENT. LINK STYLE BELTS ARE NOT ACCEPTABLE. ENERGY RECOVERY WHEEL SHALL BE SUPPLIED WITH A FULLY FACTORY PROGRAMMED VARIABLE FREQUENCY DRIVE. DURING ECONOMIZER MODE, OUTDOOR AIR AND RETURN AIR SENSORS SHALL TRIGGER WHEEL MODULATION. WHEEL SHALL MODULATE TO TARGET A DISCHARGE
- MODULATION FOR FROST CONTROL. WHEEL SHALL ROTATE AT LOWER RPM UNTIL FROSTING IS ELIMINATED. DAMPERS SHALL BE LOW LEAKAGE TYPE WITH GALVANIZED STEEL OPPOSED BLADES, BLADE SEALS, NYLON BEARINGS AND STAINLESS STEEL
- K. TEMPERATURE AND HUMIDITY CONTROLS SHALL BE AS SPECIFIED IN DIVISION 23.

ELECTRICAL.

- . ELECTRICAL CONTROLS SHALL BE FACTORY WIRED FOR A SINGLE-POINT POWER CONNECTION. 1. UNIT SHALL BE COMPLETE WITH SUPPLY AND EXHAUST FAN VFD'S, CONTROL CIRCUIT FUSING, CONTROL TRANSFORMER FOR 24 VAC CIRCUIT, AND TERMINAL STRIP SHALL BE SUPPLIED AS STANDARD COMPONENTS IN THE CONTROL CENTER. VFD'S SHALL BE AS SPECIFIED HEREINAFTER.
- M. CONTROL SYSTEM SHALL BE A FACTORY-MOUNTED STAND ALONE MICROPROCESSOR-BASED DDC, NECESSARY SENSORS AND INTERFACES TO MONITOR AND OPERATE ALL FUNCTIONS AS OUTLINED IN THE EQUIPMENT/CONTROL SCHEDULE AND REQUIRED FOR COMPLETE UNIT OPERATION. CONTROL SYSTEM SHALL BE MOUNTED IN THE UNIT MAIN CONTROL COMPARTMENT. FACTORY-MOUNTED DDC CONTROL SYSTEM SHALL BE FACTORY-PROGRAMMED AND RUN-TESTED PRIOR TO SHIPMENT TO VERIFY FUNCTIONS AND LOGIC. A UNIT-MOUNTED INTELLIGENT PROGRAMMABLE INTERFACE DEVICE SHALL BE INCLUDED FOR COMMUNICATION, DISPLAY AND SETPOINT CONTROL. A UNIT-MOUNTED HAND/OFF/AUTO SWITCH SHALL BE INCLUDED TO ALLOW FOR SERVICING. REFER TO THE CONTROL SCHEMATICS ON THE DRAWINGS TO OBTAIN CONFIGURATION REQUIREMENTS OF SPECIFIC UNITS.

2. PROVIDE WITH SINGLE POINT POWER CONNECTION WITH FACTORY DISCONNECT AND CONVENIENCE RECEPTACLE FOR CONNECTION BY

- N. UNIT SHALL HAVE GALVANIZED FINISH. O. CURB HEIGHT SHALL BE SIZED TO PROVIDE A MINIMUM OF 10" HEIGHT ABOVE INSULATION AT ITS DEEPEST POINT (SLOPED INSULATION ON FLAT
- P. WARRANTY: MOTOR-COMPRESSOR SHALL BE GUARANTEED FOR FIVE (5) YEARS.

M. SEQUENCE OF OPERATION FOR ENERGY RECOVERY UNIT:

- 1. WHEN ENABLED BY THE ONBOARD CONTROLLER AT A PREPROGRAMMED TIME, THE UNIT CONTROLLER SHALL OPEN EXHAUST AIR DAMPER D-2. AFTER VERIFICATION BY THE UNIT CONTROLLER THAT D-2 IS FULLY OPEN. THE EXHAUST FAN SHALL BE ENERGIZED AND OUTSIDE AIR DAMPER D-1 SHALL OPEN. UPON VERIFICATION BY THE UNIT CONTROLLER THAT D-1 IS FULLY OPENED, THE SUPPLY FAN SHALL BE ENERGIZED.
- 2. SPACE TEMPERATURE SETPOINT XE-4 SHALL BE MAINTAINED BY RESETTING THE SUPPLY AIR TEMPERATURE TE-3 SLOWLY UP OR DOWN AS REQUIRED. OUTSIDE AND SUPPLY AIR TEMPERATURES SHALL BE SENSED BY TE-1 AND TE-3 RESPECTIVELY
- SPACE TEMPERATURE AVERAGING: THE UNIT SHALL CONTROL TO AN AVERAGE SPACE TEMPERATURE. 3. IF THE OUTDOOR AIR TEMPERATURE TE-1 IS BELOW 65°F (ADJUSTABLE) (HEATING MODE), THE ELECTRIC HEAT SHALL BE ENABLED AND THE UNIT
- CONTROLLER SHALL MODULATE THE SCR TO ADJUST THE SUPPLY AIR TEMPERATURE TE-4 TO MAINTAIN SPACE TEMPERATURE SETPOINT. 4. IF THE OUTSIDE AIR TEMPERATURE TE-1 IS ABOVE 65°F (ADJUSTABLE) AND OUTDOOR AIR ENTHALPY IS LESS THAN RETURN AIR ENTHALPY (ECONOMIZER MODE), THE ELECTRIC HEAT AND DX COOLING SHALL BE DISABLED. THE UNIT CONTROLLER SHALL MODULATE THE ENERGY WHEEL TO ADJUST THE SUPPLY AIR TEMPERATURE TE-3 TO MAINTAIN SPACE TEMPERATURE SETPOINT.
- 5. IF THE OUTSIDE AIR TEMPERATURE TE-1 IS ABOVE 75°F (ADJUSTABLE) (COOLING MODE), HEATING SHALL BE DISABLED, THE DX COOLING SHALL BE ENABLED, AND THE UNIT CONTROLLER SHALL STAGE COOLING ON TO MAINTAIN THE SUPPLY AIR TEMPERATURE TE-3 TO MAINTAIN SPACE
- 6. IF THE SPACE RELATIVE HUMIDITY XE-4 IS ABOVE 45% (ADJ.) (DEHUMIDIFICATION MODE), AND THE UNIT IS ALREADY IN COOLING MODE, ADDITIONAL STAGES OF COOLING SHALL BE ENABLED. IF SPACE TEMPERATURE MEETS SETPOINT AND SPACE RELATIVE HUMIDITY XE-4 IS STILL ABOVE SETPOINT, STAGE ALL COOLING ON, THE HOT GAS REHEAT COIL SHALL THEN MODULATE ON TO MAINTAIN A LEAVING AIR TEMPERATURE, TE-3, SETPOINT OF ROOM NEUTRAL 80°F (ADJ.) SUMMER AND 65° (ADJ.) WINTER. IF THE SPACE RELATIVE HUMIDITY XE-4 FALLS BELOW 40% (ADJ.) THE UNIT CONTROLLER SHALL RETURN TO ITS NORMAL OPERATING MODE.
- 7. THE UNIT CONTROLLER SHALL MODULATE THE ENERGY RECOVERY WHEEL TO MAINTAIN A NON- FROSTING CONDITION WITHIN THE ENERGY RECOVERY HEAT EXCHANGER IN THE EXHAUST AIR STREAM.
- 8. DUCT SMOKE DETECTORS: WHEN PRODUCTS OF COMBUSTION ARE SENSED BY SD-1, SD-2, OR ADDITIONAL DUCT SMOKE DETECTORS AS INDICATED ON THE DRAWINGS, THE UNIT FAN SHALL BE DEENERGIZED.
- 9. ON A FALL IN SUPPLY AIR TEMPERATURE TE-3 BELOW 45°F (ADJ.), THE SUPPLY AND EXHAUST FANS SHALL BE DE-ENERGIZED, AND D-1 AND D-2
- 10. CURRENT SENSING SWITCHES SHALL VERIFY FAN OPERATIONS AND ALARM THE UNIT CONTROLLER OF OFF NORMAL CONDITION. ROTATION SENSOR RS-1 SHALL ALARM THAT THE ENERGY WHEEL IS NOT ROTATING.
- 11. REDUCED OCCUPANCY CONTROL: THE UNIT CONTROLLER SHALL ALLOW FOR USER SELECTABLE ADJUSTMENTS TO TOTAL SUPPLY AND EXHAUST AIRFLOW. A SELECTOR SWITCH SHALL BE PROVIDED FOR EACH UNIT TO ALLOW AIRFLOW TO BE REDUCED TO 67% AIRFLOW AND 50% AIRFLOW THROUGH VFD-1 AND VFD-2 DURING TIMES OF LOW OCCUPANCY. THE RATIO OF SUPPLY TO EXHAUST AIRFLOW SHALL REMAIN CONSTANT. A FACTORY PROVIDED THREE-POSITION SELECTOR SWITCH SHALL BE INSTALLED WHERE INDICATED ON DRAWINGS. SELECTOR SWITCH SHALL BE LABELED, "ANIMAL AREA VENTILATION LOW-MEDIUM-HIGH" FOR OAU-1. EACH SWITCH SHALL ALSO INCLUDE A RED LABEL WITH WHITE ENGRAVED LETTERS BELOW THE SWITCH THAT READS "WARNING: USE OF LOW AND MEDIUM SETTINGS DURING EXTREME HEAT OR COLD MAY AFFECT ROOM TEMPERATURE, ALSO, OFFICE AREA VENTILATION IS REDUCED WHEN USING LOW OR MEDIUM SETTING."

N. INSTALLATION AND STARTUP:

1. THE SERVICES OF A QUALIFIED MANUFACTURER'S TECHNICAL REPRESENTATIVE SHALL SUPERVISE THE CONTRACTOR'S INSTALLATION, TESTING, AND START-UP OF ALL THE EQUIPMENT FURNISHED UNDER THIS SPECIFICATION. A MAXIMUM TOTAL OF ONE (1) SUPERVISION DAY (8 HOURS) SHALL BE PROVIDED BY THE MANUFACTURER'S REPRESENTATIVE. UPON ACCEPTANCE OF THE EQUIPMENT, TRAINING OF THE OPERATORS SHALL CONSIST OF ONE (1) TRAINING DAY (8 HOURS). TRAINING SHALL BE VIDEO RECORDED AND PROVIDED TO THE OWNER IN DVD FORMAT.

VIBRATION ISOLATION

2.02 ISOLATORS [S] [O/M]

- A. ALL VIBRATION CONTROL APPARATUS SHALL BE SUPPLIED BY A SINGLE RECOGNIZED MANUFACTURER. THE SUPPLIER OF NOISE AND VIBRATION CONTROL EQUIPMENT SHALL SUPERVISE, INSPECT AND APPROVE THE INSTALLATION OF THEIR EQUIPMENT. THE SUPPLIER SHALL SUBMIT A LETTER TO THE ENGINEER AT THE CONCLUSION OF THE PROJECT STATING THAT ALL ITEMS HAVE BEEN INSTALLED PROPERLY AND THAT ALL EQUIPMENT IS ADEQUATELY ISOLATED.
- 1. KINETICS NOISE CONTROL, VIBRATION MOUNTINGS AND CONTROL, INC., VIBRATION ELIMINATOR CO., MASON INDUSTRIES, VIBRO-ACOUSTICS OR AMBER/BOOTH COMPANY.

C. ISOLATOR TYPES

- a. TYPE S SPRING VIBRATION ISOLATORS SHALL BE FREE-STANDING, UNHOUSED, LATERALLY STABILE, STEEL SPRINGS, WOUND USING HIGH STRENGTH HEAT TREATED SPRING ALLOY STEEL, AND SHALL HAVE A HORIZONTAL SPRING STIFFNESS EQUAL TO OR GREATER THAN 1.0 TIMES THE RATED VERTICAL SPRING STIFFNESS. SPRINGS SHALL BE SELECTED TO PROVIDE THE TABULATED MINIMUM OPERATING STATIC DEFLECTIONS AND SHALL PROVIDE A 50% OVERLOAD CAPACITY BEFORE REACHING A SOLID STATE. SPRINGS SHALL BE DESIGNED TO REACH A SOLID STATE BEFORE EXCEEDING THE SPRING STEEL FATIGUE POINT. SPRINGS USED TO ISOLATE FLOOR MOUNTED EQUIPMENT SHALL INCLUDE A DRILLED AND TAPPED STEEL TOP LOAD PLATE, AND A STEEL BOTTOM LOAD PLATE BONDED TO A 1/4" THICK RIBBED NEOPRENE NOISE STOP PAD. EACH SPRING MOUNT SHALL INCLUDE A STEEL LEVELING BOLT, LOCKNUTS, AND WASHERS FOR ATTACHMENT TO SUPPORTED EQUIPMENT. TYPE S UNITS SHALL BE KINETICS MODEL FDS.
- b. VERTICALLY RESTRAINED, SPRING MOUNTS SHALL INCORPORATE A SINGLE SPRING VIBRATION ISOLATOR HAVING ALL OF THE CHARACTERISTICS OF TYPE S SPRING ISOLATORS AS PREVIOUSLY SPECIFIED IN A STEEL MOUNT ASSEMBLY DESIGNED TO LIMIT VERTICAL MOVEMENT OF ISOLATED EQUIPMENT. IF EQUIPMENT LOADS ARE REDUCED OR EQUIPMENT IS SUBJECT TO EXTERNAL LOADS, VERTICAL MOVEMENT SHALL BE LIMITED WITHOUT DEGRADING THE VIBRATION ISOLATION OF THE SPRING ELEMENT DURING NORMAL EQUIPMENT OPERATING CONDITIONS. THE MOUNTS SHALL HAVE A FLAT STEEL TOP LOAD PLATE, FOR WELDING TO SUPPORTING EQUIPMENT, VERTICALLY RESTRAINED BY NOISE ISOLATED BOLTS, CONNECTED TO STEEL CHANNEL AND DRILLED PLATED ASSEMBLIES WELDED TO A STEEL BASE PLATE. THE BASE PLATE SHALL BE BONDED TO A 1/4" THICK RIBBED NEOPRENE NOISE STOP PAD AND DRILLED FOR BOLTING TO SUPPORTING STRUCTURES. VERTICALLY RESTRAINED SPRING MOUNTS SHALL BE KINETICS FLS.
- c. CURB RAILS SHALL BE PROVIDED FOR ALL ROOFTOP EQUIPMENT. CURB RAILS SHALL BE PREFABRICATED EXTRUDED ALUMINUM RAIL SYSTEM USING 1" DEFLECTION TYPE S FREE STANDING STABILE SPRINGS AND A CONTINUOUS ELASTOMERIC AIR AND WATER SEAL. ALL METAL PARTS SHALL BE NON-CORROSIVE OR ZINC PLATED. EACH RAIL SYSTEM SHALL BE DESIGNED AND SIZED SPECIFICALLY TO FIT THE ROOF CURB AND THE EQUIPMENT PROPOSED TO RECEIVE THE ISOLATION RAILS. THE UPPER PORTION OF THE EQUIPMENT RAIL SHALL BE DESIGNED TO CONTINUOUSLY SUPPORT THE WEIGHT OF THE EQUIPMENT PROVIDED. SPRINGS SHALL BE SPACED TO PROVIDE A UNIFORM 1" STATIC DEFLECTION WHEN EQUIPMENT IS MOUNTED ON THE ISOLATION RAILS. ALL RAIL SECTIONS SHALL BE DESIGNED AND ARRANGED TO SHED WATER OUTWARD AND SHALL BE WATERTIGHT. CURB RAILS SHALL BE KINETICS MODEL KSR.

SUSPENDED EQUIPMENT:

a. ALL VRF FAN COILS, VRV CEILING CASSETTES, AND VRV BC UNITS SHALL BE SUPPORTED ON TYPE F HANGERS. TYPE F HANGERS SHALL CONSIST OF AN ELASTOMER-IN-SHEAR ISOLATOR ENCASED IN A WELDED STEEL BRACKET. THE ELASTOMER SHALL BE BONDED TO THE HANGER BRACKET AND SHALL BE SELECTED TO SUPPORT THE LOAD WITHIN ITS PUBLISHED LOAD RATING. THE HANGER BRACKET SHALL BE DESIGNED TO CARRY A FIVE (5) TIMES OVERLOAD WITHOUT FAILURE AND ALLOW UP TO 15° ROD MISALIGNMENT WITHOUT SHORT CIRCUITING. TYPE F HANGER SHALL BE KINETICS MODEL RH.

INSTALLATION:

- a. EQUIPMENT: ALL EQUIPMENT SHALL BE ISOLATED FROM THE STRUCTURE AND FIXED PARTS BY MEANS OF RESILIENT VIBRATION AND NOISE ISOLATORS. ISOLATORS FOR FLOOR AND ROOF MOUNTED EQUIPMENT SHALL BE SOLIDLY ANCHORED TO THE SUPPORT BASE OR FLOOR AND TO THE SUPPORTED EQUIPMENT UNLESS INDICATED OTHERWISE.
- b. PIPING AND CONDUIT: ALL PIPING AND ELECTRICAL CONDUIT CONNECTED TO THE ROOFTOP CONDENSING UNITS AND AIR HANDLING UNITS. OR OTHER PIECES OF MOVING EQUIPMENT WHICH ARE ISOLATED FROM THE STRUCTURE BY SPRING TYPE VIBRATION ISOLATORS SHALL BE SUSPENDED ON ISOLATION HANGERS TO A POINT 10 FEET AWAY. USE TYPE F HANGERS FOR SUSPENDED PIPING.
- c. DUCTWORK: FLEXIBLE CONNECTIONS SHALL BE INCORPORATED IN THE DUCTWORK ADJACENT TO ALL AIR MOVING UNITS AS PART OF THE SHEET METAL WORK. DUCTWORK SHALL BE SUSPENDED ON TYPE F HANGERS FOR A DISTANCE OF 20 FEET FROM THESE UNITS.
- d. VIBRATION ISOLATORS SHALL BE SELECTED AND INSTALLED FOR THE FOLLOWING EQUIPMENT:
- CONDENSING UNITS
- DOAS UNITS
- GENERATOR 4. VRV FAN COIL UNITS
- 5. VRV CEILING CASSETTE UNITS 6. VRV BRANCH CONNECTOR UNITS
- 7. WINE COOLER UNIT
- 8. KITCHEN HOOD MAKEUP AIR UNIT 9. KITCHEN HOOD EXHAUST FAN
- e. WHERE THE LISTED EQUIPMENT HAS INTERNAL SPRING ISOLATORS, NO FURTHER ISOLATION IS REQUIRED. WHERE THE LISTED EQUIPMENT HAS INTERNAL RUBBER, NEOPRENE, OR SIMILAR LOW DEFELCTION ISOLATORS, EXTERNAL VIBRATION ISOLATION SHALL BE PROVIDED AS SPECIFIED.



