

CONTRACTOR SHALL PROVIDE AN ELECTRIC COOLING, GAS HEATING ROOFTOP UNIT. CONTRACTOR SHALL VERIFY MODEL NUMBERS AND ELECTRICAL REQUIREMENTS PRIOR TO INSTALLATION. CONTRACTOR SHALL PROVIDE STEEL SUPPORT AS REQUIRED AND THREE SETS OF FILTERS. CHANGE FILTERS AFTER FINAL CLEANING AND AGAIN PRIOR TO AIR BALANCE. FIELD VERIFY EXACT LOCATION, SIZE AND ALL OTHER REQUIREMENTS. ALL ROOF WORK TO BE PERFORMED BY AN OWNER APPROVED ROOFING CONTRACTOR AT THE CONTRACTOR'S EXPENSE. LABEL ROOFTOP UNIT PER SPECIFICATIONS. SEE HVAC EQUIPMENT SCHEDULE FOR MORE INFORMATION.

RTU SHALL BE INSTALLED ON EXISTING CURB. CONTRACTOR SHALL PROVIDE A CURB ADAPTER TO MATE THE NEW RTU TO THE EXISTING CURB. CONTRACTOR SHALL FIELD VERIFY EXISTING CURB MEASUREMENTS, CONDITION, AND ALL OTHER REQUIREMENTS. CURB ADAPTER SHALL BE MANUFACTURED BY AES INDUSTRIES, MICROMETL, THYBAR, OR EQUAL. CURB ADAPTER SHALL ACCOMMODATE THRU-THE-BASE ELECTRIC AND GAS CONNECTIONS FOR THE NEW RTU. MODIFY ROOF OPENING AS REQUIRED. CONTRACTOR IS RESPONSIBLE FOR SECURING THE NEW RTU TO THE CURB ADAPTER AND SECURING THE CURB ADAPTER TO THE EXISTING CURB IN ACCORDANCE WITH MANUFACTURER GUIDELINES AND LOCAL AHJ REQUIREMENTS.

OUTLINE OF EXISTING ROOF CURB. CONTRACTOR SHALL MODIFY CURB AS NECESSARY TO ACCOMMODATE NEW RTU AND CURB ADAPTER. CONTRACTOR SHALL CAP UNUSED PORTION OF ROOF CURB AND SEAL WEATHER TIGHT.

4. SUPPLY AND RETURN AIR DUCTS SHALL BE MADE FULL SIZE OF EQUIPMENT OPENINGS AND SECURELY CONNECTED WITH FLEXIBLE DUCT CONNECTIONS. DUCTS SHALL DROP VERTICALLY TO A POINT JUST BELOW THE STRUCTURE AND THEN TURN WITH A 90° ELBOW WITH TURNING VANES. DUCTS SHALL RUN HORIZONTALLY A MINIMUM OF 5' AND THEN TRANSITION TO SIZE INDICATED ON PLANS.

5. FACTORY PROVIDED SMOKE DETECTOR IN THE RTU RETURN AIR PATH. UPON DETECTION OF SMOKE, UNIT SHALL SHUT DOWN.

CONTRACTOR SHALL PROVIDE A NON-FAN-POWERED VARIABLE AIR VOLUME BOX. CONTRACTOR MUST VERIFY MODEL NUMBERS AND ELECTRICAL REQUIREMENTS PRIOR TO INSTALLATION. CONTRACTOR SHALL PROVIDE STRUCTURAL SUPPORT AS REQUIRED. FIELD VERIFY EXACT LOCATION, SIZE AND ALL OTHER REQUIREMENTS. LABEL VAV BOXES PER SPECIFICATIONS. SEE HVAC EQUIPMENT SCHEDULE FOR MORE INFORMATION.

PROVIDE A SUSPENDED CEILING CASSETTE INDOOR UNIT. INSTALL PER MANUFACTURER'S RECOMMENDATIONS AND REQUIREMENTS CONTRACTOR SHALL VERIFY MODEL NUMBER AND ELECTRICAL REQUIREMENTS PRIOR TO INSTALLATION. CONTRACTOR SHALL PROVIDE STRUCTURAL SUPPORT AS REQUIRED. COORDINATE EXACT LOCATION IN FIELD. CLEAN AIR FILTERS AFTER FINAL CLEANING. LABEL CEILING CASSETTE ACCORDING TO SPECIFICATIONS. SEE EQUIPMENT SCHEDULE FOR MORE INFORMATION.