2.03 VARIABLE REFRIGERANT VOLUME SYSTEMS (VRV) [S][O/M]: A. GENERAL: THE VARIABLE CAPACITY, HEAT PUMP AIR CONDITIONING SYSTEM SHALL BE A DAIKIN VRV-IV SYSTEM, OPERATING WITH R-410A REFRIGERANT. THE SYSTEM SHALL BE A HEAT PUMP AND SHALL PROVIDE SIMULTANEOUS COOLING AND HEATING. THE VRV SYSTEM SHALL BE SIZED, DESIGNED, AND INSTALLED BY AN AUTHORIZED DEALER, WITH EXTENSIVE VRV INSTALLATION AND SERVICE TRAINING. THE MANDATORY CONTRACTOR SERVICE AND INSTALL TRAINING, AS DEFINED BY THE UNIT MANUFACTURER, SHALL BE PERFORMED BY THE MANUFACTURER. EACH SYSTEM SHALL CONFORM WITH THE APPLICABLE ARI STANDARD

B. CONDENSING UNIT:

- GENERAL: a. THE CONDENSING UNIT SHALL BE DESIGNED SPECIFICALLY FOR USE WITH VRV SERIES COMPONENTS.
- b. THE REFRIGERATION CIRCUIT OF THE CONDENSING UNIT SHALL CONSIST OF INVERTER SCROLL COMPRESSORS, MOTORS, FANS, CONDENSER COIL, ELECTRONIC EXPANSION VALVES, SOLENOID VALVES, 4-WAY VALVE, DISTRIBUTION HEADERS, CAPILLARIES, FILTERS, SHUT OFF VALVES, OIL SEPARATORS, SERVICE PORTS AND REFRIGERANT ACCUMULATOR.
- c. LIQUID AND SUCTION LINES MUST BE INDIVIDUALLY INSULATED BETWEEN THE CONDENSING AND INDOOR UNITS d. THE CONDENSING UNIT SHALL BE CAPABLE OF BEING WIRED AND PIPED WITH ACCESS FROM THE LEFT, RIGHT, REAR OR BOTTOM.
- e. THE CONNECTION RATIO OF INDOOR UNITS TO CONDENSING UNIT SHALL BE PERMITTED UP TO 200% OF NOMINAL CAPACITY.
- f. EACH CONDENSING SYSTEM SHALL BE ABLE TO SUPPORT THE CONNECTION OF UP TO 64 INDOOR UNITS DEPENDENT ON THE MODEL OF THE CONDENSING UNIT. g. THE SYSTEM WILL AUTOMATICALLY RESTART OPERATION AFTER A POWER FAILURE AND WILL NOT CAUSE ANY SETTINGS TO BE LOST, THUS
- ELIMINATING THE NEED FOR REPROGRAMMING. h. THE UNIT SHALL INCORPORATE AN AUTO-CHARGING FEATURE TO ENSURE OPTIMUM PERFORMANCE. MANUAL CHANGING SHOULD BE SUPPORT WITH A MINIMUM OF 2 HOURS OF SYSTEM OPERATION DATA TO ENSURE CORRECT OPERATION.
- THE CONDENSING UNIT SHALL BE MODULAR IN DESIGN AND SHOULD ALLOW FOR SIDE-BY-SIDE INSTALLATION WITH MINIMUM SPACING. THE FOLLOWING SAFETY DEVICES SHALL BE INCLUDED ON THE CONDENSING UNIT: HIGH PRESSURE SENSOR AND SWITCH, LOW PRESSURE SENSOR. CONTROL CIRCUIT FUSES, CRANKCASE HEATERS, FUSIBLE PLUG, OVERLOAD RELAY, INVERTER OVERLOAD PROTECTOR, THERMAL PROTECTORS FOR
- COMPRESSOR AND FAN MOTORS, OVER CURRENT PROTECTION FOR THE INVERTER AND ANTI-RECYCLING TIMERS. k. TO ENSURE THE LIQUID REFRIGERANT DOES NOT FLASH WHEN SUPPLYING TO THE VARIOUS INDOOR UNITS, THE CIRCUIT SHALL BE PROVIDED WITH A I. OIL RECOVERY CYCLE SHALL BE AUTOMATIC OCCURRING 2 HOURS AFTER START OF OPERATION AND THEN EVERY 8 HOURS OF OPERATION. EACH
- SYSTEM SHALL MAINTAIN CONTINUOUS HEATING DURING OIL RETURN OPERATION. m. THE CONDENSING UNIT SHALL BE CAPABLE OF HEATING OPERATION AT -13°F (-25°C) WET BULB AMBIENT TEMPERATURE WITHOUT ADDITIONAL LOW
- AMBIENT CONTROLS OR AN AUXILIARY HEAT SOURCE. n. THE MULTIPLE CONDENSER VRV SYSTEMS SHALL CONTINUE TO PROVIDE HEAT TO THE INDOOR UNITS IN HEATING OPERATION WHILE IN THE DEFROST
- o. THE CONDENSING UNIT SHALL BE COMPLETELY WEATHERPROOF AND CORROSION RESISTANT. THE UNIT SHALL BE CONSTRUCTED FROM RUST-
- PROOFED GALVANIZED STEEL PANELS COATED WITH A BAKED ENAMEL FINISH. p. THE CONDENSING UNIT SHALL CONSIST OF ONE OR MORE PROPELLER TYPE, DIRECT-DRIVE FAN MOTORS THAT HAVE MULTIPLE SPEED OPERATION VIA
- A DC (DIGITALLY COMMUTATING) INVERTER. q. THE CONDENSING UNIT SHALL BE FACTORY EQUIPPED WITH CONDENSER COIL GUARDS ON ALL SIDES.
- CONDENSING UNITS SHALL HAVE SINGLE POINT POWER CONNECTION, FACTORY INSTALLED DISCONNECT SWITCHES AND CONVENIENCE RECEPTACLES FOR CONNECTION BY ELECTRICAL CONTRACTOR.

a. THE FAN MOTOR SHALL HAVE INHERENT PROTECTION AND PERMANENTLY LUBRICATED BEARINGS AND BE MOUNTED. b. THE FAN MOTOR SHALL BE PROVIDED WITH A FAN GUARD TO PREVENT CONTACT WITH MOVING PARTS.

- a. THE INVERTER SCROLL COMPRESSORS SHALL BE VARIABLE SPEED (PVM INVERTER) CONTROLLED WHICH IS CAPABLE OF CHANGING THE SPEED TO FOLLOW THE VARIATIONS IN TOTAL COOLING AND HEATING LOAD AS DETERMINED BY THE SUCTION GAS PRESSURE AS MEASURED IN THE CONDENSING UNIT. NON-INVERTER-DRIVEN COMPRESSORS, WHICH MAY CAUSE STARTING MOTOR CURRENT TO EXCEED THE NOMINAL MOTOR CURRENT (RLA) AND REQUIRE LARGER WIRE SIZING, SHALL NOT BE ALLOWED.
- THE INVERTER DRIVEN COMPRESSORS IN THE CONDENSING UNIT SHALL BE OF HIGHLY EFFICIENT RELUCTANCE DC (DIGITALLY COMMUTATING), HERMETICALLY SEALED SCROLL "G-TYPE" OR "J-TYPE".
- NEODYMIUM MAGNETS SHALL BE ADOPTED IN THE ROTOR CONSTRUCTION TO YIELD A HIGHER TORQUE AND EFFICIENCY IN THE COMPRESSOR INSTEAD OF THE NORMAL FERRITE MAGNET TYPE.
- THE CAPACITY CONTROL RANGE SHALL BE AS LOW AS 3% TO 100%. THE COMPRESSOR'S MOTOR SHALL HAVE A COOLING SYSTEM USING DISCHARGE GAS, TO AVOID SUDDEN CHANGES IN TEMPERATURE RESULTING IN SIGNIFICANT STRESSES ON WINDING AND BEARINGS.
- EACH COMPRESSOR SHALL BE EQUIPPED WITH A CRANKCASE HEATER, HIGH PRESSURE SAFETY SWITCH, AND INTERNAL THERMAL OVERLOAD
- OIL SEPARATORS SHALL BE STANDARD WITH THE EQUIPMENT TOGETHER WITH AN INTELLIGENT OIL MANAGEMENT SYSTEM. THE COMPRESSOR SHALL BE SPRING MOUNTED TO AVOID THE TRANSMISSION OF VIBRATION ELIMINATING THE STANDARD NEED FOR SPRING
- IN THE EVENT OF COMPRESSOR FAILURE, THE REMAINING COMPRESSORS SHALL CONTINUE TO OPERATE AND PROVIDE HEATING OR COOLING AS REQUIRED AT A PROPORTIONALLY REDUCED CAPACITY. THE MICROPROCESSOR AND ASSOCIATED CONTROLS SHALL BE DESIGNED TO
- SPECIFICALLY ADDRESS THIS CONDITION FOR SINGLE MODULE AND MANIFOLDED SYSTEMS. IN THE CASE OF MULTIPLE CONDENSER MODULES. CONJOINED OPERATION HOURS OF THE COMPRESSORS SHALL BE BALANCED BY MEANS OF A DUTY CYCLING FUNCTION, ENSURING SEQUENTIAL STARTING OF EACH MODULE AT EACH START/STOP CYCLE, COMPLETION OF OIL RETURN, COMPLETION OF DEFROST OR EVERY 8 HOURS.
- C. INDOOR UNIT 1. THE INDOOR UNIT SHALL BE COMPLETELY FACTORY ASSEMBLED AND TESTED. INCLUDED IN THE UNIT IS FACTORY WIRING, PIPING, ELECTRONIC PROPORTIONAL EXPANSION VALVE, CONTROL CIRCUIT BOARD, FAN MOTOR THERMAL PROTECTOR, FLARE CONNECTIONS, CONDENSATE DRAIN PAN, CONDENSATE DRAIN PUMP, CONDENSATE SAFETY SHUTOFF AND ALARM, SELF-DIAGNOSTICS, AUTO-RESTART FUNCTION, 3-MINUTE FUSED TIME DELAY, AND TEST RUN SWITCH. THE UNIT SHALL BE EQUIPMENT WITH AUTOMATICALLY ADJUSTING EXTERNAL STATIC PRESSURE LOGIC THAT IS SELECTABLE DURING
- COMMISSIONING. THIS ADJUSTS THE AIRFLOW BASED ON THE INSTALLED EXTERNAL STATIC PRESSURE.
- 2. INDOOR UNIT AND REFRIGERANT PIPES WILL BE CHARGED WITH DEHYDRATED AIR PRIOR TO SHIPMENT FROM THE FACTORY. 3. BOTH REFRIGERANT LINES SHALL BE INSULATED FROM THE OUTDOOR UNIT.
- 4. THE INDOOR UNITS SHALL BE EQUIPPED WITH A CONDENSATE PAN AND CONDENSATE PUMP. THE CONDENSATE PUMP PROVIDES UP TO 18-3/8" OF LIFT FROM THE CENTER OF THE DRAIN OUTLET AND HAS A BUILT IN SAFETY SHUTOFF AND ALARM.
- 5. THE INDOOR UNITS SHALL BE EQUIPPED WITH A RETURN AIR THERMISTOR. THE INDOOR UNIT WILL BE SEPARATELY POWERED WITH 208V/1-PHASE/60HZ.
- 7. THE CABINET SHALL BE LOCATED INTO THE CEILING AND DUCTED TO THE SUPPLY AND RETURN OPENINGS. 8. THE CABINET SHALL BE CONSTRUCTED WITH SOUND ABSORBING FOAMED POLYSTYRENE AND POLYETHYLENE INSULATION
- 9. UNIT FAN:
- a. THE FAN SHALL BE DIRECT-DRIVE DC (ECM) TYPE FAN, STATICALLY AND DYNAMICALLY BALANCED IMPELLER WITH THREE FAN SPEEDS AVAILABLE. b. THE UNIT SHALL BE EQUIPMENT WITH AUTOMATICALLY ADJUSTING EXTERNAL STATIC PRESSURE LOGIC SELECTABLE DURING COMMISSIONING. c. THE FAN MOTOR SHALL OPERATE ON 208/230 VOLTS, 1 PHASE, 60 HERTZ WITH A MOTOR OUTPUT RANGE OF 0.12 TO 0.47 HP RESPECTIVELY.
- d. THE AIRFLOW RATE SHALL BE AVAILABLE IN THREE SETTINGS.
- e. THE FAN MOTOR SHALL BE THERMALLY PROTECTED. f. THE FAN MOTOR SHALL BE EQUIPPED AS STANDARD WITH ADJUSTABLE EXTERNAL STATIC PRESSURE (ESP) SETTINGS.
- a. COILS SHALL BE OF THE DIRECT EXPANSION TYPE CONSTRUCTED FROM COPPER TUBES EXPANDED INTO ALUMINUM FINS TO FORM A MECHANICAL
- b. THE COIL SHALL BE OF A WAFFLE LOUVER FIN AND HIGH HEAT EXCHANGE, RIFLED BORE TUBE DESIGN TO ENSURE HIGHLY EFFICIENT PERFORMANCE. c. THE COIL SHALL BE A 3 ROW CROSS FIN COPPER EVAPORATOR COIL WITH 15 FPI DESIGN COMPLETELY FACTORY TESTED.
- d. A CONDENSATE PAN SHALL BE LOCATED UNDER THE COIL.
- e. A CONDENSATE PUMP WITH AN 18-3/8" LIFT SHALL BE LOCATED BELOW THE COIL IN THE CONDENSATE PAN WITH A BUILT IN SAFETY ALARM. f. A THERMISTOR WILL BE LOCATED ON THE LIQUID AND GAS LINE. 11. ELECTRICAL:
- a. A SEPARATE POWER SUPPLY WILL BE REQUIRED OF 208 VOLTS, 1 PHASE, 60 HERTZ.
- b. TRANSMISSION (CONTROL) WIRING BETWEEN THE INDOOR AND OUTDOOR UNIT SHALL BE A MAXIMUM OF 3,280 FEET (TOTAL 6,560 FEET). c. TRANSMISSION (CONTROL) WIRING BETWEEN THE INDOOR UNIT AND REMOTE CONTROLLER SHALL BE A MAXIMUM DISTANCE OF 1,640 FEET.
- 12. CONTROLS: a. THE UNIT SHALL HAVE CONTROLS PROVIDED BY THE MANUFACTURER TO PERFORM INPUT FUNCTIONS NECESSARY TO OPERATE THE SYSTEM.
- b. THE UNIT SHALL BE COMPATIBLE WITH INTERFACING WITH A BMS SYSTEM VIA LONWORKS OR BACNET GATEWAYS. D. REFRIGERANT PIPING AND SPECIALTIES SHALL BE AS RECOMMENDED BY THE MANUFACTURER. E. UNIT REMOTE CONTROLLER SHALL BE CAPABLE OF CONTROLLING UP TO 16 INDOOR UNITS FROM A WALL-MOUNTED CONTROLLER. THE REMOTE CONTROLLER SHALL BE CAPABLE OF CONNECTING ANYWHERE ON THE COMMUNICATION BUS AND SHALL NOT REQUIRE BEING PHYSICALLY LOCATED IN THE SAME ROOM AS THE INDOOR UNIT(S) UNDER ITS CONTROL. THE REMOTE CONTROLLER SHALL CONTROL THE FOLLOWING GROUPED OPERATION FOR UP TO SIXTEEN INDOOR UNITS COLLECTIVELY: ON/OFF, OPERATION MODE (COOL, HEAT, AUTO, DRY, AND FAN), TEMPERATURE SETTING, FAN SPEED SETTING, AND AIRFLOW DIRECTION SETTING. THE REMOTE CONTROLLER SHALL HAVE THREE TIMER OPTIONS: ONE ON/OFF SETTING DEFINED FOR ONE DAY, REPEATED DAILY TIMER, AND AUTO-OFF TIMER FUNCTION. THE REMOTE CONTROLLER SHALL BE ABLE TO LIMIT THE SET TEMPERATURE RANGE FROM THE REMOTE CONTROLLER AND VIA A PC. THE ROOM TEMPERATURE SHALL BE SENSED AT EITHER THE REMOTE CONTROLLER OR THE INDOOR UNIT DEPENDENT ON THE INDOOR UNIT DIPSWITCH SETTING. THE

REMOTE CONTROLLER SHALL DISPLAY A FOUR-DIGIT ERROR CODE IN THE EVENT OF SYSTEM ABNORMALITY/ERROR. THE REMOTE CONTROLLER SHALL REQUIRE MANUAL ADDRESSING USING ROTARY DIAL SWITCH TO THE COMMUNICATION BUS. THE REMOTE CONTROLLER SHALL CONNECT USING TWO-WIRE, STRANDED,

- NON-POLAR CONTROL WIRE TO THE INDOOR UNIT. F. THE CENTRALIZED CONTROLLER SHALL BE CAPABLE OF CONTROLLING VIA A PC A MAXIMUM OF 50 INDOOR UNITS ACROSS MULTIPLE OUTDOOR UNITS. ANY OWNER PC ABLE TO CENNECT TO THE CENTRALIZED CONTROLLER. THE CENTRALIZED CONTROLLER SHALL BE APPROXIMATELY 5"X11" IN SIZE AND SHALL BE POWERED FROM A POWER SUPPLY UNIT. THE CENTRALIZED CONTROLLER SHALL SUPPORT OPERATION SUPERSEDING THAT OF THE REMOTE CONTROLLERS, SYSTEM CONFIGURATION, DAILY/WEEKLY/ANNUAL SCHEDULING, MONITORING OF OPERATION STATUS, ERROR EMAIL NOTIFICATION, ONLINE MAINTENANCE TOOL AND MALFUNCTION MONITORING. THE CENTRALIZED CONTROLLER SHALL HAVE BASIC OPERATION CONTROLS WHICH CAN BE APPLIED TO AN INDIVIDUAL INDOOR UNIT, A GROUP OF INDOOR UNITS (UP TO 50 INDOOR UNITS), OR ALL INDOOR UNITS (COLLECTIVE BATCH OPERATION). THIS BASIC CONTROL SET OF OPERATION CONTROLS FOR THE CENTRALIZED CONTROLLER SHALL INCLUDE ON/OFF, OPERATION MODE SELECTION (COOL, HEAT, AUTO, DRY, AND FAN), TEMPERATURE SETTING, FAN SPEED SETTING, AIRFLOW DIRECTION SETTING, ERROR EMAIL NOTIFICATION, AND ONLINE MAINTENANCE. THE CENTRALIZED CONTROLLER SHALL BE ABLE TO ENABLE OR DISABLE OPERATION OF LOCAL REMOTE CONTROLLERS VIA THE PC. THE CENTRALIZED CONTROLLER SHALL ALLOW THE USER TO DEFINE DAILY, WEEKLY, AND ANNUAL SCHEDULES WITH OPERATIONS CONSISTING OF ON/OFF, MODE SELECTION, TEMPERATURE SETTING, AND PERMIT/PROHIBIT OF
- REMOTE CONTROLLERS G. CONTROLS FOR SAFE AUTOMATIC CONTROLLED OPERATION OF EACH SYSTEM SHALL BE PROVIDED. PROVIDE ALL NECESSARY ACCESSORIES AND PROGRAMMING TO TIE SYSTEM INTO CONTROLS SYSTEM SPECIFIED HEREINBEFORE. OPERATION SHALL BE AS SPECIFIED IN DIVISION 23. H. REFRIGERANT: EACH SYSTEM SHALL BE CLEANED, PURGED AND COMPLETELY CHARGED WITH REFRIGERANT AND OIL, AND GUARANTEED TO BE FREE OF
- I. PERFORMANCE TEST: EACH SYSTEM SHALL BE TESTED AND CHECKED OUT FOR SAFE CONTROLLED OPERATION. ONE WEEK BEFORE FINAL INSPECTION, A LETTER IN THREE COPIES FROM THE CERTIFIED REPRESENTATIVE SHALL BE SUBMITTED TO THE ENGINEER CERTIFYING THAT EACH SYSTEM IS PERFORMING SAFELY AND SATISFACTORILY.
- J. WARRANTY: MOTOR-COMPRESSOR SHALL BE GUARANTEED FOR FIVE (5) YEARS.



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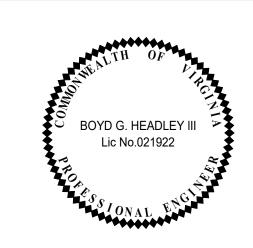
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FOR



JOB NUMBER 22011 DATE 08/30/24 DRAWN BY Author APPROVED BY Approver © brwarchitects,

CONSTRUCTION

MECHANICAL **SPECIFICATIONS**

AIR DISTRIBUTION

3.01 DUCTWORK:

- A. MATERIALS: 1. SHEET METAL DUCTS: TRADEMARKED GALVANIZED STEEL, LOCK FORMING QUALITY, HAVING ZINC COATING OF 0.90 OUNCES PER SQUARE FOOT FOR
- EACH SIDE (G90, ASTM A 525 AND A 527). 2. FASTENERS: USE RIVETS AND BOLTS THROUGHOUT: SHEET METAL SCREWS MAY BE USED ON LOW PRESSURE DUCTS.
- 3. SEALANTS: WATER AND FIRE RESISTANT WHEN DRY, COMPATIBLE WITH MATING MATERIALS. WHERE SEALANTS ARE USED ON EXPOSED DUCTWORK, COMPOSITION SHALL BE DESIGNED TO PREVENT BLEED-THROUGH OF FINISH PAINT, OR SEALANT SHALL BE PRE-PAINTED WITH A COATING IMPERVIOUS TO BLEED-THROUGH. ALL SEAMS AND JOINTS SHALL BE SEALED.
- 4. ALL DUCT AND ACCESSORY MATERIALS SHALL HAVE A COMPOSITE FLAME SPREAD RATING NOT EXCEEDING 25, AND A SMOKE DEVELOPED RATING NOT EXCEEDING 50 AS TESTED UNDER PROCEDURE ASTM E-84-75, NFPA 255 AND UL 723. DUCT COVERINGS AND LININGS SHALL NOT FLAME, GLOW, SMOLDER OR SMOKE WHEN TESTED IN ACCORDANCE WITH ASTM C411. B. CONSTRUCTION:
- 1. LOW PRESSURE DUCTWORK (ALL DUCTWORK LOCATED DOWNSTREAM OF VAV BOXES, EXHAUST DUCTS, AND TRANSFER DUCTS) SHALL BE RECTANGULAR. TEES AND LATERALS SHALL BE LOW LOSS TYPE. DUCTS SHALL BE CONSTRUCTED TO COMPLY WITH SMACNA DUCT STANDARDS: PRESSURE CLASS 2" W.G.; SEAL CLASS A; LEAKAGE CLASS 12.

3.02 FLEXIBLE DUCTS [S]:

A. INSULATED, FLEXIBLE DUCT SHALL BE UL 181, CLASS 1, 2-PLY VINYL FILM SUPPORTED BY HELICALLY WOUND, SPRING-STEEL WIRE; FIBROUS-GLASS INSULATION; POLYETHYLENE OR ALUMINIZED VAPOR-BARRIER FILM. INSULATION SHALL BE 1" THICK FIBERGLASS WITH MINIMUM 4 MIL SEAMLESS VAPOR BARRIER JACKET. FLEX DUCT SHALL BE RATED FOR 10-INCH WG POSITIVE, 1.0-INCH WG NEGATIVE PRESSURE, AND VELOCITY OF 4,000 FPM.

3.03 DUCTWORK INSULATION [S]:

- A. EXPOSED RECTANGULAR DUCTS: 1-1/2" THICK RIGID FIBROUS GLASS INSULATION, 3.0 LB. DENSITY, 0.24 BTUIN./SQ.FT./°F/HR. MAXIMUM "K" VALUE AT 75°F, WITH FACTORY APPLIED REINFORCED ALUMINUM FOIL VAPOR BARRIER. INSULATION TO BE EXPOSED IN PUBLIC, FINISHED AREAS SHALL HAVE FACTORY APPLIED REINFORCED WHITE KRAFT ALL SERVICE JACKET FOR PAINTING.
- B. ROUND DUCTS, FLAT OVAL DUCTS AND CONCEALED RECTANGULAR DUCTS: 1-1/2" THICK FLEXIBLE FIBROUS GLASS INSULATION, 1.0 LB. DENSITY, 0.27 BTUIN./SQ.FT./°F/HR. MAXIMUM "K" VALUE AT 75°F, WITH FACTORY APPLIED REINFORCED ALUMINUM FOIL VAPOR BARRIER.
- C. FLEXIBLE DUCT INSULATION SHALL BE PROVIDED WITH A MINIMUM 2" FACING FLAP OVERLAPPING ADJACENT AND CONNECTING INSULATION. SEAMS SHALL BE STAPLED APPROXIMATELY 6" ON CENTER WITH 1/2" OUTWARD CLINCHING STAPLES. WHERE RECTANGULAR DUCTS ARE 24" IN WIDTH OR GREATER. INSULATION SHALL BE SECURED TO THE BOTTOM OF THE DUCT WITH MECHANICAL FASTENERS TO PREVENT SAGGING. ALL INSULATION JOINTS SHALL BE TIGHTLY BUTTED. ALL JOINTS, VOIDS AND PUNCTURES IN FACING SHALL BE SEALED VAPOR TIGHT WITH MASTIC.
- D. INTERNAL: THE LINING SHALL BE APPLIED TO CUT-TO-SIZE PIECES FASTENED TO THE ENTIRE INTERIOR OF THE DUCT WITH MASTIC, STICK CLIPS AND SPEED WASHERS. EDGES AND JOINTS SHALL BE COATED WITH FIRE RESISTANT MASTIC. EXTERNAL DUCT INSULATION IS NOT REQUIRED ON DUCTS WITH INTERNAL LINING UNLESS NOTED OTHERWISE.
- E. WHERE DUCT MOUNTED HEATING COILS ARE LOCATED DOWNSTREAM FROM COOLING COILS AND AT VARIABLE AIR VOLUME TERMINAL UNITS THE COIL
- SHALL BE PROVIDED WITH VAPOR-SEALED EXTERNAL DUCT INSULATION ON SIDES, TOP AND BOTTOM. F. WHERE DUCTWORK IS INDICATED TO HAVE INTERNAL ACOUSTIC LINING, SHEET METAL DROPS TO DIFFUSER AND REGISTER NECKS SHALL ALSO BE LINED.
- G. DAMAGED INSULATION: ALL EXISTING THERMAL COVERINGS THAT ARE REMOVED OR DAMAGED DURING CONSTRUCTION SHALL BE REPLACED OR REPAIRED TO NOT LESS THAN ORIGINAL CONDITION. REPAIRED SECTIONS SHALL PROVIDE EQUAL OR BETTER THERMAL PERFORMANCE AND VAPOR PROTECTION.
- H. PATCHING: WHERE EXISTING CONTROL, MONITORING OR OTHER PENETRATING DEVICES ARE REMOVED FROM DUCTWORK OR PIPING, THE INSULATION

3.04 DIFFUSERS, REGISTERS AND GRILLES [S]:

A. GENERAL:

1. ALL DEVICES SHALL BE COMMERCIAL GRADE AND SHALL BE CONSTRUCTED OF ALUMINUM.

SHALL BE PATCHED TO MATCH THICKNESS, TYPE AND FINISH OF EXISTING INSULATION.

- 2. MANUFACTURER SHALL CERTIFY CATALOGED PERFORMANCE AND ENSURE CORRECT APPLICATION OF EACH AIR DEVICE TO PROVIDE AIR PATTERN, VELOCITY, PRESSURE DROP AND SOUND CHARACTERISTICS NC SUITABLE FOR SPACE INSTALLED. SHOP DRAWINGS SHALL INCLUDE AIR QUANTITY, SIZE, PRESSURE DROP, THROW FT, AND SOUND LEVEL NC.
- 3. ALL DEVICES LOCATED IN CEILINGS SHALL HAVE WHITE BAKED ENAMEL FINISH. DEVICES AT OTHER LOCATIONS SHALL HAVE PRIME FINISH SUITABLE FOR PAINTING OR ANODIZED ALUMINUM UNLESS NOTED OTHERWISE.
- 4. MAXIMUM AIR OUTLET NOISE LEVEL SHALL NOT EXCEED NC35.
- 5. PROVIDE SPONGE RUBBER SEAL AROUND EDGES OF ALL SUPPLY REGISTERS AND GRILLES. B. SQUARE CEILING DIFFUSERS FOR LAY IN SERVICE SHALL BE ALUMINUM, REMOVABLE CORE, LOUVER FACE, SQUARE LAY-IN MOUNTED TYPE WITH 1/4"
- HORIZONTAL LEGS ON ALL SIDES OF INNER CORE, COMPLETE WITH VOLUME CONTROL UNIT. C. RETURN AND EXHAUST REGISTERS SHALL BE ALUMINUM, UNLESS NOTED OTHERWISE, COMPLETE WITH FIXED HORIZONTAL OR LONGITUDINAL DEFLECTING VANES AT NOT MORE THAN 1/2 INCH CENTERS. PROVIDE 1 INCH MARGIN FRAME WITH COUNTERSUNK SCREW HOLES. DAMPER SHALL BE OPPOSED BLADE
- FACE OPERATED TYPE WITH REMOVABLE KEY. D. GRILLES SHALL BE AS SPECIFIED FOR REGISTERS EXCEPT WITHOUT OPPOSED BLADE DAMPERS.

3.05 DUCT ACCESS DOORS [S]:

A. DOORS FOR LOW PRESSURE RECTANGULAR DUCTWORK SHALL BE GALVANIZED STEEL, 20 GAUGE RIGID TYPE, 12" X 16" MINIMUM SIZE UNLESS NOTED OTHERWISE, EXCEPT WHERE SIZE OF DUCT WILL NOT ACCOMMODATE THIS SIZE, THEY SHALL BE AS LARGE AS POSSIBLE. DOOR SHALL HAVE GASKET, TWO HINGES, AND TWO COMPRESSION LATCHES WITH OUTSIDE AND INSIDE HANDLES. PROVIDE INSULATED DOORS WHERE INSTALLED IN INSULATED

DUCTWORK. B. DOORS FOR ROUND OR FLAT-OVAL LOW. MEDIUM OR HIGH PRESSURE DUCTWORK SHALL BE A COMPLETE FACTORY MOUNTED. DUCT SECTION/ACCESS DOOR ASSEMBLY CONSTRUCTED OF MINIMUM 20 GAUGE GALVANIZED STEEL. ACCESS DOOR SHALL MATCH WITHIN TWO INCHES THE DIAMETER OF DUCT AND SHALL BE COMPLETE WITH GASKET, INSULATED DOOR WITH HANDLE, COMPRESSION CLIPS AND CHAIN RETAINER.

CLEANING, BALANCING, AND TESTING

GENERAL

A. THE TAB CONTRACTOR SHALL PROVIDE A COMPLETE MEASUREMENT OF AIR FLOW FOR ALL SYSTEMS.

A. DUCTWORK:

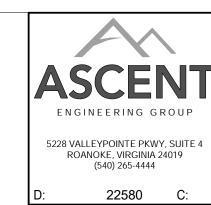
1. LOW VELOCITY DUCTWORK: DUCTS, PLENUMS AND CASINGS SHALL BE TESTED AND MADE SUBSTANTIALLY AIR TIGHT AT STATIC PRESSURE INDICATED FOR THE SYSTEM. SUBSTANTIALLY AIR TIGHT SHALL BE CONSTRUED TO MEAN THAT NO AIR LEAKAGE IS NOTICEABLE THROUGH THE SENSE OF FEELING OR HEARING.

4.03 ADJUSTING AND BALANCING

- A. EQUIPMENT: BEFORE ATTEMPTING TO ADJUST AND BALANCE THE AIR SYSTEMS, THE CONTRACTOR SHALL VERIFY THAT THE FOLLOWING ITEMS HAVE BEEN
- COMPLETED AND ARE CORRECT. 1. ELECTRIC CURRENT FLOW IN EACH PHASE OF MOTORS AND ELECTRIC HEATING ELEMENTS.
- 2. MOTOR PROTECTIVE DEVICES ARE SIZED TO PROPERLY PROTECT INSTALLED MOTORS. 3. THERMOSTATS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRING SETTING OR ADJUSTMENT SHALL BE SET AS INDICATED.
- B. COMPENSATING FOR DIVERSITY: WHEN THE TOTAL AIRFLOW OF ALL TERMINAL UNITS IS MORE THAN THE INDICATED AIRFLOW OF THE FAN, PLACE A SELECTED NUMBER OF TERMINAL UNITS AT A MINIMUM SET-POINT AIRFLOW WITH THE REMAINDER AT MAXIMUM-AIRFLOW CONDITION UNTIL THE TOTAL AIRFLOW OF THE TERMINAL UNITS EQUALS THE INDICATED AIRFLOW OF THE FAN. SELECT THE REDUCED-AIRFLOW TERMINAL UNITS SO THEY ARE DISTRIBUTED EVENLY AMONG THE BRANCH DUCTS.
- C. PRESSURE-INDEPENDENT, VARIABLE-AIR-VOLUME SYSTEMS: AFTER THE FAN SYSTEMS HAVE BEEN ADJUSTED, ADJUST THE VARIABLE-AIR-VOLUME SYSTEMS AS FOLLOWS:
- 1. SET OUTDOOR-AIR DAMPERS AT MINIMUM, AND SET RETURN- AND EXHAUST-AIR DAMPERS AT A POSITION THAT SIMULATES FULL-COOLING LOAD. 2. SELECT THE TERMINAL UNIT THAT IS MOST CRITICAL TO THE SUPPLY-FAN AIRFLOW AND STATIC PRESSURE. MEASURE STATIC PRESSURE. ADJUST SYSTEM STATIC PRESSURE SO THE ENTERING STATIC PRESSURE FOR THE CRITICAL TERMINAL UNIT IS NOT LESS THAN THE SUM OF THE TERMINAL-UNIT MANUFACTURER'S RECOMMENDED MINIMUM INLET STATIC PRESSURE PLUS THE STATIC PRESSURE NEEDED TO OVERCOME TERMINAL-UNIT DISCHARGE
- 3. MEASURE TOTAL SYSTEM AIRFLOW. ADJUST TO WITHIN INDICATED AIRFLOW.
- 4. SET TERMINAL UNITS AT MAXIMUM AIRFLOW AND ADJUST CONTROLLER OR REGULATOR TO DELIVER THE DESIGNED MAXIMUM AIRFLOW. USE TERMINAL-UNIT MANUFACTURER'S WRITTEN INSTRUCTIONS TO MAKE THIS ADJUSTMENT. WHEN TOTAL AIRFLOW IS CORRECT, BALANCE THE AIR OUTLETS DOWNSTREAM FROM TERMINAL UNITS THE SAME AS DESCRIBED FOR CONSTANT-VOLUME AIR SYSTEMS.
- 5. SET TERMINAL UNITS AT MINIMUM AIRFLOW AND ADJUST CONTROLLER OR REGULATOR TO DELIVER THE DESIGNED MINIMUM AIRFLOW. CHECK AIR OUTLETS FOR A PROPORTIONAL REDUCTION IN AIRFLOW THE SAME AS DESCRIBED FOR CONSTANT-VOLUME AIR SYSTEMS.
- a. IF AIR OUTLETS ARE OUT OF BALANCE AT MINIMUM AIRFLOW, REPORT THE CONDITION BUT LEAVE OUTLETS BALANCED FOR MAXIMUM AIRFLOW.
- 6. REMEASURE THE RETURN AIRFLOW TO THE FAN WHILE OPERATING AT MAXIMUM RETURN AIRFLOW AND MINIMUM OUTDOOR AIRFLOW.
- a. ADJUST THE FAN AND BALANCE THE RETURN-AIR DUCTS AND INLETS THE SAME AS DESCRIBED FOR CONSTANT-VOLUME AIR SYSTEMS. 7. MEASURE STATIC PRESSURE AT THE MOST CRITICAL TERMINAL UNIT AND ADJUST THE STATIC-PRESSURE CONTROLLER AT THE MAIN SUPPLY-AIR
- SENSING STATION TO ENSURE THAT ADEQUATE STATIC PRESSURE IS MAINTAINED AT THE MOST CRITICAL UNIT. 8. RECORD FINAL FAN-PERFORMANCE DATA.

4.04 BALANCE AND PERFORMANCE DATA REPORT:

- A. GENERAL: EACH HEATING, VENTILATING AND AIR CONDITIONING SYSTEM SHALL BE OPERATED AND TESTED CONTINUOUSLY FOR AT LEAST TWO CONSECUTIVE DAYS TO VERIFY THAT THE SYSTEM IS OPERATING SATISFACTORILY AND SAFELY AND THAT ALL EQUIPMENT IS PRODUCING THE REQUIRED CAPACITY. TO BE SUCCESSFUL, THIS TEST MUST BE CONDUCTED WITH ALL CONTROLS IN AUTOMATIC POSITION AND ALL LIGHTS ON OR OFF TO SIMULATE DAY TIME OR NIGHT TIME USE OF THE BUILDING. SUBMIT TWO TYPEWRITTEN COPIES OF REPORTS COVERING AIR SYSTEM BALANCE AND PERFORMANCE. REPORTS MUST BE RECEIVED BY THE ARCHITECT-ENGINEER AT LEAST ONE WEEK PRIOR TO THE CONTRACTOR'S REQUEST FOR A SUBSTANTIAL COMPLETION INSPECTION. REPORTS THAT CONTAIN DEFICIENCIES RELATED TO INCOMPLETE OR IMPROPER SYSTEM INSTALLATION WILL BE REJECTED BY THE ENGINEER WITHOUT FURTHER REVIEW.
- B. CALIBRATION DATA: THE REPORT SHALL INCLUDE A LIST OF ALL INSTRUMENTATION USED AND THE DATE OF THE MOST RECENT CALIBRATION FOR EACH INSTRUMENT.
- C. BALANCE DATA: THE FOLLOWING BALANCE DATA SHALL BE PROVIDED. DESIGN AND ACTUAL AIR FLOWS SHALL BE PROVIDED IN TABULAR FORM. 1. ALL AIR HANDLING EQUIPMENT USED FOR HEATING, COOLING AND VENTILATING:
 - a. SYSTEM NOMENCLATURE AND IDENTIFICATION. b. NAMEPLATE INFORMATION: MANUFACTURER, MODEL AND SERIAL NUMBER, HORSEPOWER, RPM, VOLTAGE, PHASE, MAXIMUM AMPERAGE.
 - c. FAN SPEED.
 - d. STATIC PRESSURE PROFILE READING BETWEEN ALL COMPONENTS AND TOTAL EXTERNAL STATIC PRESSURE e. OUTSIDE, RETURN, AND SUPPLY AIR QUANTITIES.
 - ACTUAL RUNNING MOTOR AMPERAGE.
 - g. COOLING AND HEATING AIRFLOW.
- h. MINIMUM AIRFLOW. 2. AIR OUTLET AND INLET:
- ROOM IDENTIFICATION.
- b. MANUFACTURER.
- c. SIZE. d. FREE AREA FACTOR.
- e. AIR QUANTITY.
- f. VELOCITY. FANS
- a. SYSTEM NOMENCLATURE AND IDENTIFICATION.
- b. NAMEPLATE INFORMATION: MANUFACTURER, MODEL AND SERIAL NUMBER, HORSEPOWER, RPM, VOLTAGE, PHASE, MAXIMUM AMPERAGE.
- c. FAN SPEED.
- d. TOTAL EXTERNAL STATIC PRESSURE.
- e. AIR QUANTITY.
- ACTUAL RUNNING MOTOR AMPERAGE. D. PERFORMANCE DATA: THE FOLLOWING INFORMATION SHALL BE RECORDED TWICE EACH DAY AND TWICE EACH NIGHT DURING THE PERFORMANCE TEST. READING SHALL BE TAKEN FOR EACH ITEM AT A DIFFERENT TIME EACH SUCCEEDING DAY AT LEAST TWO HOURS LATER THAN THE TIME THE READING
- WAS TAKEN ON THE PRECEDING DAY.
- 1. ALL AIR HANDLING AND AIR CONDITIONING EQUIPMENT USED FOR HEATING, COOLING AND VENTILATING: a. SYSTEM NOMENCLATURE AND IDENTIFICATION
- b. DRY BULB AND WET BULB TEMPERATURES ENTERING AND LEAVING ALL COILS TEST ALL ELECTRIC HEATING COILS FOR OPERATION OF LOW AIRFLOW INTERLOCK
- 2. ELECTRIC HEATING COILS:
- a. SYSTEM NOMENCLATURE AND IDENTIFICATION.
- b. NAMEPLATE INFORMATION: MANUFACTURER, MODEL AND SERIAL NUMBER.
- c. DRY BULB TEMPERATURES ENTERING AND LEAVING COILS.
- TEMPERATURE: a. EACH ROOM IN BUILDING.
- E. HEATED AND CHILLED WATER LINES: PIPE 4" AND SMALLER SHALL BE TYPE L HARD DRAWN COPPER TUBING OR STANDARD WEIGHT SCHEDULE 40 BLACK STEEL PIPE OVER 4" SHALL BE STANDARD WEIGHT BLACK STEEL. FITTINGS FOR COPPER PIPE SHALL BE ASME B16.18 OR ASME B16.22 SOLDER TYPE. VIEGA PROPRESS (NO SUBSTITUTE) MAY BE USED FOR PIPE 2" AND SMALLER. FITTINGS FOR STEEL PIPE SHALL BE STANDARD WEIGHT, THREADED (OR GROOVED), BLACK, MALLEABLE IN ACCORDANCE WITH ASME B16.3 OR CAST IRON IN ACCORDANCE WITH ASME B16.4 EXCEPT FITTINGS OVER 2" SIZE MAY BE WELDING TYPE. FLANGES SHALL BE WELD NECK TYPE. ALL FITTINGS SHALL BE SUITABLE FOR 125 PSI WATER SERVICE.



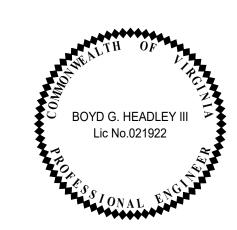


THE HAYNES

2221 CRYSTAL SPRING AVE SW **ROANOKE. VA 24014**

FOR

VAN THIEL



JOB NUM	IBER	22011
DATE		08/30/24
DRAWN E	3Y	Author
APPROVE	ED BY	Approvei
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CONSTRUCTION SET

REVISIONS

MECHANICAL **SPECIFICATIONS**





- ALL FLEX DUCT RUNOUTS TO DIFFUSERS SHALL BE SAME
- FLEXIBLE DUCTWORK SHALL BE SUPPORTED AS SPECIFIED AND CONNECTED TO DIFFUSER ACCORDING TO THE TURNS IN FLEXIBLE DUCTWORK TO MAKE REQUIRED
- DUCTWORK IS PROHIBITED ON RETURN AND EXHAUST. WHERE DUCT SIZES TO AIR HANDLING UNITS ARE NOT INDICATED, DUCT SHALL BE FULL SIZE OF UNIT OPENING. PROVIDE MANUAL VOLUME DAMPERS AT BRANCH
- WITHIN 3' OF THE CONNECTION. ALL PENETRATIONS THROUGH WALLS SHALL BE SEALED. ALL DUCT PENETRATIONS THROUGH FLOORS SHALL BE
- ALL EXPOSED DUCT SHALL BE SUITABLE FOR PAINTING. ALL OPEN-END DUCTS SHALL BE COVERED WITH 1/2" WIRE
- HEATING AND COOLING REQUIREMENTS.
- 2. OUTSIDE AIRFLOW TO LOBBY CASETTES SHALL BE
- 3. COORDINATE ALL FAN COIL UNITS AND CEILING AIR
- DEVICES WITH ARCHITECTURAL CEILING PLANS. 4. PROVIDE STRICT COORDINATION BETWEEN DUCTWORK AND PIPING IN ALL AREAS.
- OF GRILLE NECK. GRILLE SHALL BE FILTER TYPE SUITABLE FOR 2 STANDARD 20"X14"X1" FILTERS. PLENUM BOX SHALL BE SUFFICIENT HEIGHT FOR
- KITCHEN HOOD, EXHAUST DUCTWORK, AND CONNECTION TO HOOD OUTLET BY KITCHEN
- HOOD PLENUM COLLARS BY MECHANICAL
- BALANCE HOOD SUPPLY AIR DAMPERS FOR 3190 CFM EQUALLY DISTRIBUTED TO EACH DAMPER.
- (5) HORIZONTAL FIRE DAMPER THROUGH SECOND FLOOR LOCATED AT DUCT PENETRATION OUT OF RATED
- (6) CONNECT DUCT TO WALL LOUVERS. SEE ARCH DRAWINGS. PROVIDE 2" INSULATION ON COOLER CONDENSING SECTION DUCTWORK. PROVBIDE 1" INSULATION ON COOLER SUPPLY AMD RETRUN DUCTWORK.
- (7) 14x8 CEILING GRILLE IN 8 FOOT CEILING IN WINE CLOSET, SUPPLY AND RETURN.
- 10" DIAMTER RIGID DUCT WITH ELBOWS ROTATED DOWN TO PASS UNDER OTHER DUCTWORK. TRANSITION TO 14X8 AND EXTEND TO RETURN GRILLE.
- 9 PROVIDE STRICT COORDINATION BETWEEN DUCTWORK AND PIPING IN THIS AREA.
- (10) PLENUM FULL SIZE OF SUPPLY REGISTER.
- COLLAR AND OFFSET DUCT FROM ABOVE. PROVIDE CLEANOUT ACCESS DOOR. PROVIDE 2-HOUR UL LISTED DUCT WRAP ON ALL SIDES.