PROVIDE A WALL MOUNTED DUCTLESS INDOOR UNIT. INSTALL PER MANUFACTURER'S RECOMMENDATIONS AND REQUIREMENTS. CONTRACTOR SHALL VERIFY MODEL NUMBER AND ELECTRICAL REQUIREMENTS PRIOR TO INSTALLATION. CONTRACTOR SHALL PROVIDE STRUCTURAL SUPPORT AS REQUIRED. COORDINATE EXACT LOCATION IN FIELD. CLEAN AIR FILTERS AFTER FINAL CLEANING. LABEL WALL MOUNTED UNIT ACCORDING TO SPECIFICATIONS. SEE EQUIPMENT SCHEDULE FOR MORE INFORMATION.

PROVIDE A MINI-SPLIT HEAT PUMP. CONTRACTOR SHALL VERIFY MODEL NUMBERS AND ELECTRICAL REQUIREMENTS PRIOR TO INSTALLATION. INSTALL HEAT PUMP ON HOUSEKEEPING PAD AND EQUIPMENT SUPPORT STAND BY DIVERSITECH, OR EQUAL. INSTALL UNIT LEVEL. LABEL HP PER SPECIFICATIONS. HEAT PUMP AND SUPPORT STAND SHALL BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. SEE EQUIPMENT SCHEDULES FOR MORE INFORMATION.

10. DASHED LINE AROUND HVAC EQUIPMENT REPRESENTS MANUFACTURER'S RECOMMENDED CLEARANCES FOR EQUIPMENT MAINTENANCE AND PROPER OPERATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN SERVICE CLEARANCES THE FULL HEIGHT OF THE UNIT IN THIS AREA.

11. SINGLE LINE REPRESENTS BOTH SUCTION AND LIQUID REFRIGERANT ROUTING. CONTRACTOR SHALL PROVIDE REFRIGERANT PIPING BETWEEN EACH PIECE OF EQUIPMENT AND MAKE FINAL CONNECTIONS. PROVIDE SHUT-OFF VALVES, CHARGING PORTS, FILTER DRYERS, SIGHT GLASSES, 24 VOLT SOLENOID VALVES, AND ALL ITEMS REQUIRED FOR A COMPLETE AND FUNCTIONING REFRIGERATION SYSTEM. INSTALL TXV AND CLAMP-ON PIPE TEMPERATURE SENSOR AS FURNISHED BY MANUFACTURER. INSULATE REFRIGERANT LINES. FIELD VERIFY EXACT ROUTING, AND SIZE REFRIGERANT LINES PER MANUFACTURER'S RECOMMENDATIONS FOR DISTANCE, NUMBER OF FITTINGS AND HEIGHT OF LIQUID LIFT. SEE HVAC EQUIPMENT SCHEDULE FOR MORE INFORMATION. ROUTE REFRIGERANT LINES TIGHT TO STRUCTURE WHEN POSSIBLE AND RUN PARALLEL OR PERPENDICULAR TO STRUCTURE IN AN ORDERLY MANNER. FIELD VERIFY AND COORDINATE ALL REQUIREMENTS PRIOR TO BID.

12. PENETRATE EXTERIOR WALL AS HIGH AS POSSIBLE ABOVE BREAKROOM CEILING. SLEEVE PENETRATION AND SEAL WEATHER TIGHT FIELD VERIFY EXACT LOCATION AND COORDINATE ALL REQUIREMENTS.

13. ROUTE CONDENSATE LINE FROM AHU TO MOP SINK IN ROOM: JANITOR 117. SLOPE CONDENSATE LINE A MINIMUM OF 1/8" PER FOOT TOWARD THE POINT OF TERMINATION. PROVIDE A CLEANOUT AT EACH CHANGE IN DIRECTION. TERMINATE ABOVE MOP SINK WITH MINIMUM 2" AIR GAP.