RESTAURANT

TERRACE

L102

VIN BAR

TERRACE

L101

100A

RESTAURANT

114

10x8 👀

 $\sqrt{14x40-E(1)}$

ELECTRICAL

ROOM

110

106

114

RESTROOMS

ROOM STAIR -

EMPLOYEE

-RESTROOM

112

KITCHEN

(|i|X|i||||22x8||

KITCHEN 107

DINING

104

MECHANICAL DUCTWORK FLOOR PLAN - FIRST FLOOR

RECEIVING

STORAGE

108A

---- DN

TERRACE

M1.1 SCALE: 1/8" = 1'-0"

- SIZE AS DIFFUSER ROUND NECK ADAPTER. FLEXIBLE DUCTWORK SHALL NOT EXCEED 5 FT. IN LENGTH.
- DETAILS. CONTRACTOR SHALL USE MINIMUM NUMBER OF CONNECTION. ALL RETURN AND EXHAUST DUCT SHALL BE HARD DUCTED TO GRILLES AND REGISTERS. FLEXIBLE
- CONNECTIONS TO ALL LOW-PRESSURE SUPPLY, RETURN, AND EXHAUST DUCTWORK. PROVIDE A MANUAL VOLUME DAMPER DOWNSTREAM OF THE FINAL BRANCH TAKEOFF. ALL MANUAL VOLUME DAMPERS SHALL BE INSTALLED
- PROTECTED TO PREVENT THE PASSAGE OF FLAME AND PRODUCTS OF COMBUSTION.
- ALL ROUND OR FLAT OVAL DUCT INDICATED TO BE LINED SHALL BE DOUBLE WALL.
- 0. REFER TO DIVISION 23 SPECIFICATIONS FOR TEMPORARY
- ALL OUTSIDE AIRFLOW TO EACH SUITE SHALL BE BALANCED TO 30 CFM.
- BALANCED TO 60 CFM.

SHEET NOTES

- 1 PROVIDE PLENUM BOX OFF TOP OF GRILLE FULL SIZE OUTSIDE AIR SUPPLY DUCT AND RETURN DUCT FROM UNIT SHALL TAP INTO THE SIDE OF THE PLENUM BOX. RETURN AND OUTSIDE AIR TAPS AND CAPPED AT TOP.
- (3) ALL HOOD SUPPLY DUCTWORK AND CONNECTION TO

- 26X26 HOOD EXHAUST PLENUM. CONNECT TO HOOD

THE HAYNES

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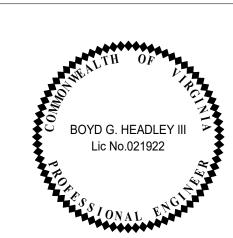
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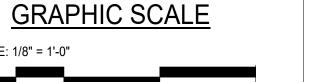
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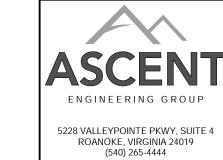
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MECHANICAL 1ST FLOOR PLAN -DUCTWORK



8' 4' 0 8'



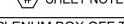


GENERAL DUCTWORK NOTES

- ALL FLEX DUCT RUNOUTS TO DIFFUSERS SHALL BE SAME SIZE AS DIFFUSER ROUND NECK ADAPTER. FLEXIBLE DUCTWORK SHALL NOT EXCEED 5 FT. IN LENGTH. FLEXIBLE DUCTWORK SHALL BE SUPPORTED AS SPECIFIED
- AND CONNECTED TO DIFFUSER ACCORDING TO THE DETAILS. CONTRACTOR SHALL USE MINIMUM NUMBER OF TURNS IN FLEXIBLE DUCTWORK TO MAKE REQUIRED CONNECTION. ALL RETURN AND EXHAUST DUCT SHALL BE HARD DUCTED TO GRILLES AND REGISTERS. FLEXIBLE DUCTWORK IS PROHIBITED ON RETURN AND EXHAUST. WHERE DUCT SIZES TO AIR HANDLING UNITS ARE NOT
- INDICATED, DUCT SHALL BE FULL SIZE OF UNIT OPENING. PROVIDE MANUAL VOLUME DAMPERS AT BRANCH CONNECTIONS TO ALL LOW-PRESSURE SUPPLY, RETURN, AND EXHAUST DUCTWORK. PROVIDE A MANUAL VOLUME DAMPER DOWNSTREAM OF THE FINAL BRANCH TAKEOFF. ALL MANUAL VOLUME DAMPERS SHALL BE INSTALLED WITHIN 3' OF THE CONNECTION.
- ALL PENETRATIONS THROUGH WALLS SHALL BE SEALED. ALL DUCT PENETRATIONS THROUGH FLOORS SHALL BE PROTECTED TO PREVENT THE PASSAGE OF FLAME AND PRODUCTS OF COMBUSTION.
- ALL ROUND OR FLAT OVAL DUCT INDICATED TO BE LINED SHALL BE DOUBLE WALL.
- ALL EXPOSED DUCT SHALL BE SUITABLE FOR PAINTING. ALL OPEN-END DUCTS SHALL BE COVERED WITH 1/2" WIRE 0. REFER TO DIVISION 23 SPECIFICATIONS FOR TEMPORARY
- HEATING AND COOLING REQUIREMENTS. 1. ALL OUTSIDE AIRFLOW TO EACH SUITE SHALL BE BALANCED
- 2. OUTSIDE AIRFLOW TO LOBBY CASETTES SHALL BE
- BALANCED TO 60 CFM. 3. COORDINATE ALL FAN COIL UNITS AND CEILING AIR
- DEVICES WITH ARCHITECTURAL CEILING PLANS. 4. PROVIDE STRICT COORDINATION BETWEEN DUCTWORK AND PIPING IN ALL AREAS.

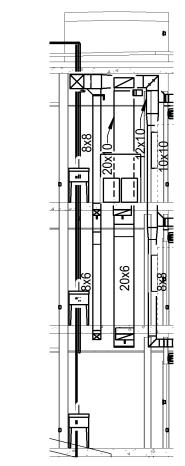
SHEET NOTES

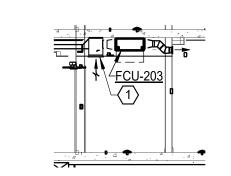
- TYPE SUITABLE FOR STANDARD 20"X14"X1" THE PLENUM BOX. PLENUM BOX SHALL BE
- MOTOR OPERATED DAMPER INSIDE DRYER PLENUM, OVER FULL PORTION OF EXPOSED FACE OF LOUVER. INTERLOCK WITH BOTH
- INSULATED DRYER PLENUM AROUND BOTH
- DRYERS. SEE STACKED DRYER PLENUM DETAIL.



- PROVIDE PLENUM BOX OFF TOP OF GRILLE FULL SIZE OF GRILLE NECK. GRILLE SHALL BE FILTER FILTER. OUTSIDE AIR SUPPLY DUCT AND RETURN DUCT FROM UNIT SHALL TAP INTO THE SIDE OF SUFFICIENT HEIGHT FOR RETURN AND OUTSIDE AIR TAPS AND CAPPED AT TOP.

- DRYER EXHAUST DUCTS ABOVE CEILING, FULL SIZE OF DRYER OUTLET.
- 5 DRYER EXHAUST TO OUTSIDE. TURN DOWN 45 DEGREES AND TURN AWAY 45 DEGREES AWAY FROM INTAKE LOUVER.





SOUTH

STAIR

200b≎

SUITE 1

201

SUITE 2

202

SUITE 4 204

SUITE 5

205

3 TYPICAL SUITE FAN COIL UNIT SECTION 1/8" = 1'-0"

- INTAKE LOUVER - SEE ARCH DRAWINGS

MECHANICAL DUCTWORK FLOOR PLAN - SECOND FLOOR

HOUSEKEEPING

211

SUITE 10

210

SUITE 9

209

SUITE 8

208

SUITE 7 · 207

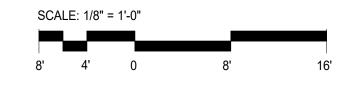
SUITE 6

206

M1.2 SCALE: 1/8" = 1'-0"

212

GRAPHIC SCALE





THE HAYNES

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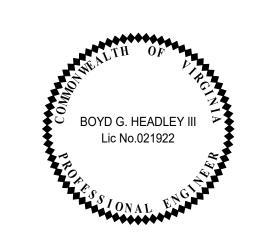
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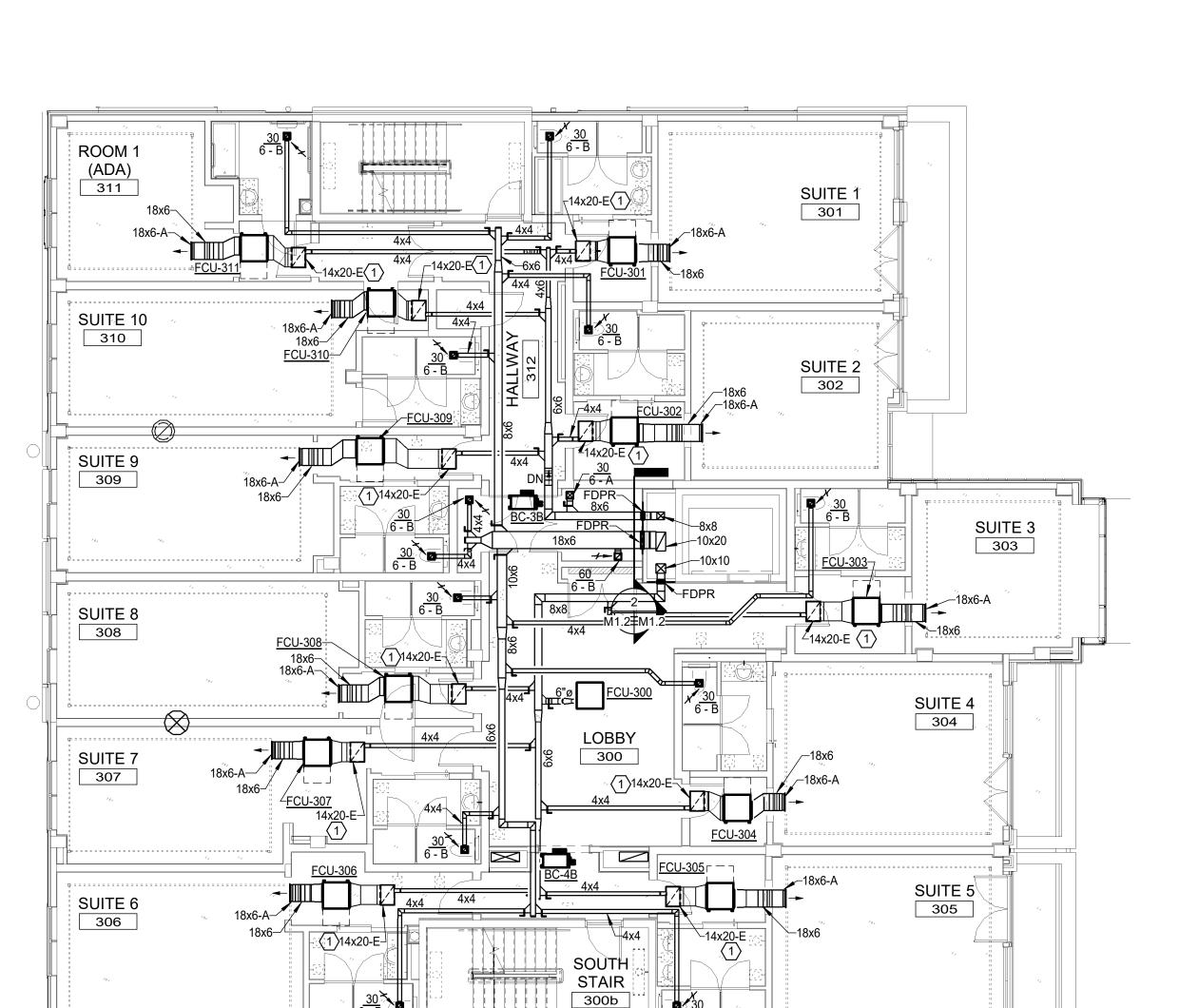
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REVISIONS

M1.2

MECHANICAL 2ND FLOOR PLAN -DUCTWORK





MECHANICAL DUCTWORK FLOOR PLAN - THIRD FLOOR

SCALE: 1/8" = 1'-0"

GENERAL DUCTWORK NOTES

- ALL FLEX DUCT RUNOUTS TO DIFFUSERS SHALL BE SAME
- SIZE AS DIFFUSER ROUND NECK ADAPTER. FLEXIBLE DUCTWORK SHALL NOT EXCEED 5 FT. IN LENGTH. FLEXIBLE DUCTWORK SHALL BE SUPPORTED AS SPECIFIED AND CONNECTED TO DIFFUSER ACCORDING TO THE DETAILS. CONTRACTOR SHALL USE MINIMUM NUMBER OF TURNS IN FLEXIBLE DUCTWORK TO MAKE REQUIRED CONNECTION. ALL RETURN AND EXHAUST DUCT SHALL BE HARD DUCTED TO GRILLES AND REGISTERS. FLEXIBLE DUCTWORK IS PROHIBITED ON RETURN AND EXHAUST.
- INDICATED, DUCT SHALL BE FULL SIZE OF UNIT OPENING. PROVIDE MANUAL VOLUME DAMPERS AT BRANCH CONNECTIONS TO ALL LOW-PRESSURE SUPPLY, RETURN, AND EXHAUST DUCTWORK. PROVIDE A MANUAL VOLUME DAMPER DOWNSTREAM OF THE FINAL BRANCH TAKEOFF. ALL MANUAL VOLUME DAMPERS SHALL BE INSTALLED

WHERE DUCT SIZES TO AIR HANDLING UNITS ARE NOT

- WITHIN 3' OF THE CONNECTION. ALL PENETRATIONS THROUGH WALLS SHALL BE SEALED. ALL DUCT PENETRATIONS THROUGH FLOORS SHALL BE PROTECTED TO PREVENT THE PASSAGE OF FLAME AND PRODUCTS OF COMBUSTION.
- ALL ROUND OR FLAT OVAL DUCT INDICATED TO BE LINED SHALL BE DOUBLE WALL.
- ALL EXPOSED DUCT SHALL BE SUITABLE FOR PAINTING. ALL OPEN-END DUCTS SHALL BE COVERED WITH 1/2" WIRE
- 10. REFER TO DIVISION 23 SPECIFICATIONS FOR TEMPORARY HEATING AND COOLING REQUIREMENTS. 1. ALL OUTSIDE AIRFLOW TO EACH SUITE SHALL BE BALANCED
- TO 30 CFM. 2. OUTSIDE AIRFLOW TO LOBBY CASETTES SHALL BE
- BALANCED TO 60 CFM. 13. COORDINATE ALL FAN COIL UNITS AND CEILING AIR
- DEVICES WITH ARCHITECTURAL CEILING PLANS. 14. PROVIDE STRICT COORDINATION BETWEEN DUCTWORK AND PIPING IN ALL AREAS.

SHEET NOTES

PROVIDE PLENUM BOX OFF TOP OF GRILLE FULL SIZE OF GRILLE NECK. GRILLE SHALL BE FILTER TYPE SUITABLE FOR STANDARD 20"X14"X1" FILTER. OUTSIDE AIR SUPPLY DUCT AND RETURN DUCT FROM UNIT SHALL TAP INTO THE SIDE OF THE PLENUM BOX. PLENUM BOX SHALL BE SUFFICIENT HEIGHT FOR RETURN AND OUTSIDE AIR TAPS AND CAPPED AT TOP.

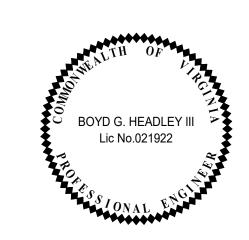


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FOR

VAN THIEL



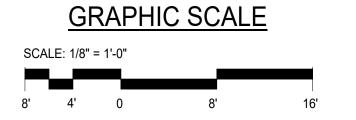
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APPROVED BY	ВН
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CONSTRUCTION SET

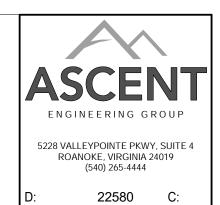
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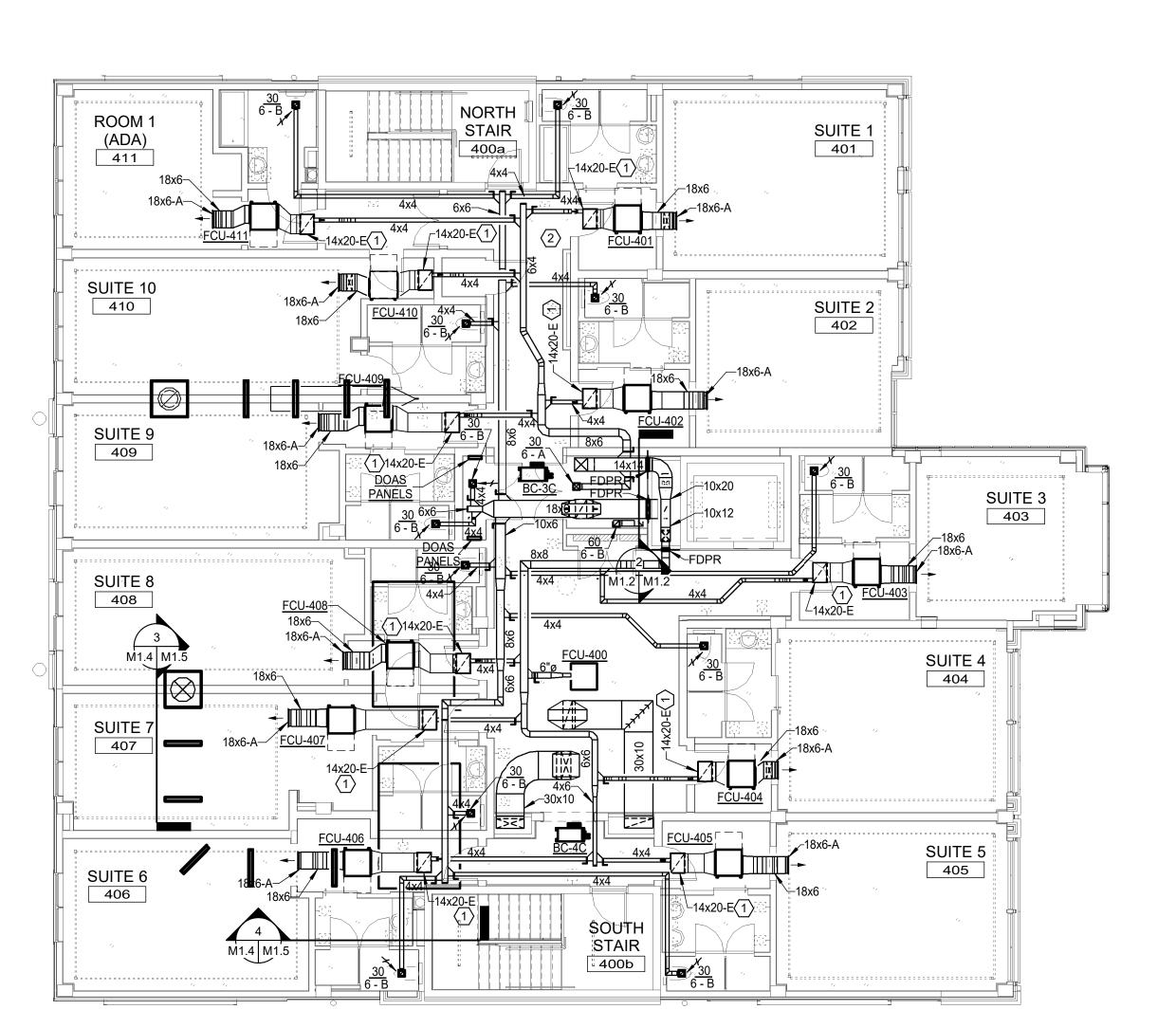
M1.3

MECHANICAL 3RD FLOOR PLAN -DUCTWORK









MECHANICAL DUCTWORK FLOOR PLAN - FOURTH FLOOR

SCALE: 1/8" = 1'-0"

GENERAL DUCTWORK NOTES

- ALL FLEX DUCT RUNOUTS TO DIFFUSERS SHALL BE SAME
- SIZE AS DIFFUSER ROUND NECK ADAPTER. FLEXIBLE DUCTWORK SHALL NOT EXCEED 5 FT. IN LENGTH. FLEXIBLE DUCTWORK SHALL BE SUPPORTED AS SPECIFIED AND CONNECTED TO DIFFUSER ACCORDING TO THE DETAILS. CONTRACTOR SHALL USE MINIMUM NUMBER OF TURNS IN FLEXIBLE DUCTWORK TO MAKE REQUIRED CONNECTION. ALL RETURN AND EXHAUST DUCT SHALL BE HARD DUCTED TO GRILLES AND REGISTERS. FLEXIBLE DUCTWORK IS PROHIBITED ON RETURN AND EXHAUST.
- INDICATED, DUCT SHALL BE FULL SIZE OF UNIT OPENING. PROVIDE MANUAL VOLUME DAMPERS AT BRANCH CONNECTIONS TO ALL LOW-PRESSURE SUPPLY, RETURN, AND EXHAUST DUCTWORK. PROVIDE A MANUAL VOLUME DAMPER DOWNSTREAM OF THE FINAL BRANCH TAKEOFF. ALL MANUAL VOLUME DAMPERS SHALL BE INSTALLED

WHERE DUCT SIZES TO AIR HANDLING UNITS ARE NOT

- WITHIN 3' OF THE CONNECTION. ALL PENETRATIONS THROUGH WALLS SHALL BE SEALED. ALL DUCT PENETRATIONS THROUGH FLOORS SHALL BE PROTECTED TO PREVENT THE PASSAGE OF FLAME AND PRODUCTS OF COMBUSTION.
- ALL ROUND OR FLAT OVAL DUCT INDICATED TO BE LINED SHALL BE DOUBLE WALL.
- ALL EXPOSED DUCT SHALL BE SUITABLE FOR PAINTING. ALL OPEN-END DUCTS SHALL BE COVERED WITH 1/2" WIRE
- 10. REFER TO DIVISION 23 SPECIFICATIONS FOR TEMPORARY HEATING AND COOLING REQUIREMENTS. 1. ALL OUTSIDE AIRFLOW TO EACH SUITE SHALL BE BALANCED
- TO 30 CFM. 12. OUTSIDE AIRFLOW TO LOBBY CASETTES SHALL BE
- BALANCED TO 60 CFM. 3. COORDINATE ALL FAN COIL UNITS AND CEILING AIR
- DEVICES WITH ARCHITECTURAL CEILING PLANS. 14. PROVIDE STRICT COORDINATION BETWEEN DUCTWORK AND PIPING IN ALL AREAS.