14. CONTRACTOR SHALL INSTALL FACTORY FURNISHED REMOTE CONTROLLER. MOUNT CONTROLLER TO WALL AT APPROXIMATE LOCATION SHOWN WITH TOP OF CONTROLLER AT 48" AFF. PROVIDE ALL CONTROL WIRING AS REQUIRED.

15. CONTRACTOR SHALL PROVIDE A CONDENSATE DRAIN FROM RTU. MINIMUM DRAIN SIZE SHALL BE 1". CONTRACTOR SHALL FURNISH AND INSTALL A SPLASH BLOCK ON ROOF AND EXTEND UV RESISTANT PVC PIPING WITH CHEMICALLY WELDED JOINTS TO SPLASH BLOCK AND TERMINATE OVER SPLASH BLOCK. FIELD VERIFY AND COORDINATE MATERIALS AND ALL OTHER REQUIREMENTS.

PER MANUFACTURER'S INSTRUCTIONS. FIELD VERIFY EXACT LOCATION AND REQUIREMENTS. 17. ROUTE EXHAUST DUCT UP THROUGH 2ND FLOOR MECHANICAL ROOM TO ROOF. FIELD VERIFY AND COORDINATE THE EXACT ROUTING

OF THE DUCTWORK THROUGH THE SECOND FLOOR WITH THE OWNER AND THE GC. LOCATION OF EXHAUST OUTLET ON ROOF SHALL BE A MINIMUM OF 10'-0" AWAY FROM ANY OUTSIDE AIR INTAKES.

18. PROVIDE A MINIMUM OF 3 STRAIGHT DUCT DIAMETERS UPSTREAM OF THE VAV BOX INLET AND A MINIMUM OF 48" DOWNSTREAM OF THE VAV BOX OUTLET.

19. CONTRACTOR SHALL INSTALL DUCT STATIC PRESSURE SENSOR (FACTORY FURNISHED WITH RTU). INSTALL IN ACCORDANCE WITH MANUFACTURER REQUIREMENTS. PROVIDE ALL NECESSARY CONTROL WIRING.

20. CONTRACTOR SHALL PROVIDE TRANE TRACER CONCIERGE CONTROL PANEL WITH WIRELESS COMMUNICATION INTERFACE AND TOUCHSCREEN DISPLAY. MOUNT TOUCHSCREEN DISPLAY ON THE RIGHT AT A HEIGHT OF 48" A.F.F. TO THE TOP OF THE DISPLAY. MOUNT THE CONTROL PANEL ON THE LEFT, ALIGNED WITH THE DISPLAY. INSTALL THE WIRELESS COMMUNICATION INTERFACE ABOVE THE CEILING. INSTALL IN ACCORDANCE WITH MANUFACTURER REQUIREMENTS.

21. CONTRACTOR SHALL INSTALL ZONE SENSOR (FACTORY FURNISHED WITH RTU). INSTALL IN ACCORDANCE WITH MANUFACTURER REQUIREMENTS.

22. MULTIPLE SENSORS ARE INSTALLED FOR THIS ZONE. TEMPERATURE READINGS SHALL BE AVERAGED TOGETHER AS THE SPACE TEMPERATURE CONTROL POINT FOR THE ZONE.

23. SENSOR SHALL HAVE A MANUAL OCCUPANCY OVERRIDE. WHEN ACTIVATED, THIS SENSOR BECOMES THE CONTROLLING SENSOR FOR THE ZONE FOR SET PERIOD OF TIME (ADJ).

24. THIS ZONE SHALL BE IN UNOCCUPIED MODE 24/7.

VIRGINIA BRANCH 202 I BLACKSE

JEROMY T. PERRY Lic. No. 42243

STATE, PROVINCE OR TERRITORY SHOWN ON THI SEAL. THIS BUILDING USE IS ONLY APPLICABLE IN AREAS MEETING THE STATED DESIGN CRITERIA.