SHEET NOTES

PROVIDE PLENUM BOX OFF TOP OF GRILLE FULL SIZE OF GRILLE NECK. GRILLE SHALL BE FILTER TYPE SUITABLE FOR STANDARD 20"X14"X1" FILTER. OUTSIDE AIR SUPPLY DUCT AND RETURN DUCT FROM UNIT SHALL TAP INTO THE SIDE OF THE PLENUM BOX. PLENUM BOX SHALL BE SUFFICIENT HEIGHT FOR RETURN AND OUTSIDE AIR TAPS AND CAPPED AT TOP.

MAINTAIN CLEAR AREA BETWEEN GENERATOR ROOF PENETRATION AND CONDUIT RISERS IN CHASE.

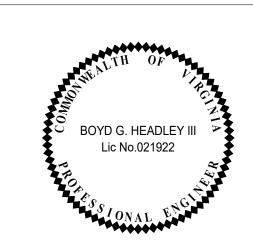


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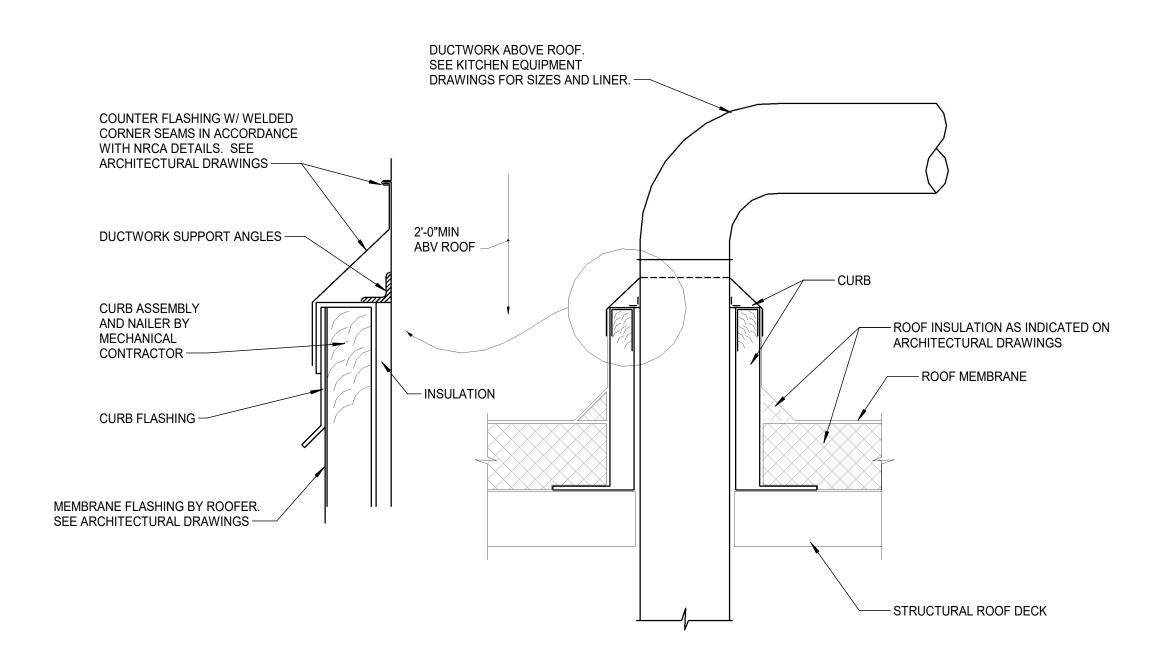
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CONSTRUCTION SET

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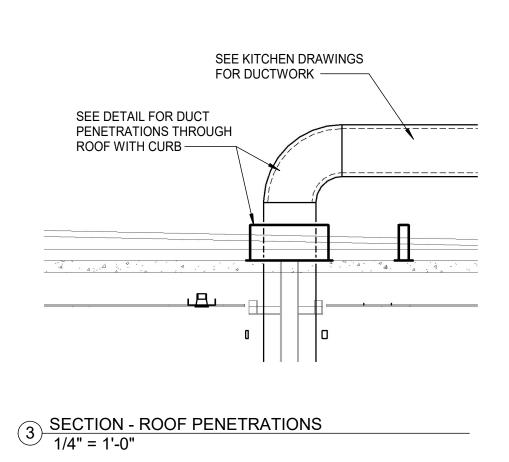
M1.4

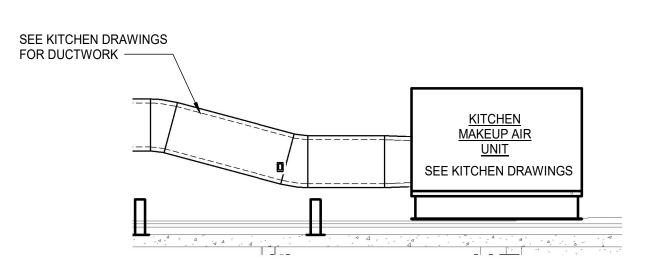
MECHANICAL 4TH FLOOR PLAN -DUCTWORK



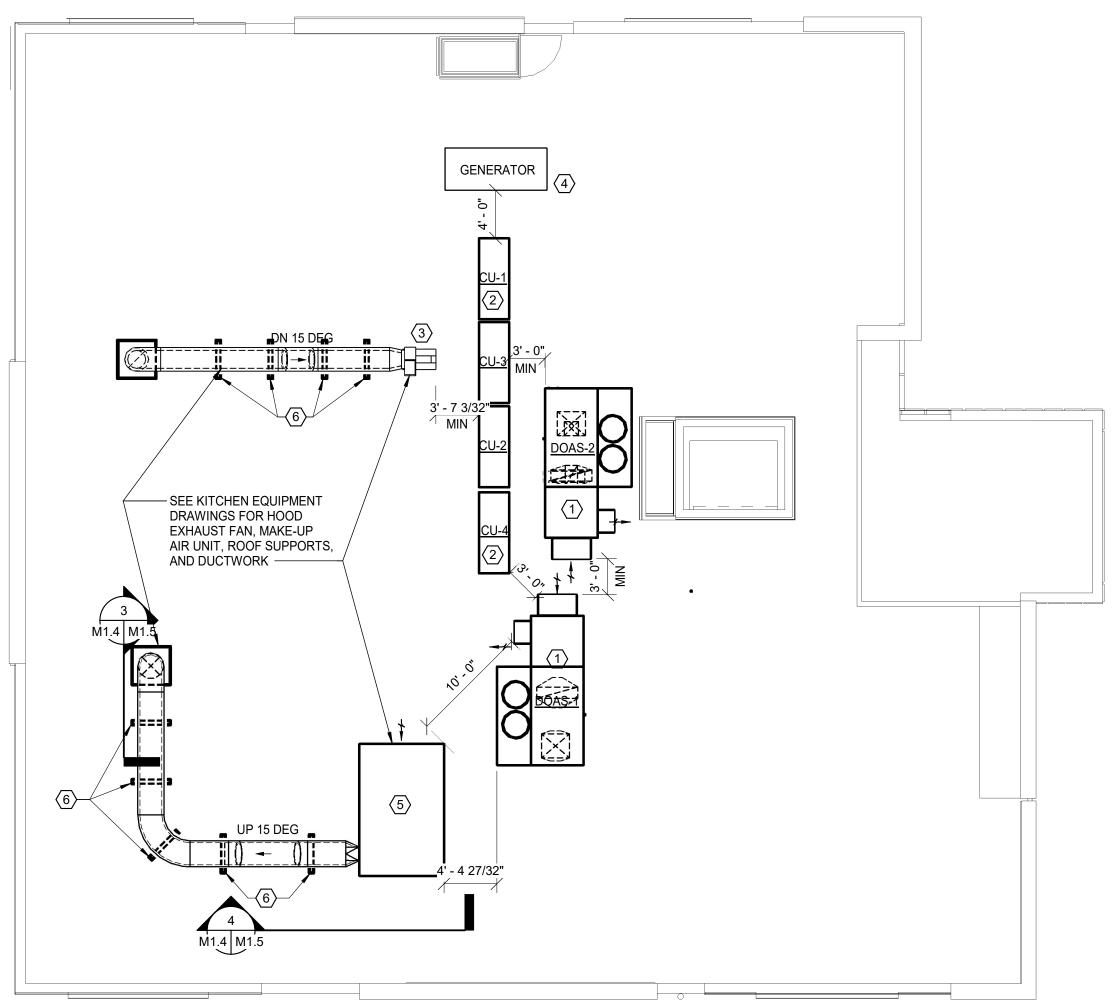
NOTE: CURB HEIGHT SHALL BE AS REQUIRED TO PROVIDE ROOFING CONTRACTOR'S MINIMUM FLASHING HEIGHT ACCOUNTING FOR THE THICKNESS OF TAPERED INSULATION WHERE INSTALLED.

DUCT ROOF PENETRATION DETAIL NO SCALE





4 SECTION - MAKEUP AIR DUCT 1/4" = 1'-0"



MECHANICAL DUCTWORK FLOOR PLAN - ROOF

SCALE: 1/8" = 1'-0"

SHEET NOTES

- REFER TO DETAIL ON SHEET M3.1 FOR INSTALLATION.
- 2 SET ROOFTOP VRV OUTDOOR UNITS ON EQUIPMENT SUPPORTS AS INMDICATED ON STRUCTURAL DRAWINGS WITH VIBRATION ISOLATION AS SPECIFIED.
- (3) LOCATE KITCHEN EXHAUST FAN A MINIMUM OF 20 FEET FROM THE NEAREST DOAS INTAKE. VERIFY FAN UPWARD EXHAUST IS A MINIMUM OF 7 FEET ABOVE THE ROOF. COORDINATE WITH KITCHEN EQUIPMENT INSTALLER.
- 4 LOCATE GENERATOR EXHAUST OUTLET A MINIMUM OF 20 FEET FROM THE NEAREST DOAS INTAKE. COORDINATE WITH ELECTRICAL TO HAVE OUTLET TURNED AWAY FROM THE DOAS UNITS.
- (5) LOCATE KITCHEN MAU GAS EXHAUST OUTLET A MINIMUM OF 10 FEET FROM THE NEAREST DOAS INTAKE. COORDINATE WITH KITCHEN EQUIPMENT INSTALLER TO HAVE GAS EXHAUST OUTLET TURNED AWAY FROM THE DOAS UNITS.
- (6) ROOFTOP DUCT SUPPORTS BY MECHANICAL CONTRACTOR. MINIMUM SPACING SHALL BE AS INDICATED ON KITCHEN DRAWINGS.



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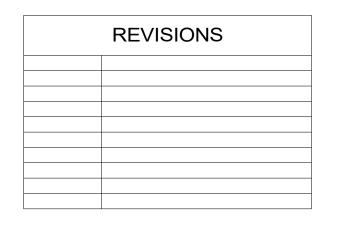
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M1.5

MECHANICAL ROOF PLAN

GRAPHIC SCALE



ENGINEERING GROUP 5228 VALLEYPOINTE PKWY, SUITE 4 ROANOKE, VIRGINIA 24019

22580 C:

GENERAL PIPING NOTES

- ALL PENETRATIONS THROUGH WALLS SHALL BE SEALED. WHERE A SINGLE SENSOR IS SHOWN FOR A SPACE SERVED BY MULTIPLE TERMINAL UNITS OR AIR HANDLERS, THE SINGLE SENSOR SHALL CONTROL ALL UNITS SERVING THE SPACE.
- WHERE MULTIPLE SENSORS ARE SHOWN FOR SINGLE TERMINAL UNITS OR AIR HANDLERS, THE SENSORS SHALL PROVIDE AVERAGING CONTROL OF THE UNIT. REFER TO DIVISION 23 SPECIFICATIONS FOR TEMPORARY
- HEATING AND COOLING REQUIREMENTS. REFER TO PHASING PLANS FOR PHASING REQUIREMENTS SINGLE REFRIGERANT LINES INDICATE MULTIPLE LINES AS REQUIRED FOR ENERGY RECOVERY VRV HEAT PUMP
- ALL COOLING CONDENSATE DRAIN LINES SHALL BE 1-1/4". ALL PIPING SHALL BE CONCEALED ASBOVE CEILINGS.

1 UTILIZE INTERNAL THERMOSTAT WHERE INDICATED.

2 EXTEND 3/4" DRAIN FROM BOTTOM OF WATERTIGHT DUCT TO FLOOR DRAIN BELOW DISHWASHER.

RADIANT FLOORS IN BATHROOMS

ALL RADIANT FLOORS IN BATHROOMS ARE AN ADD ALTERNATE. IF THE ALTERNATE IS NOT ACCEPTED, DO NOT ROUGH IN FOR BATHROOM THERMOSTATS.

GRAPHIC SCALE

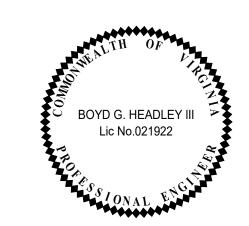


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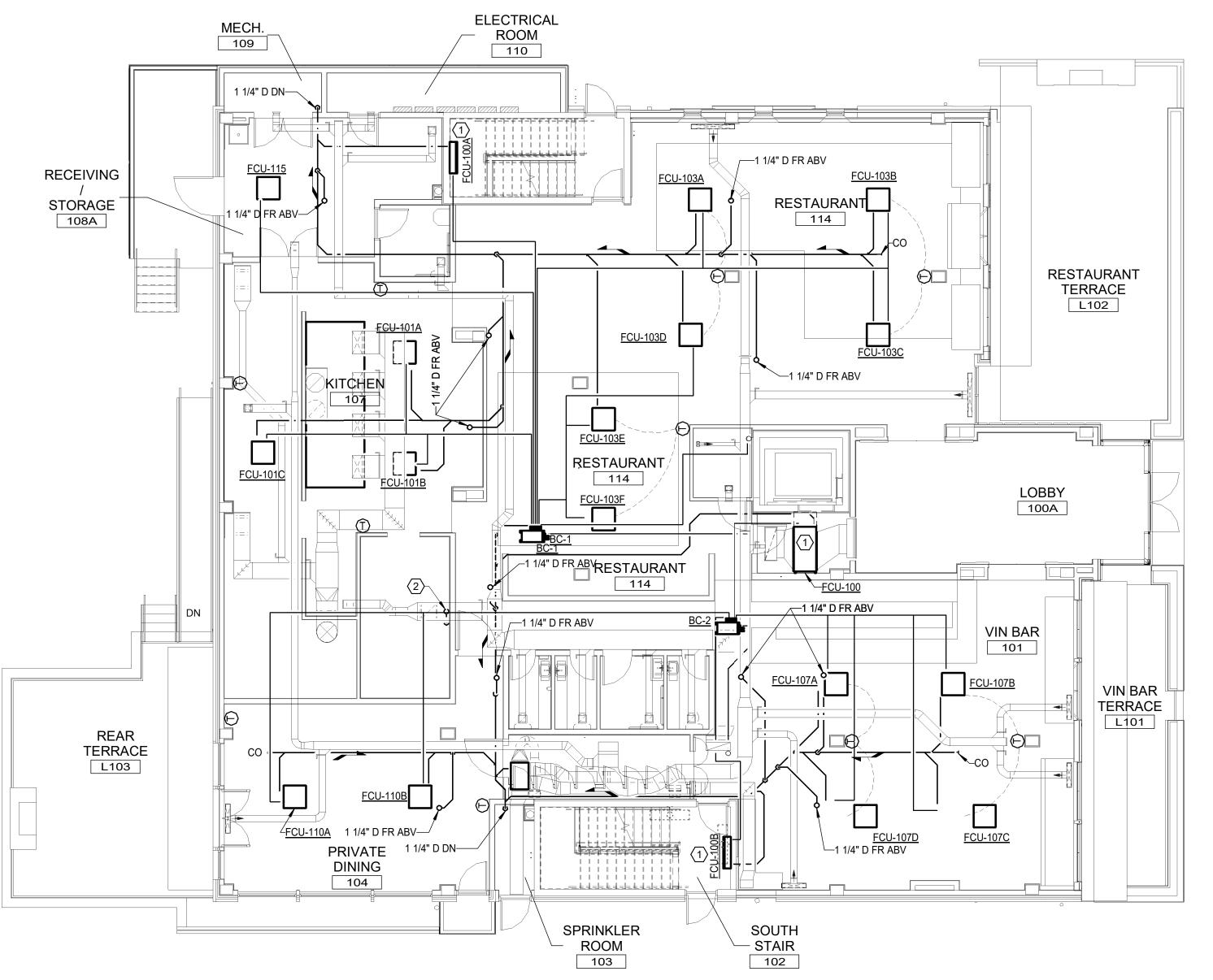
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REVISIONS

M2.1

MECHANICAL 1ST FLOOR PLAN -**PIPING**



MECHANICAL PIPING FLOOR PLAN - FIRST FLOOR

M2.1 SCALE: 1/8" = 1'-0"



GENERAL PIPING NOTES

- ALL PENETRATIONS THROUGH WALLS SHALL BE SEALED. WHERE A SINGLE SENSOR IS SHOWN FOR A SPACE SERVED BY MULTIPLE TERMINAL UNITS OR AIR HANDLERS, THE SINGLE SENSOR SHALL CONTROL ALL UNITS SERVING THE SPACE.
- TERMINAL UNITS OR AIR HANDLERS, THE SENSORS SHALL PROVIDE AVERAGING CONTROL OF THE UNIT. REFER TO DIVISION 23 SPECIFICATIONS FOR TEMPORARY
- HEATING AND COOLING REQUIREMENTS. REFER TO PHASING PLANS FOR PHASING REQUIREMENTS SINGLE REFRIGERANT LINES INDICATE MULTIPLE LINES AS REQUIRED FOR ENERGY RECOVERY VRV HEAT PUMP
- ALL COOLING CONDENSATE DRAIN LINES SHALL BE 1-1/4". ALL PIPING SHALL BE CONCEALED ASBOVE CEILINGS.

SHEET NOTES

REFRIGERANT PIPING SHALL HAVE NO FITTINGS ABOVE BATHROOMS OR ANY OTHER ROOM SMALLER THAN 124 SQUARE FEET.

RADIANT FLOORS IN BATHROOMS

ALL RADIANT FLOORS IN BATHROOMS ARE AN ADD ALTERNATE. IF THE ALTERNATE IS NOT ACCEPTED, DO NOT ROUGH IN FOR BATHROOM THERMOSTATS.