DRAWING NUMBER

C

City Name .. Virginia 37.3 Deg. Location . Latitude .. Longitude ... **80.0** Deg. . 1175.0 ft Elevation Summer Design Dry-Bulb .. **92.0** °F . **73.0** °F Summer Coincident Wet-Bulb Summer Daily Range 19.6 °F .. **12.0** °F Winter Design Dry-Bulb Winter Design Wet-Bulb .. . 9.4 °F Atmospheric Clearness Number . 0.95 Average Ground Reflectance ... Soil Conductivity **0.800** BTU/(hr·ft·°F) Local Time Zone (GMT +/- N hours) .. **5.0** hours Consider Daylight Savings Time . Simulation Weather Data .. Current Data is 2001 ASHRAE Handbook Design Cooling Months .. January to December

LOAD CALCULATIONS									
Air System Information Air System Name Equipment Class Air System Type Sizing Calculation Information	PKG ROOF	Number of zones Floor Area Location Roanc	6510.0						
Calculation Months Sizing Data		Zone CFM Sizing Sum of space a Space CFM Sizing Individual peak							
Central Cooling Coil Sizing Data									
Total coil load Total coil load Sensible coil load Coil CFM at Jul 1500 Max block CFM Sum of peak zone CFM Sensible heat ratio CFM/Ton ft²/Ton BTU/(hr·ft²) Water flow @ 10.0 °F rise	272.7 MBH 206.1 MBH 10000 CFM 10000 CFM 10000 CFM 0.756 440.0 286.4 41.9	Load occurs at OA DB / WB Entering DB / WB Leaving DB / WB Coil ADP Bypass Factor Resulting RH Design supply temp. Zone T-stat Check Max zone temperature deviation	92.0 / 73.0 79.5 / 67.2 59.5 / 58.4 						
Central Heating Coil Sizing Data									
Max coil load Coil CFM at Des Htg Max coil CFM Water flow @ 20.0 °F drop	10000 CFM 10000 CFM	Load occurs at	28.7						

. 10000 CFM ... 9583 CFM

.. 1975 CFM

0.30 CFM/ft²

Fan motor BHP Fan motor kW ..

Fan static ...

CFM/person

. 3.26 kW

1.50 in wg

.. **9.45** CFM/person

Actual max CFM .

Standard CFM ... Actual max CFM/ft²

Outdoor Ventilation Air Data
Design airflow CFMCFM/ft²

		ESIGN COOLIN	G	DESIGN HEATING			
	COOLING DATA			HEATING DATA			
	COOLING OA D		F / 73.0 °F	HEATING OA DB / WB 12.0 °F / 9.4 °F			
		Sensible	Latent		Sensible	Laten	
ZONE LOADS	Details	(BTU/hr)	(BTU/hr)	Details	(BTU/hr)	(BTU/hr	
Window & Skylight Solar Loads	465 ft²	19710	-	465 ft²	-		
Wall Transmission	3369 ft²	6912	-	3369 ft²	29421		
Roof Transmission	2050 ft ²	2228	-	2050 ft ²	3674		
Window Transmission	465 ft²	7665	-	465 ft²	31585		
Skylight Transmission	O ft²	0	-	O ft²	0		
Door Loads	0 ft²	0	-	O ft²	0		
Floor Transmission	6510 ft ²	0	-	6510 ft ²	5230		
Partitions	0 ft²	0	-	O ft²	0		
Ceiling	O ft²	0	-	O ft²	0		
Overhead Lighting	6510 W	20629	-	0	0		
Task Lighting	0 W	0	-	0	0		
Electric Equipment	9752 W	31906	-	0	0		
People	209	40466	42845	0	0	(
Infiltration	-	3519	1977	-	11591	(
Miscellaneous	-	6006	0	-	0	(
Safety Factor	5% / 5%	6952	2241	5%	4075	(
>> Total Zone Loads	-	145993	47063	-	85576	(
Zone Conditioning	-	163095	47063	-	84568	(
Plenum Wall Load	0%	0	-	0	0		
Plenum Roof Load	0%	0	-	0	0		
Plenum Lighting Load	0%	0	-	0	0		
Return Fan Load	10000 CFM	0	-	10000 CFM	0		
Ventilation Load	1975 CFM	31920	19524	1975 CFM	113495	(
Supply Fan Load	10000 CFM	11120	-	10000 CFM	-11120		
Space Fan Coil Fans	-	0	-	-	0		
Duct Heat Gain / Loss	0%	0	-	0%	0		
>> Total System Loads	-	206135	66587	-	186943	(
Central Cooling Coil	-	206135	66591	-	0	(
Central Heating Coil	-	0	-	_	186943		
>> Total Conditioning	-	206135	66591	-	186943	i	
Key:	Positiv	e values are clo	loads	Positiv	e values are htg	loads	
•		e values are ht			e values are clg		