WHERE MULTIPLE SENSORS ARE SHOWN FOR SINGLE THE HAYNES

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CHITECTS

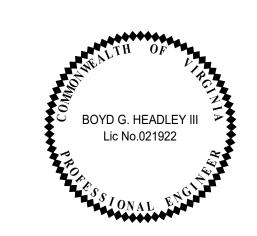
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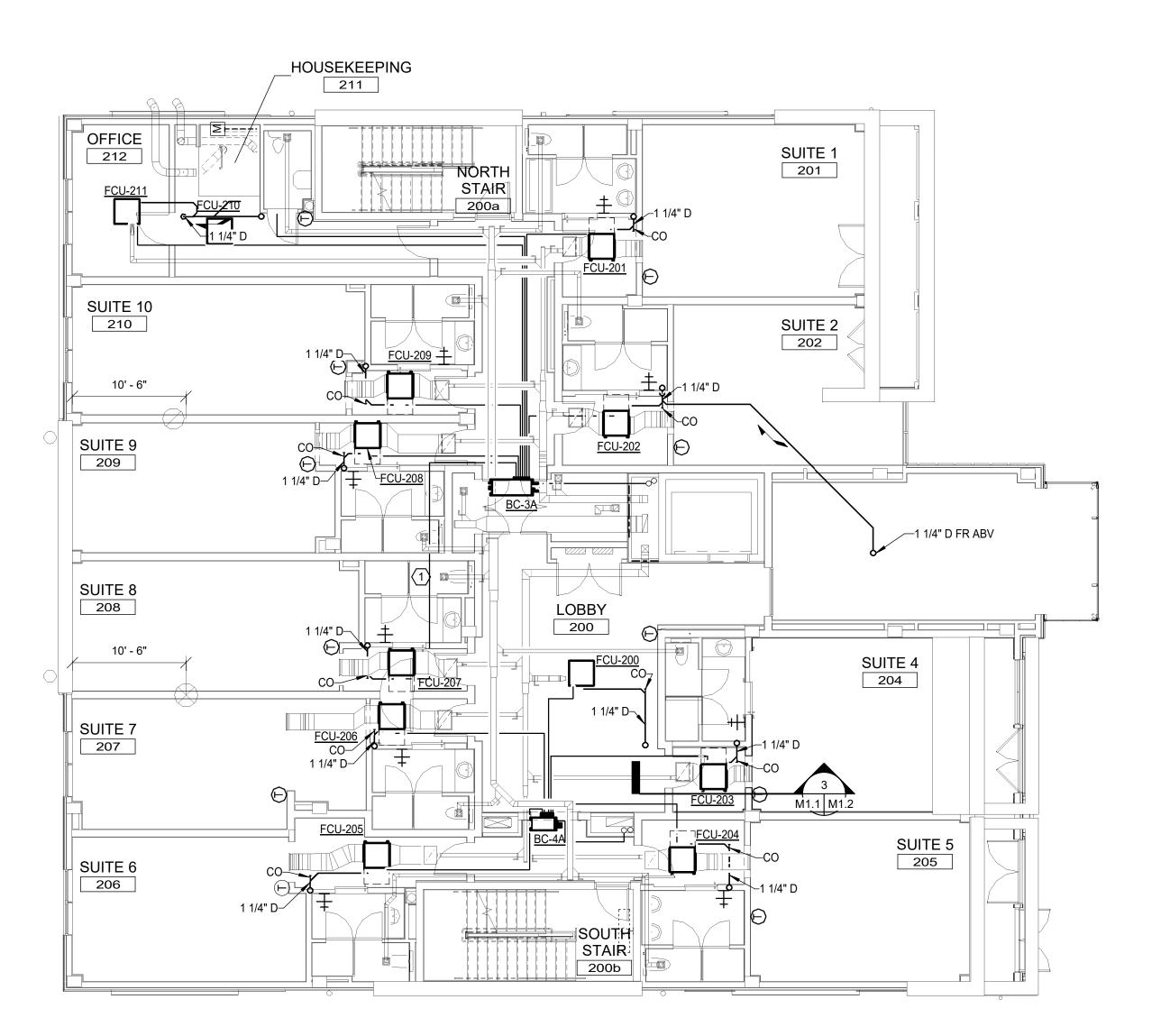
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REVISIONS

M2.2

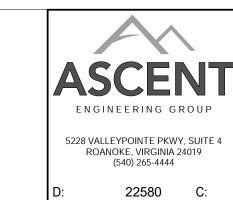
MECHANICAL 2ND FLOOR PLAN -PIPING

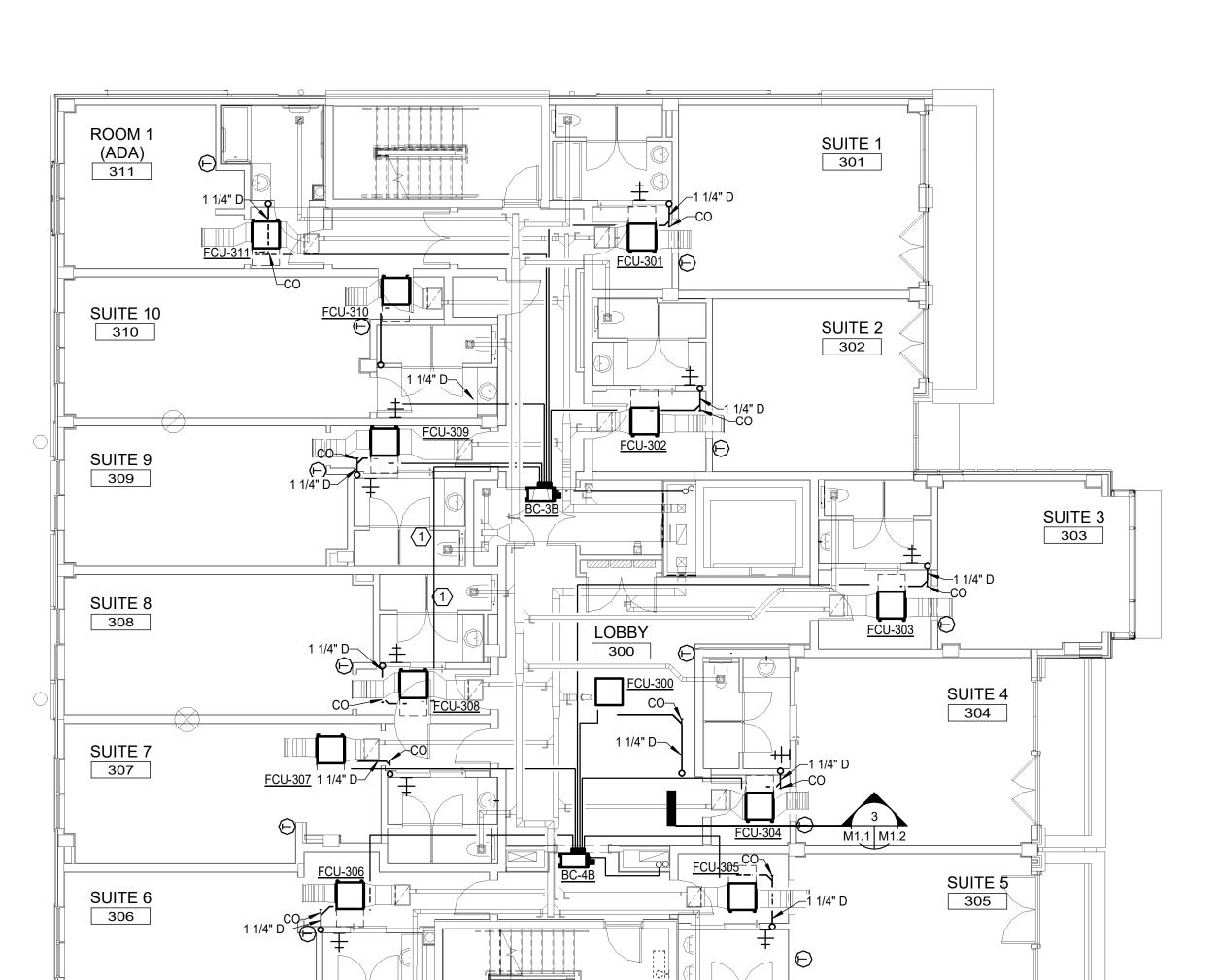


MECHANICAL PIPING FLOOR PLAN - SECOND FLOOR

M2.2 SCALE: 1/8" = 1'-0"

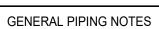
GRAPHIC SCALE





MECHANICAL PIPING FLOOR PLAN - THIRD FLOOR

M2.3 SCALE: 1/8" = 1'-0"



- ALL PENETRATIONS THROUGH WALLS SHALL BE SEALED.
 WHERE A SINGLE SENSOR IS SHOWN FOR A SPACE SERVED BY MULTIPLE TERMINAL UNITS OR AIR HANDLERS, THE SINGLE SENSOR SHALL CONTROL ALL UNITS SERVING THE SPACE.
- WHERE MULTIPLE SENSORS ARE SHOWN FOR SINGLE TERMINAL UNITS OR AIR HANDLERS, THE SENSORS SHALL PROVIDE AVERAGING CONTROL OF THE UNIT.
 REFER TO DIVISION 23 SPECIFICATIONS FOR TEMPORARY
- HEATING AND COOLING REQUIREMENTS.

 5. REFER TO PHASING PLANS FOR PHASING REQUIREMENTS

 6. SINGLE REFRIGERANT LINES INDICATE MULTIPLE LINES AS REQUIRED FOR ENERGY RECOVERY VRV HEAT PUMP SYSTEMS
- ALL COOLING CONDENSATE DRAIN LINES SHALL BE 1-1/4".
 ALL PIPING SHALL BE CONCEALED ASBOVE CEILINGS.

SHEET NOTES

1 REFRIGERANT PIPING SHALL HAVE NO FITTINGS
ABOVE BATHROOMS OR ANY OTHER ROOM
SMALLER THAN 124 SQUARE FEET.

RADIANT FLOORS IN BATHROOMS

ALL RADIANT FLOORS IN BATHROOMS ARE AN ADD ALTERNATE. IF THE ALTERNATE IS NOT ACCEPTED, DO NOT ROUGH IN FOR BATHROOM THERMOSTATS.

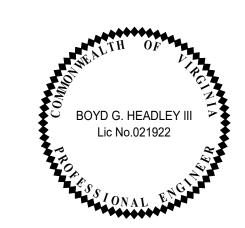


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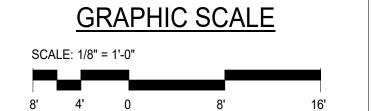
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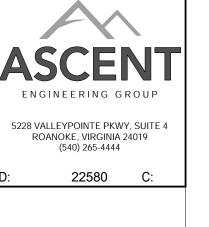
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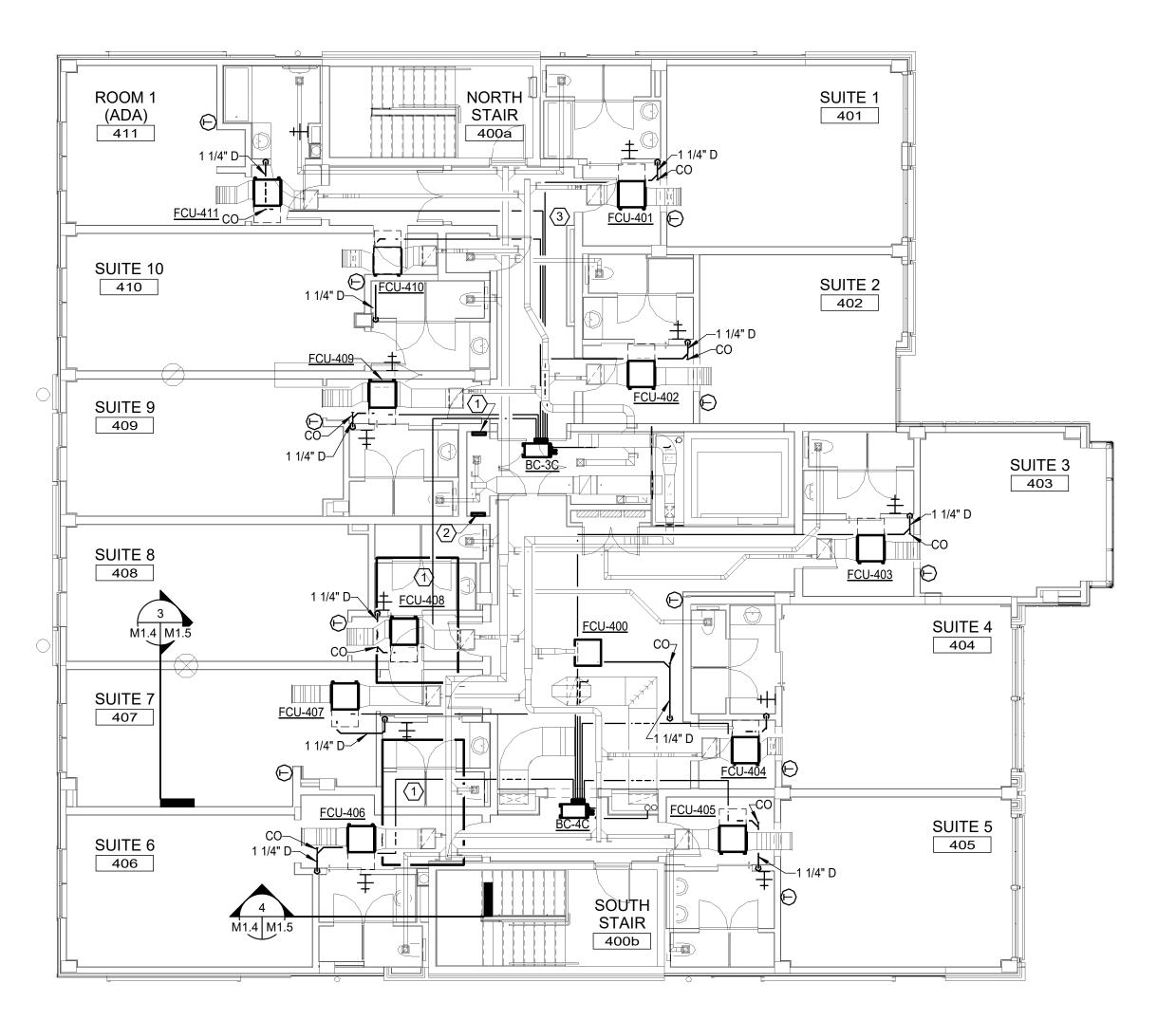
REVISIONS		

M2.3

MECHANICAL 3RD FLOOR PLAN -PIPING







MECHANICAL PIPING FLOOR PLAN - FOURTH FLOOR

M2.4 SCALE: 1/8" = 1'-0"

GENERAL PIPING NOTES

- ALL PENETRATIONS THROUGH WALLS SHALL BE SEALED.
 WHERE A SINGLE SENSOR IS SHOWN FOR A SPACE SERVED BY MULTIPLE TERMINAL UNITS OR AIR HANDLERS, THE SINGLE SENSOR SHALL CONTROL ALL UNITS SERVING THE SPACE.
- WHERE MULTIPLE SENSORS ARE SHOWN FOR SINGLE TERMINAL UNITS OR AIR HANDLERS, THE SENSORS SHALL PROVIDE AVERAGING CONTROL OF THE UNIT.
 REFER TO DIVISION 23 SPECIFICATIONS FOR TEMPORARY
- HEATING AND COOLING REQUIREMENTS.

 5. REFER TO PHASING PLANS FOR PHASING REQUIREMENTS

 6. SINGLE REFRIGERANT LINES INDICATE MULTIPLE LINES AS REQUIRED FOR ENERGY RECOVERY VRV HEAT PUMP
- 7. ALL COOLING CONDENSATE DRAIN LINES SHALL BE 1-1/4".8. ALL PIPING SHALL BE CONCEALED ASBOVE CEILINGS.

SHEET NOTES

- 1 REFRIGERANT PIPING SHALL HAVE NO FITTINGS ABOVE BATHROOMS OR ANY OTHER ROOM SMALLER THAN 124 SQUARE FEET.
 2 DOAS CONTROL AND MONITORING PANEL.
- 3 MAINTAIN CLEAR AREA BETWEEN GENERATOR ROOF PENETRATION AND CONDUIT RISERS IN CHASE.

RADIANT FLOORS IN BATHROOMS

ALL RADIANT FLOORS IN BATHROOMS ARE AN ADD ALTERNATE. IF THE ALTERNATE IS NOT ACCEPTED, DO NOT ROUGH IN FOR BATHROOM THERMOSTATS.

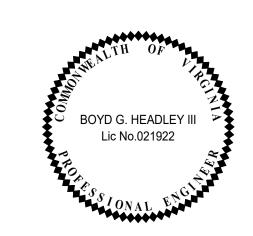


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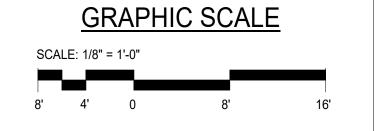
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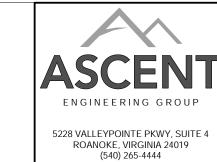
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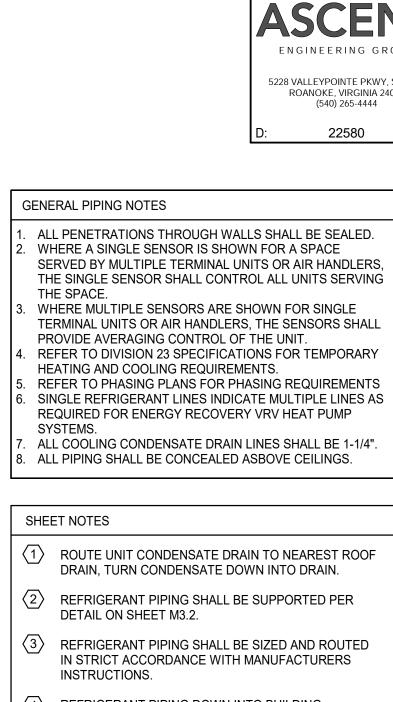
M2.4

MECHANICAL 4TH FLOOR PLAN -PIPING









- (1) ROUTE UNIT CONDENSATE DRAIN TO NEAREST ROOF DRAIN, TURN CONDENSATE DOWN INTO DRAIN.
- REFRIGERANT PIPING DOWN INTO BUILDING. PROVIDE ROOF PENETRATION AS DETAILED.



THE HAYNES

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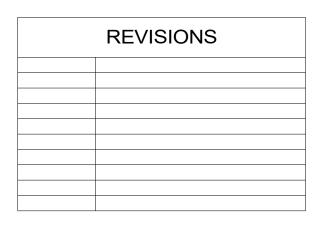
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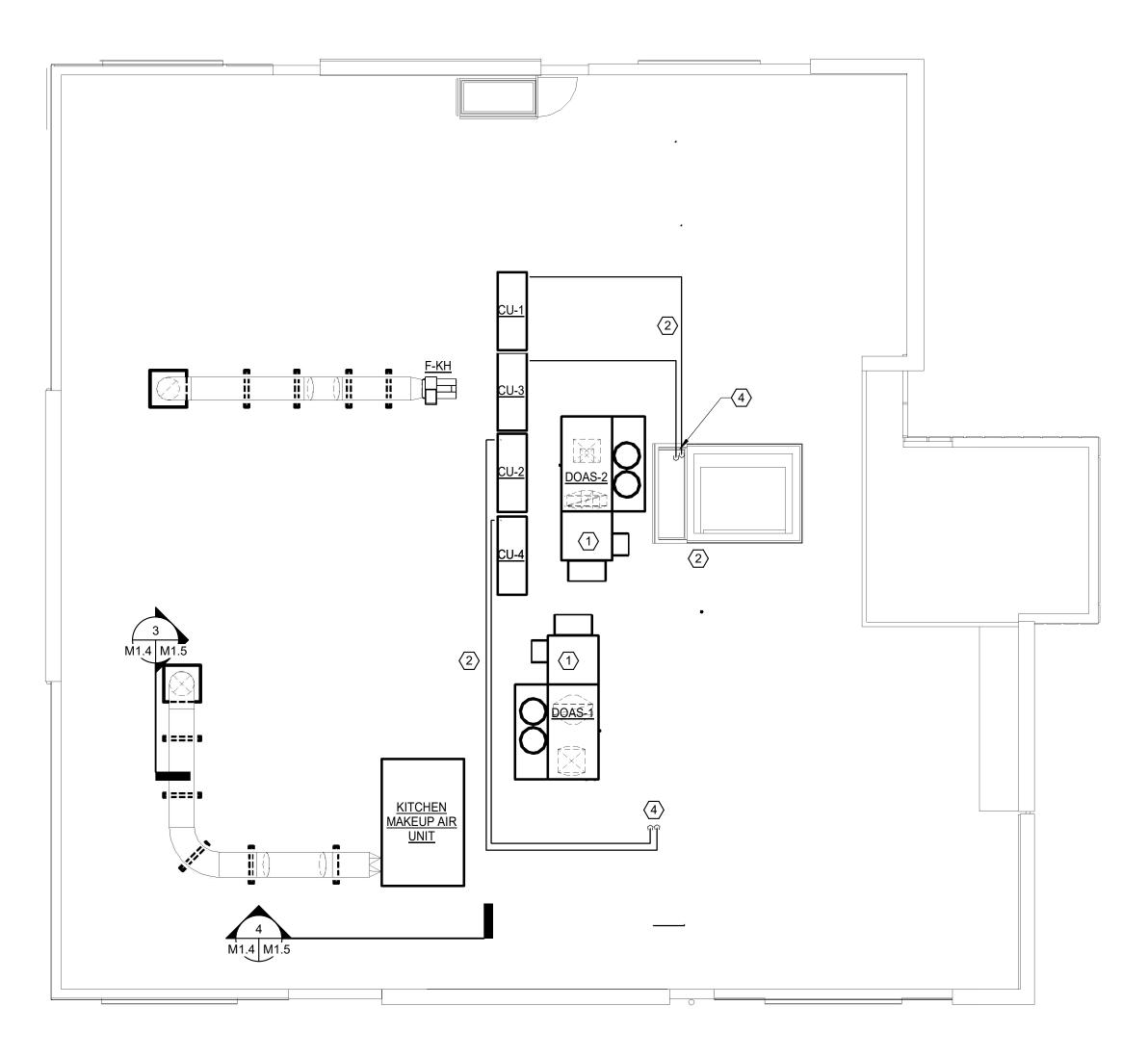


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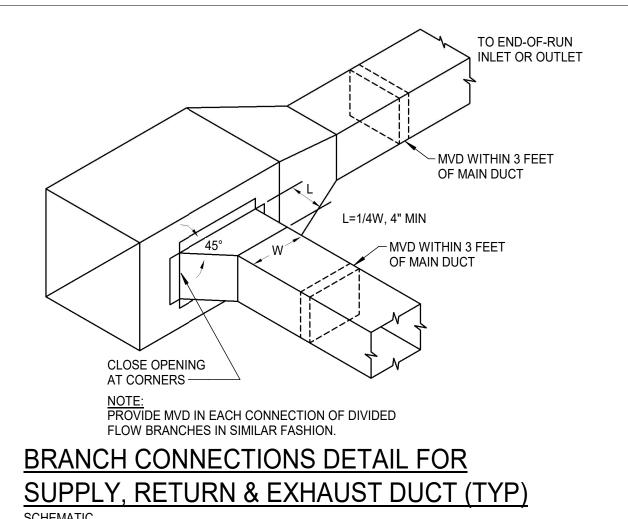


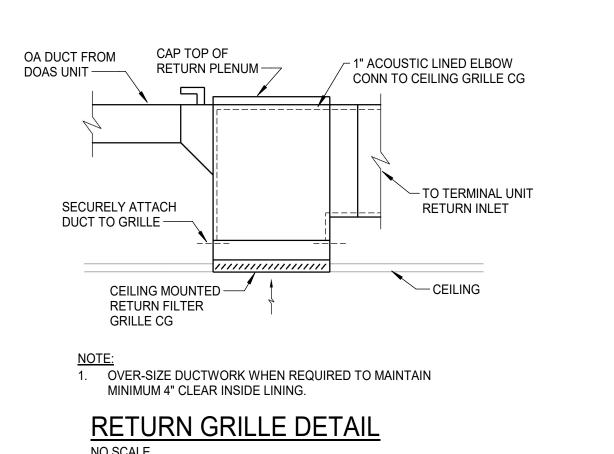
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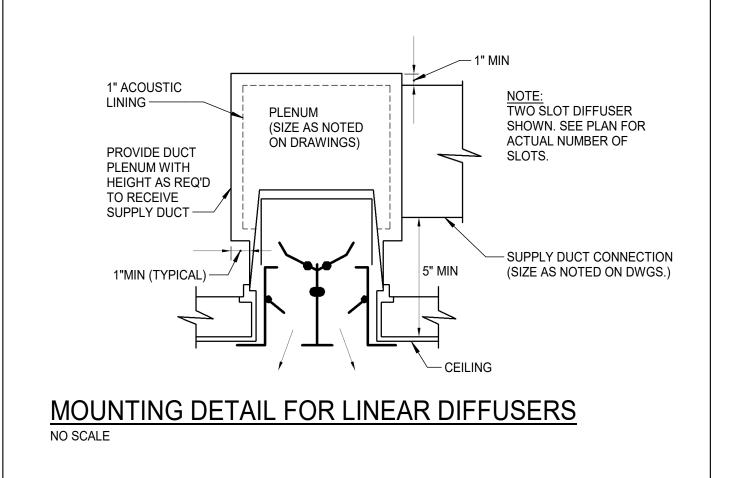


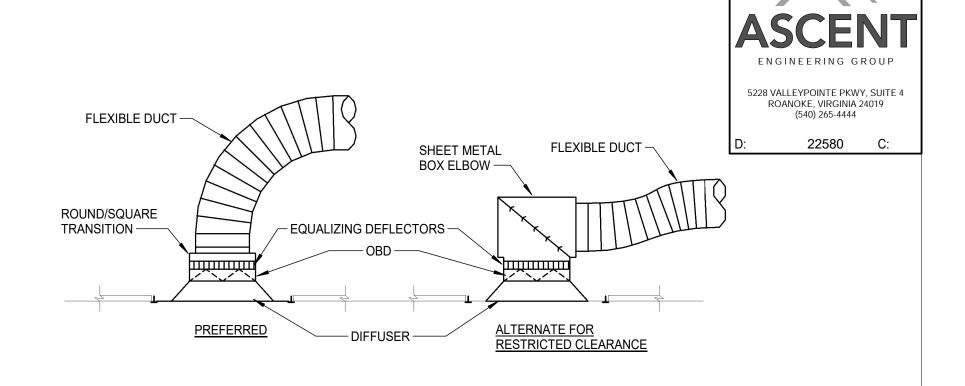
MECHANICAL PIPING FLOOR PLAN - ROOF

SCALE: 1/8" = 1'-0"

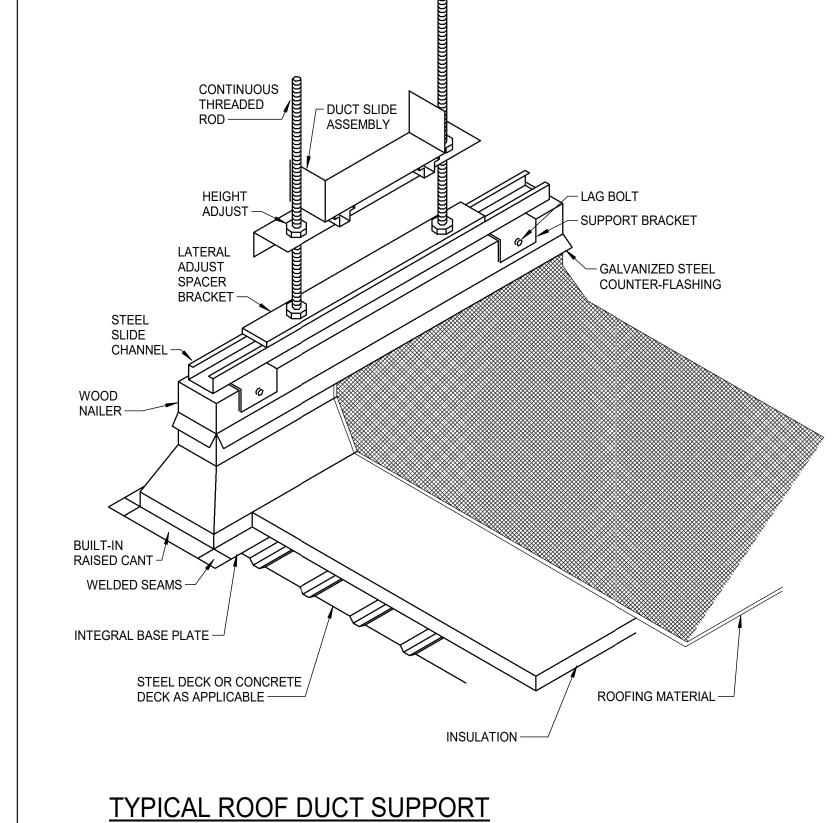


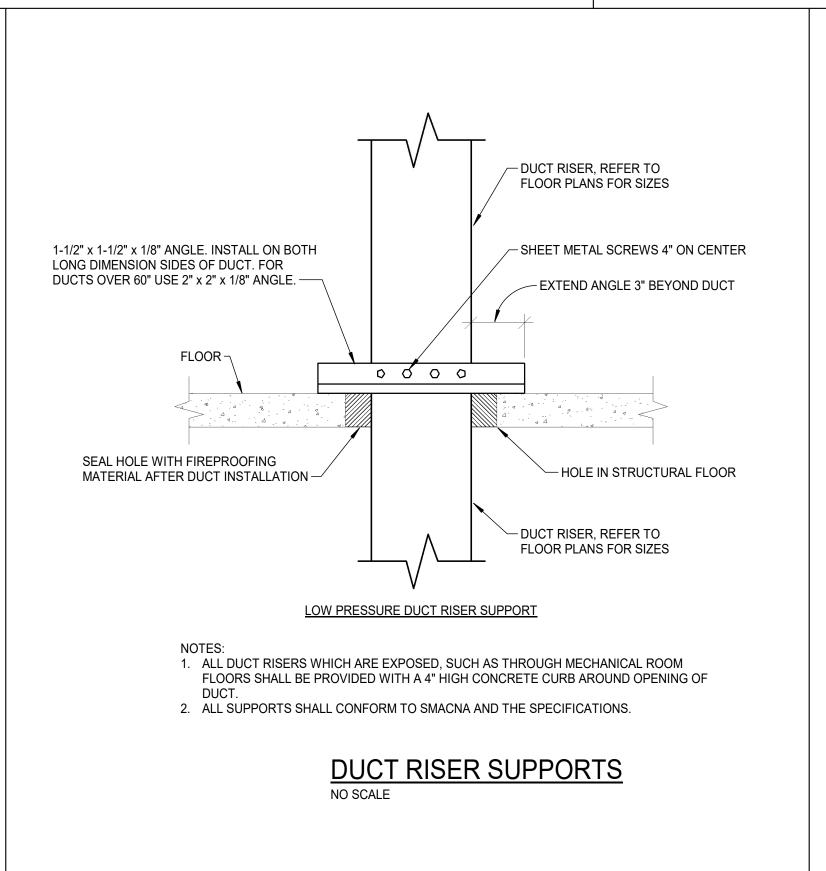


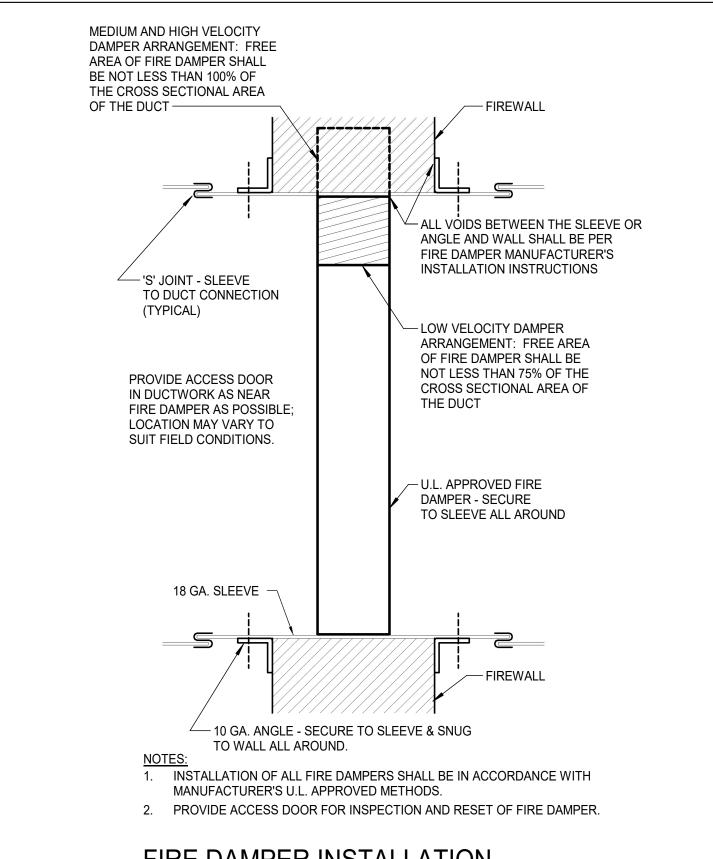


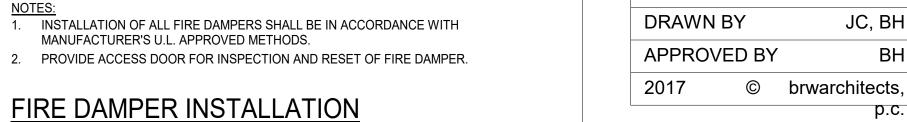


DIFFUSER CONNECTION DETAIL









CONSTRUCTION SET

HITECTS

charlottesville virginia 22902

THE HAYNES

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FOR

VAN THIEL

BOYD G. HEADLEY III

22011

BH

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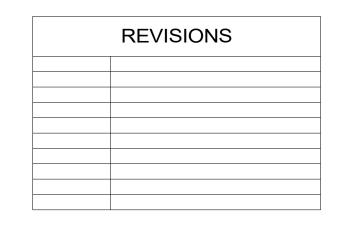
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DATE

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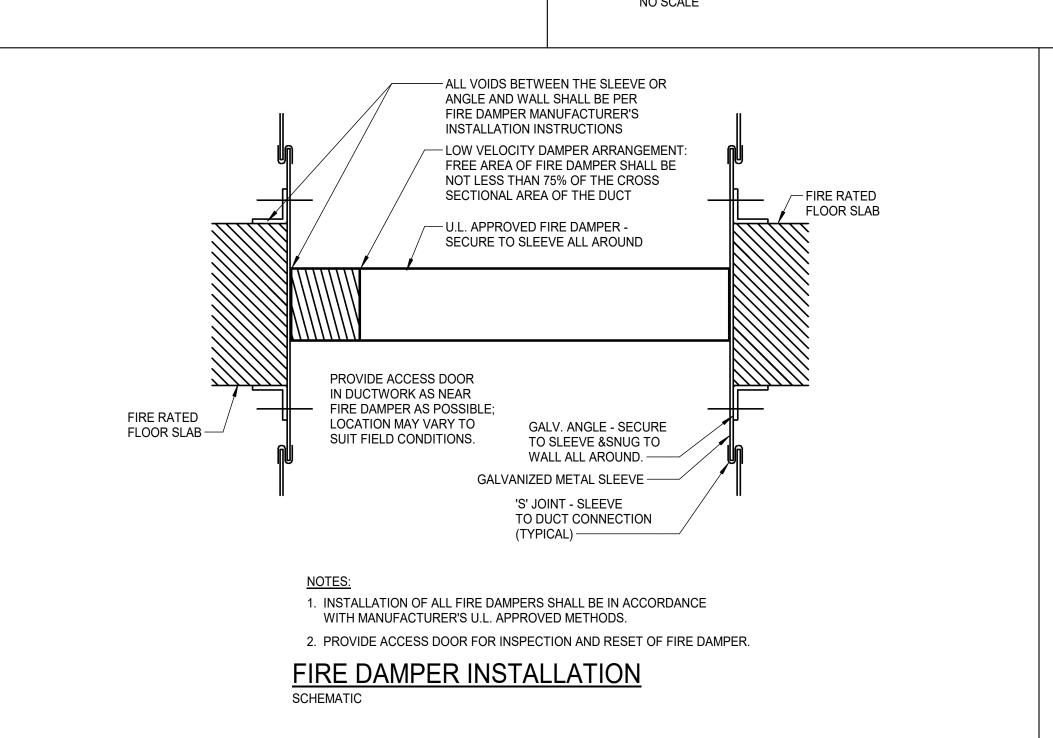
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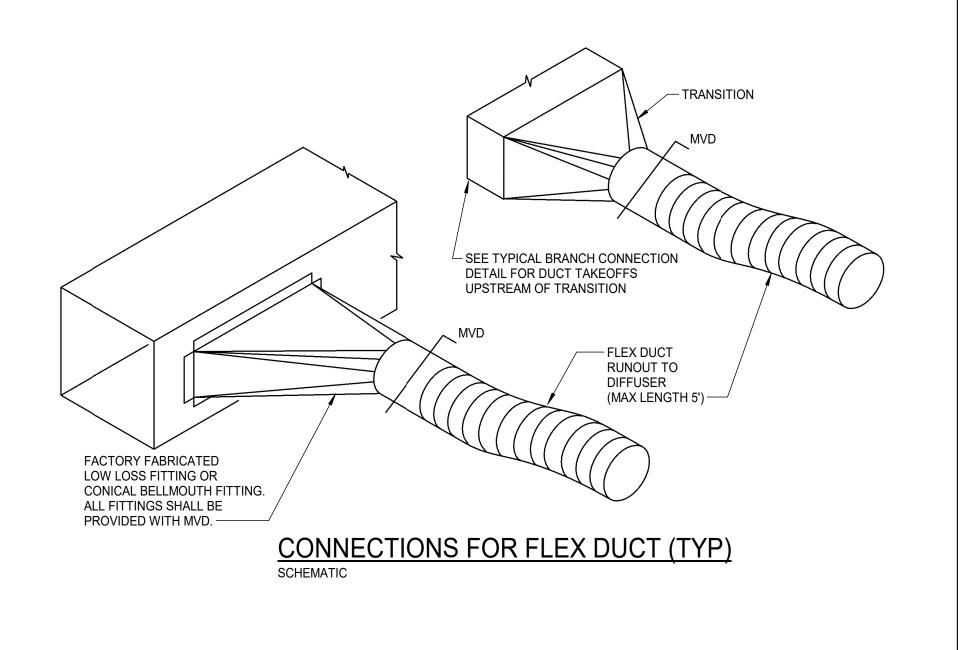
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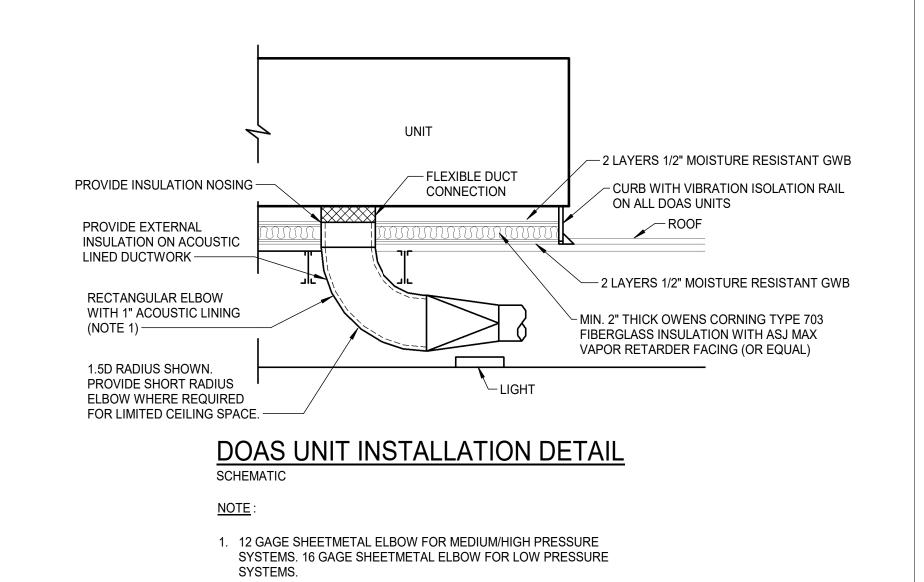


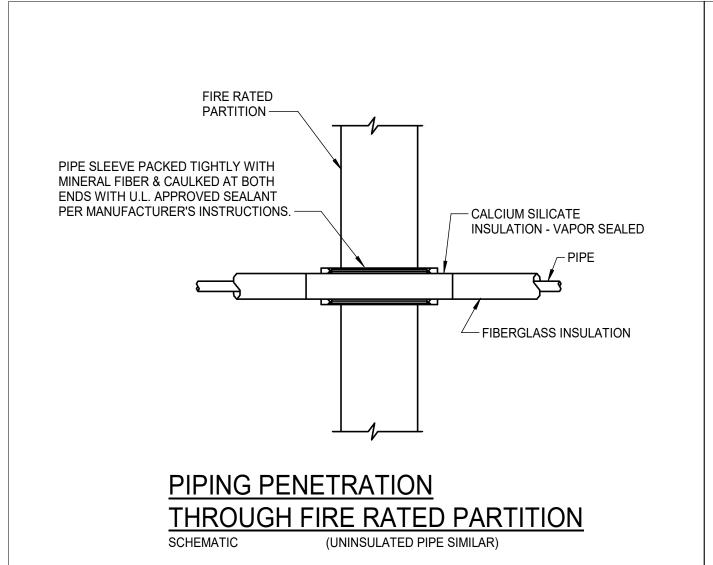
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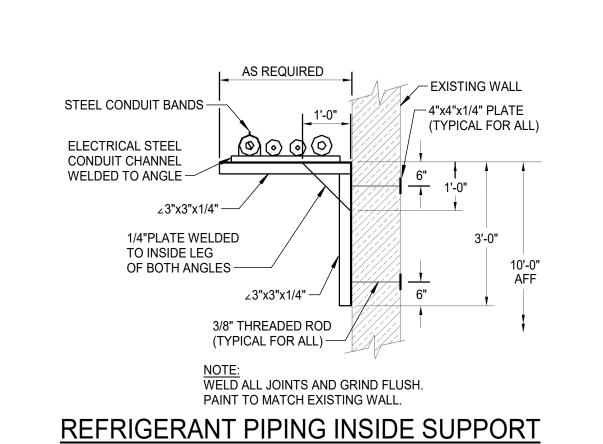
MECHANICAL DETAILS



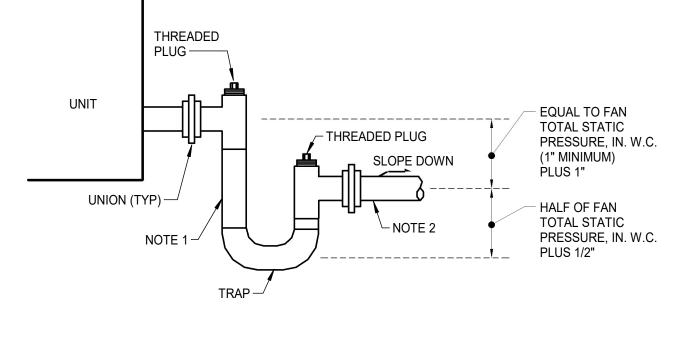








NO SCALE



1. DRAIN LINE SHALL BE COPPER AND FULL SIZE OF UNIT CONNECTION, BUT NO SMALLER THAN 3/4".

STEEL CONDUIT STEEL CONDUIT - INSULATION BANDS — PER SPEC ∠ ELECTRICAL STEEL CONDUIT CHANNEL ANCHOR TO PIER -- 4 ' 4 ' AS REQUIRED 3'-0" STEEL FABRIC 1'-0" REFRIGERANT PIPING PIER SUPPORT

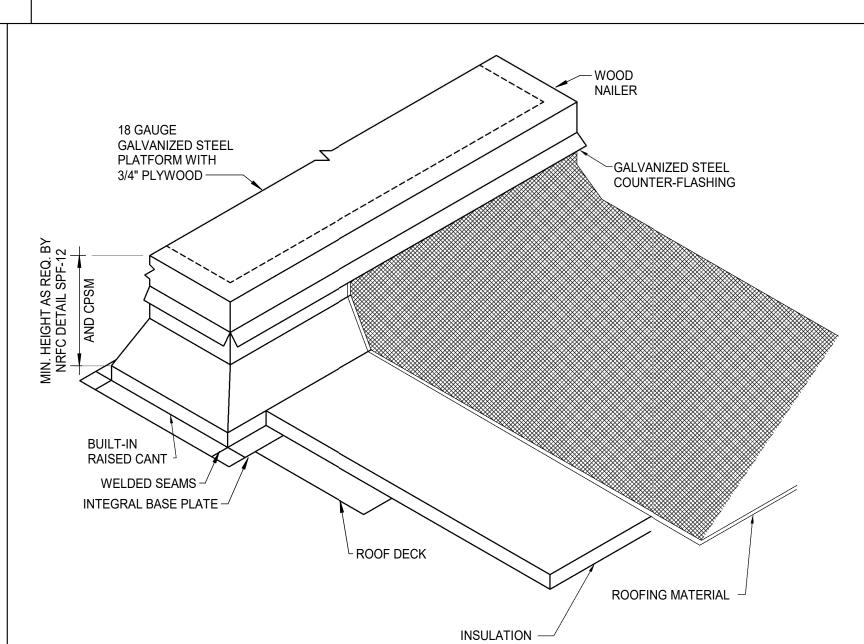
ENGINEERING GROUP

5228 VALLEYPOINTE PKWY. SUITF 4

(540) 265-4444

22580 C:

ROANOKE, VIRGINIA 24019



TYPICAL ROOF EQUIPMENT RAIL SUPPORT

1. ATTACH INTEGRAL BASE PLATE TO CONCRETE DECK WITH DROP-IN ANCHORS AND THROUGH BOLTS, SPACING AS RECOMMENCED BY MANUFACTURER, BUT

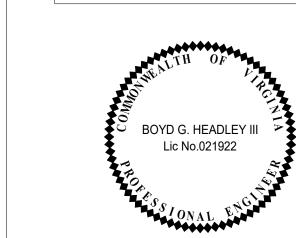
NO LESS THAN 4 ANCHORS PER SUPPORT.