TITU	TITUS AIR DISTRIBUTION SCHEDULE									
MARK CATALOG NUMBER	CATALOG	SIZE		MOUNTING		MATERIA	L	BORDER	NOTES	
	MOD.	SIZE	CEILING	OTHER	STEEL	ALUM.	STYLE	NOTES		
<u>SD-1</u>	TITUS OMNI	24"X24"	SEE PLAN	•		•		С		
<u>RG-1</u>	TITUS 355 RL	24"X24"	22"X22"	•		•		С		
<u>TG-1</u>	TITUS 355 RL	24"X24"	22"X22"	•		•		С		

NOTES (APPLY TO ALL AIR DISTRIBUTION DEVICES): FIRST LETTER: S-SUPPLY R-RETURN T-TRANSFER

SECOND LETTER: D-DIFFUSER R-REGISTER G-GRILLE

CATALOG NUMBERS REFER TO TITUS AIR DEVICES. SEE ARCHITECTURAL SHEETS FOR FINISH COLOR, IF NO COLOR IS SPECIFIED, PROVIDE STANDARD WHITE.

A. SURFACE MOUNTED.

B. LAY-IN - PROVIDE WITH TITUS MODEL #TRM-S FRAME FOR DRYWALL CEILING MOUNTING. SEE DETAIL ON THIS

C. LAY-IN FRAME FOR T-BAR CEILING. D. LAY-IN - PROVIDE WITH TITUS BORDER STYLE 22 FOR DRYWALL CEILING MOUNTING FOR LINEAR DEVICES.

MARK	<u>HP-1</u>	<u>HP-2</u>
MANUFACTURER	MITSUBISHI	MITSUBISHI
MODEL#	MUZ-GX12NL	PUZ-AK48NL
EER2	13.35	10.4
SEER2	25.6	19.4
HSPF2	10.7	9.4
COP AT 47°F	3.84	3.3
PAIRED WITH	AHU-1	AHU-2
COOLING AMBIENT OAT (°FDB)	95	95
HEATING AMBIENT OAT (°FDB)	47	47
HEATING AMBIENT OAT (°FWB)	43	43
TOTAL COOLING CAPACITY (MBH)	12	48.0
TOTAL HEATING CAPACITY (MBH)	14.4	60.0
PHYSICAL DATA		
NUMBER OF FANS	1	2
NO. OF COMPRESSORS	-	-
ELECTRICAL		
VOLTS/Ø/HZ	208 / 1 / 60	208 / 1 / 60
MCA (AMPS)	12	38
MOCP (AMPS)	21	67
MAX. WEIGHT (LBS.)	77	265
ACCESSORIES	1, 2, 3	1, 2, 3
NOTES	A, B, C, D	A, B, C, D

FACTORY FURNISHED TRANSFORMER FOR FIELD APPLIED CONTROLS.
FACTORY FURNISHED LOW AMBIENT KIT.
CONTRACTOR FURNISHED AND INSTALLED DISCONNECT.

WIRING OF CONTROLS TO BE BY CONTRACTOR.
REFER TO CONTROL WIRING SCHEMATICS FOR ANY FIELD
INSTALLED CONTROL DEVICES NOT FACTORY INSTALLED.
UNIT PROVIDED BY THE CONTRACTOR.
CONTRACTOR TO PROVIDE ALL STRUCTURAL SUPPORT.

SUPPLY DIFFUSER

	HP-1	HP-2	MARK	AHU-1	AHU-2
	MITSUBISHI	MITSUBISHI	MANUFACTURER	MITSUBISHI	MITSUBISHI
	MUZ-GX12NL	PUZ-AK48NL	MODEL #	MSZ-GX12NL	PLA-AE48NL
	13.35	10.4	PAIRED WITH	<u>HP-1</u>	<u>HP-2</u>
	25.6	19.4	NOMINAL TONNAGE	1	4
	10.7	9.4	SUPPLY AIR FLOW (CFM)	448	1,200
	3.84	3.3	OUTSIDE AIR FLOW (CFM)	-	-
	AHU-1	<u>AHU-2</u>	EXT. S.P. (IN. W.C.)	-	-
OAT (°FDB)	95	95	DX COOLING COIL	·	
OAT (°FDB)	47	47	EAT (°FDB/WB)	80 / 67	80 / 67
OAT (°FWB)	43	43	RATED TOTAL (MBH)	12	48
APACITY (MBH)	12	48.0	RATED SENSIBLE (MBH)	9.24	32.16
APACITY (MBH)	14.4	60.0	HEAT PUMP HEATING		
			RATED CAPACITY AT 5°F (MBH)	10.1	23
S	1	2	ELECTRICAL		
SSORS	-	-	VOLTS/Ø/HZ	208 / 1 / 60	208 / 1 / 60
			MOTOR (HP)	-	-
	208 / 1 / 60	208 / 1 / 60	MCA (AMPS)	1	2
	12	38	MOCP (AMPS)	-	-
	21	67	MAX. WEIGHT (LBS.)	23	57
.)	77	265	ACCESSORIES	1, 2, 3, 4, 5	1, 2, 3, 4, 5
	1, 2, 3	1, 2, 3	NOTES	A, B, C, D	A, B, C, D
	A, B, C, D	A, B, C, D	ACCESSORIES:	<u>'</u>	1

SWITCH, THERMAL EXPANSION VALVE, ETC.).
FACTORY FURNISHED (FIELD INSTALLED) THERMOSTAT.
CONTRACTOR FURNISHED AND INSTALLED DISCONNECT.
CONTRACTOR FURNISHED AND INSTALLED REFRIGERANT SPECIALTIES.
FACTORY FURNISHED CONDENSATE PUMP.

WIRING OF CONTROLS TO BE BY CONTRACTOR.
REFER TO CONTROL WIRING SCHEMATICS FOR ANY FIELD INSTALLED CONTROL DEVICES
NOT FACTORY INSTALLED.
UNIT FURNISHED AND INSTALLED BY CONTRACTOR.
CONTRACTOR TO PROVIDE ALL STRUCTURAL SUPPORT.

VAV UNIT SCHED	ULE								
MARK	VAV-1	VAV-2	VAV-3	VAV-4	<u>VAV-5</u>	VAV-6	VAV-7	VAV-8	VAV-9
MANUFACTURER	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE
MODEL#	VCEF	VCEF	VCEF	VCEF	VCEF	VCCF	VCEF	VCCF	VCEF
NLET SIZE	10"	10"	10"	10"	12"	12"	14"	8"	14"
MAXIMUM AIR FLOW (CFM)	750	800	900	800	1325	1225	1800	500	1900
MINIMUM FLOW (CFM)	375	400	450	400	665	615	900	250	950
ELECTRIC HEAT			1		1				
POWER INPUT (KW)	3.5	4	4	4	6.5	NO HEAT	9	NO HEAT	9
STAGES	2	2	2	2	2	-	2	-	2
VOLTS/Ø/HZ	208/3/60	208/3/60	208/3/60	208/3/60	208/3/60	-	208/3/60	-	208/3/60
ACCESSORIES	1, 2	1, 2	1, 2	1, 2	1, 2	1, 2	1, 2	1, 2	1, 2
NOTES	A, B, C	A, B, C	A, B, C	A, B, C	A, B, C				
ACCECCODIEC:		1	1	1	l	1	1	1	.1

FACTORY PROVIDED DISCONNECT SWITCH, CONTROL TRANSFORMER, CONTROLLER AND WIRELESS COMMUNICATION INTERFACE COMPATIBLE WITH TRANE TRACER CONCIERGE CONTROL SYSTEM. FACTORY FURNISHED (FIELD INSTALLED) AIR-FI TEMPERATURE SENSOR WITH THUMBWHEEL ADJUSTMENT. REFER TO PLANS FOR ADDITIONAL INFORMATION.

CLG. CEILING

REFER TO CONTROL WIRING SCHEMATICS FOR ANY FIELD INSTALLED CONTROL DEVICES NOT FACTORY INSTALLED.

UNIT FURNISHED AND INSTALLED BY CONTRACTOR. CONTRACTOR TO PROVIDE ALL STRUCTURAL SUPPORT.