HANGER ROD SIZE (REFER TO SPECS)

ADJUSTABLE CLEVIS HANGER -

INSULATION -

REFER TO SPECS -



HITECTS

charlottesville virginia 22902

THE HAYNES

2221 CRYSTAL SPRING AVE SW

ROANOKE. VA 24014

FOR

VAN THIEL

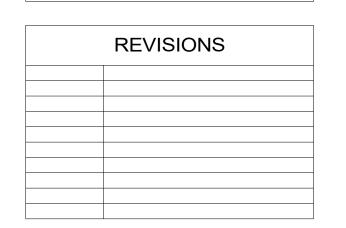
112 fourth street ne

434.971.7160

brw-architects.com

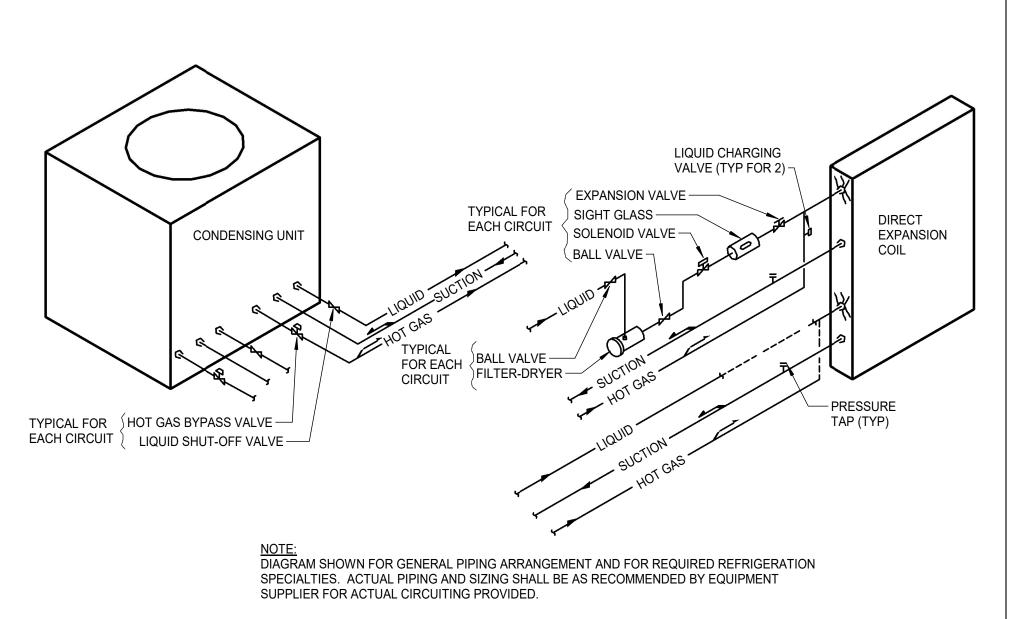
JOB NUM	IBER	22011
DATE		08/30/24
DRAWN E	3Y	JC, BH
APPROVE	ED BY	ВН
2017	(C)	brwarchitects

CONSTRUCTION SET

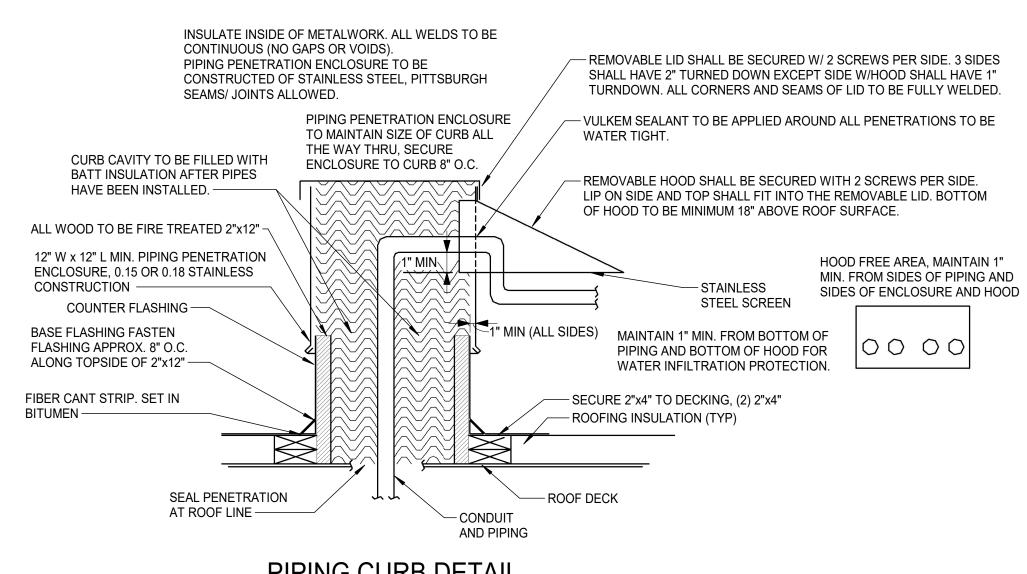


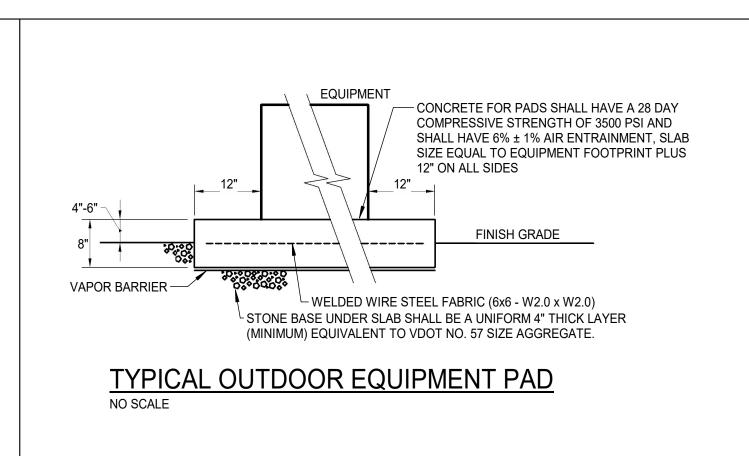
M3.2

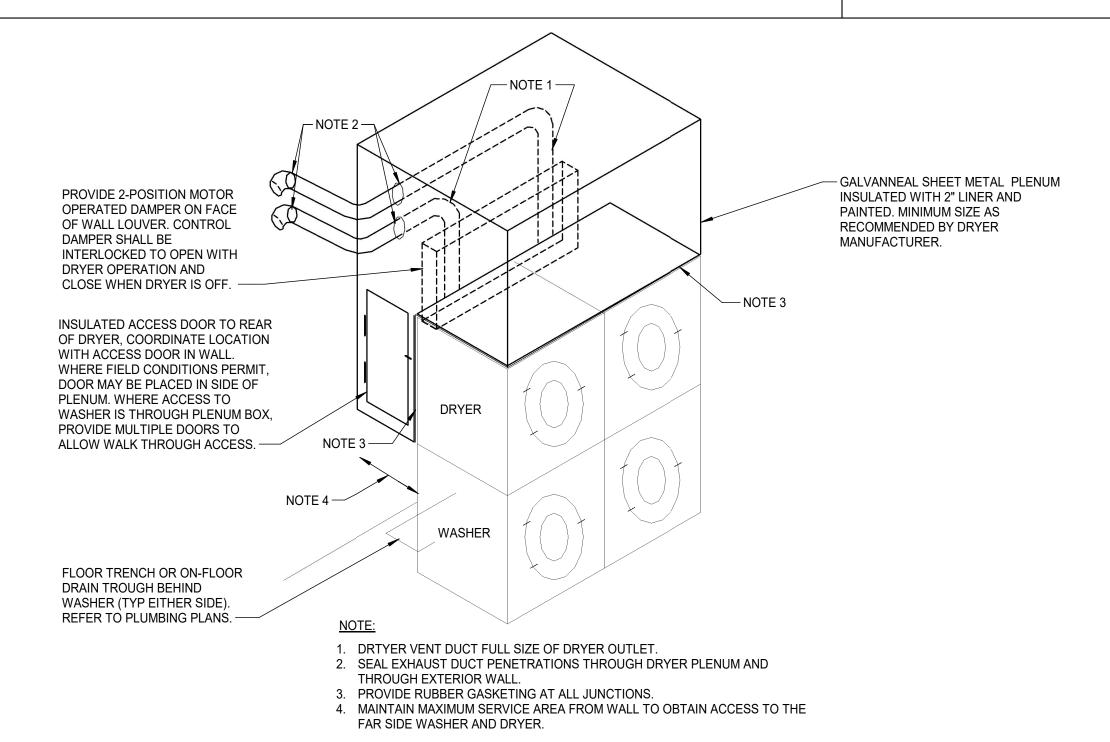
MECHANICAL DETAILS



REFRIGERATION LINE CONNECTIONS







PIPE HANGER AND INSULATION DETAIL

INSULATION PROTECTION

SHIELD AT EACH HANGER.

REFER TO SPECS.

BLOCK INSERT, QTY AS REQD. REFER TO SPECS.

1. SEE STRUCTURAL DRAWINGS FOR HANGER ROD CONNECTION STRUCTURE

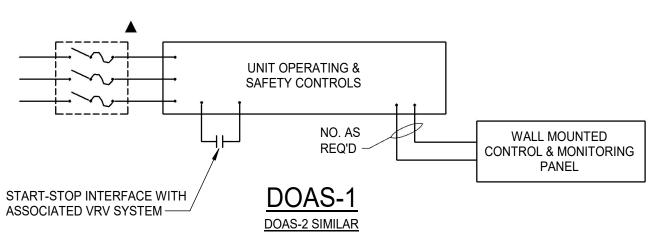
3. ARRANGEMENT SHOWN IS SUITABLE FOR DRAW-THROUGH UNITS ONLY.

2. EXTEND TO NEAREST GUTTER/ROOF/FLOOR DRAIN UNLESS NOTED OTHERWISE.

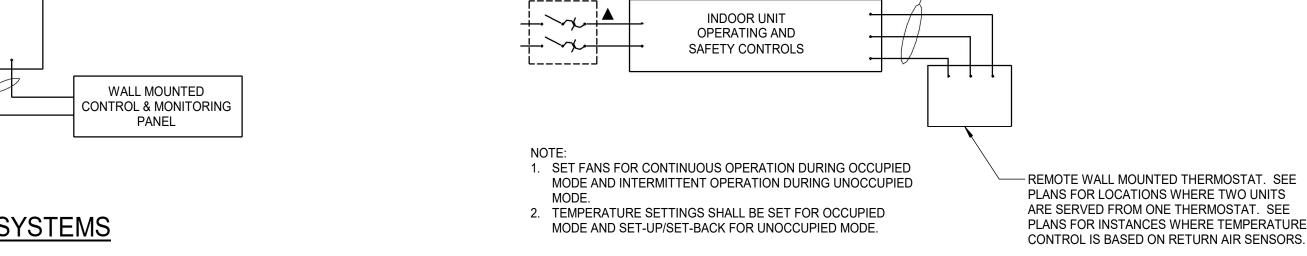
COOLING COIL CONDENSATE DRAIN

PIPING CURB DETAIL

STACKED DRYER PLENUM DETAIL



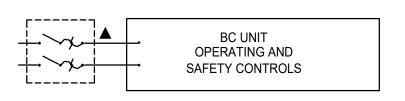
DEDICATED OUTDOOR AIR SYSTEMS



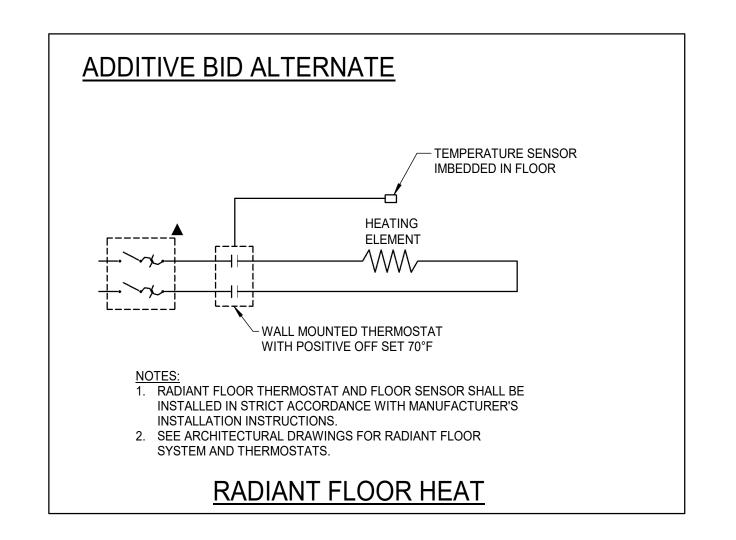
VRV INDOOR UNITS

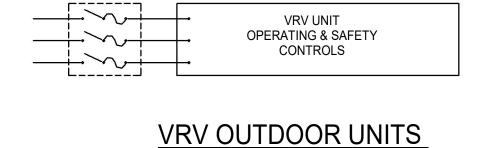
NO. AS

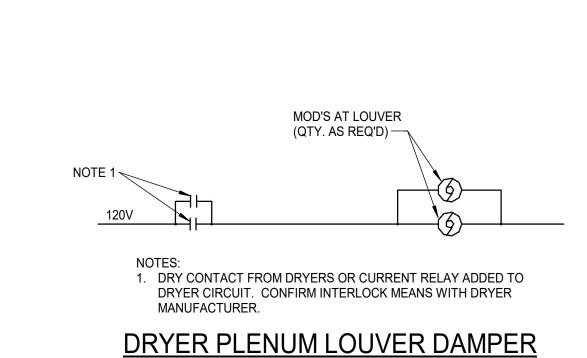
REQ'D.

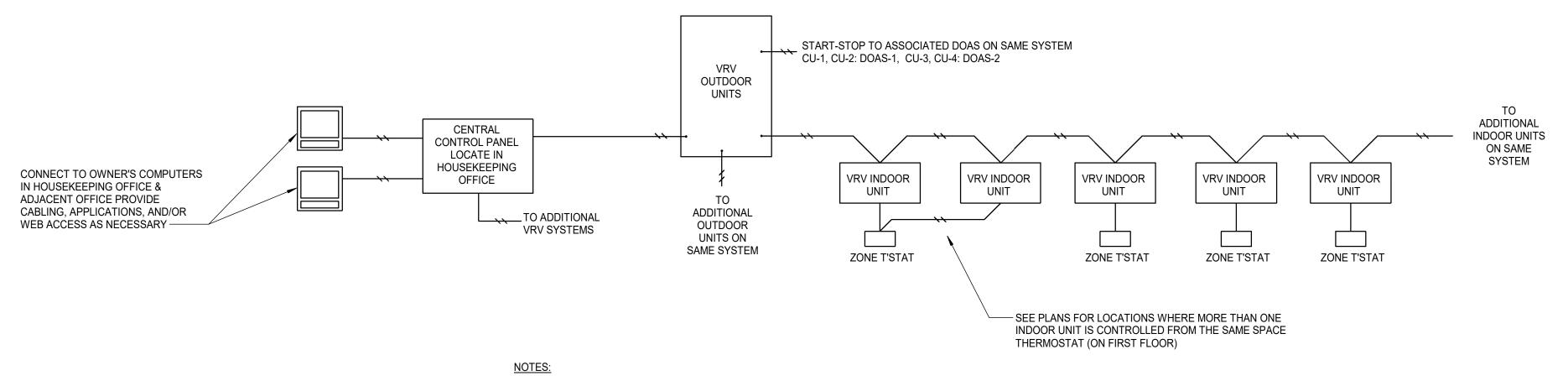


BRANCH SELECTOR UNITS



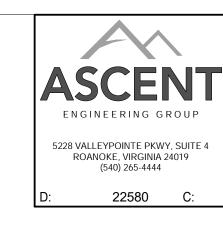






- 1. THERE SHALL BE TWO SEPARATE VRV SYSTEMS, ONE TO SERVE ALL INDOOR UNITS ON THE FIRST FLOOR AND ONE TO SERVE ALL INDOOR UNITS ON 2ND, 3RD AND 4TH FLOORS. SEE PLANS FOR NUMBER OF OUTDOOR UNITS AND ASSOCIATED INDOOOR UNITS.
- 2. EACH SYSTEM SHALL BE INTERLOCKED WITH ITS ASSOCIATED DOAS UNIT AS INDICATED.

VRV SYSTEM CONTROL ARCHITECTURE



CONTROL LEGEND		
HOLDING COILS — COMBINATION FUSIBLE MOTOR STARTER RELAY	— <u>\$</u> —	
MOTOR	<u> </u>	
MOTOR PROTECTIVE SWITCH	→	
DISCONNECT SWITCH (FUSED)	→ ^ <u></u>	
DISCONNECT	————	
PILOT LIGHT	─	
T'STAT OR RELAY	─ ─ ⊢	
SET POINT-CLOSE BELOW 65°F	65°F 1	
SET POINT-CLOSE ABOVE 65°F	——————————————————————————————————————	
ELECTRICAL WIRING, ABOVE 100 VOLT	PW	
TWIST SHIELDED PAIR, 24 VOLT		

AIRFLOW MEASURING STATION ANALOG INPUT ANALOG OUTPUT CARBON DIOXIDE SENSOR	AF AI AO CO2	FREEZE PROTECTION FIRESTAT FIRE ALARM SYSTEM GAS HEATER HEATING COIL	FP FS F.A. GH HC
CONTROL RELAY COOLING COIL CURRENT RELAY DIGITAL INPUT	CR CC CTR DI	HOT GAS REHEAT COIL HUMIDITY SENSOR PNEUMATIC ELECTRIC PHASE LOSS	HG HE PE
DIGITAL OUTPUT DIRECT DIGITAL CONTROL PANEL DIRECT EXPANSION COIL ELECTRIC COIL ELECTRIC PNEUMATIC	DO DDC DX EHC EP	PROTECTION START-STOP SMOKE DETECTOR TEMP SENSOR	PLP S/S SD TE
FAN RELAY	FR		

ALL ITEMS SHOWN ON CONTROL DIAGRAMS AND WIRING 100 VOLTS OR LESS SHALL BE INCLUDED AS A PART OF DIVISION 23 EXCEPT POWER WIRING OVER 100 VOLTS. ITEMS MARKED ▲ OR ITEMS SPECIFIED TO BE FURNISHED WITH EQUIPMENT. WIRING OVER 100 VOLTS AND ITEMS MARKED ▲ SHALL BE FURNISHED AS A PART OF DIVISION 26. ALL OVERLOADS, HOA SWITCHES, AUXILIARY CONTACTS AND PILOT LIGHTS SHALL BE INTEGRAL WITH THE MOTOR STARTERS UNLESS SHOWN OTHERWISE.

ALL WIRING SHOWN ON ELECTRIC SEQUENCE CONTROLS SHALL BE OVER 100 VOLTS UNLESS NOTED OTHERWISE. RELAYS FROM THE CONTROL SYSTEM SHALL BE LOCATED ADJACENT TO THE CONTROLLED DEVICE (MOTOR OR MOTOR STARTER), AND MAY BE LOCATED WITHIN STARTER HOUSINGS WHERE SPACE IS AVAILABLE AND WHERE APPROVED BY NEC.

ALL SEQUENCES OF OPERATION, FLOW DIAGRAMS, AND POINTS LIST ARE COMPLEMENTARY. ALL CONTROL STRATEGIES SHALL BE SATISFIED EVEN IF SOME OF THE REQUIRED CONTROL POINTS, ALARM, OR SOFTWARE HAVE BEEN INADVERTENTLY LEFT OFF OF THE POINTS LIST OR FLOW DIAGRAM. SIMILARLY, CONTROL POINTS, ALARM, AND SOFTWARE STRATEGIES INDICATED ON THE POINTS LIST SHALL BE PROVIDED EVEN IF A WRITTEN SEQUENCE OR FLOW DIAGRAM DEVICE HAS BEEN INADVERTENTLY OMITTED.

CONTROL ITEMS MARKED THUS "VENTILATION-ON-OFF" SHALL HAVE PLATE ENGRAVED WITH THE WORDING CONTAINED WITHIN THE QUOTE "..." MARKS PLUS EQUIPMENT IDENTIFICATION.

*QTY AS REQUIRED/INDICATED ON PLANS.

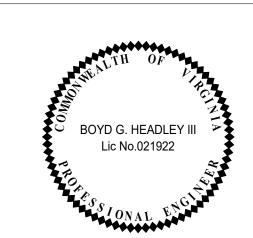


THE HAYNES

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FOR

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JOB NUME	BER	22011
DATE		08/30/24
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APPROVE	D BY	ВН
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		n c

CONSTRUCTION SET

REVISIONS		

M4.1

MECHANICAL CONTROLS