HVA	HVAC SYMBOLS & ABBREVIATIONS LEGEND									
THERMOSTAT		RETURN GRILLE	CONT.	CONTINUATION	MAX.	MAXIMUM				
HUMIDISTAT SENSOR			CONTR. COORD.	CONTRACTOR COORDINATE	MCA.	MAX CIRCIUT AMPACITY				
A HORN STROBE		EXHAUST GRILLE	CUH.	CABINET UNIT	MECH.	MECHANICAL				
(K) SMOKE DETECTO	R ◀Î	SPIN-IN FITTING	DIFF.	HEATER DIFFUSER	MFR. MIN.	MANUFACTURER MINIMUM				
TEST KEY	 ⊿¹⊤	SPIN-IN FITTING W/	DISC. DN.	DISCONNECT DOWN	MOCP.	MAX OVERCURRENT				
SD → DUCT SMOKE DETECTOR		MAN. BAL. DPR.	DN. DPR.	DAMPER		PROTECTION				
├────────────────────────────────────	X"Ø AB.	ROUND DUCT ABOVE	EA.	EACH	MTD. NTS.	MOUNTED NOT TO SCALE				
SUPPLY DUCT - UI	P A/C	AIR CONDITIONING	EC.	ELECTRICAL CONTRACTOR	OA.	OUTSIDE AIR				
SUPPLY DUCT - DI	AD:	ACCESS DOOR	EX.	EXISTING	PC.	PLUMBING				
RA OR EXH. DUCT		ABOVE FINISHED FLOOR	EXH. F. DPR.	EXHAUST FIRE DAMPER	RA.	CONTRACTOR RETURN AIR				
RA OR EXH. DUCT	AHU.	AIR HANDLING UNIT	FLEX.	FLEXIBLE	RTU.	ROOFTOP UNIT				
ELBOW TURNING	7/1/011.	ARCHITECT BACKDRAFT DPR.	FLR. GC.	FLOOR GENERAL	SA. TV.	SUPPLY AIR TURNING VANES				
FIRE DAMPER (F.D. MANUAL BALANCE	BFI	BELOW	GC.	CONTRACTOR	TYP.	TYPICAL				
DAMPER	BLDG.	BUILDING CUBIC FEET	HC.	HEATING CONTRACTOR	WH.	WATER HEATER				
→ TRANSITION	CFM.	PER MINUTE	HP.	HORSEPOWER	W/	WITH				

MARK	RTU-1	
MANUFACTURER	TRANE	
MODEL#	YHK300	
NOMINAL TONNAGE	25	
SUPPLY AIR FLOW (CFM)	10,000	
OUTSIDE AIR FLOW (CFM)	2,055	
AMBIENT OAT (°FDB)	92	
EXT. S.P. (IN. W.C.)	1.5	
DX COOLING COIL		
EAT (°FBD/WB)	80.0 / 67.0	
TOTAL (MBH)	270.16	
SENSIBLE (MBH)	205.27	
EER	10.8	
IEER	16.0	
NATURAL GAS HEAT		
INPUT (MBH)	400	
OUTPUT (MBH)	324	
STAGES	MODULATING	
ELECTRICAL		
VOLTS/Ø/HZ	208 / 3 / 60	
MOTOR (HP)	2 @ 4.6	
MCA (AMPS)	128	
MOCP (AMPS)	175	
MAX. WEIGHT (LBS.)	2,450	
ACCESSORIES	1-2, 4-9, 11, 13-15	
NOTES	A, B, C, D, E	

FACTORY PROVIDED NUT-103ED DISCONNECT A THAUTH BASE ELEC.

FACTORY PROVIDED DUCT SMOKE DETECTOR IN RETURN AIR.

FACTORY FURNISHED (FIELD INSTALLED) 14" HIGH ROOF CURB.

FACTORY FURNISHED LOW LEAK ECONOMIZER WITH COMPARATIVE ENTHALPY CONTROL AND FAULT DETECTION & DIAGNOSTICS.

FACTORY PROVIDED GAS HEAT.

FACTORY PROVIDED (FIELD WIRED) NON-POWERED GFI OUTLET.

FACTORY FURNISHED (FIELD INSTALLED) CONTROLLER AND WIRELESS COMMUNICATION INTERFACE COMPATIBLE WITH TRANE TRACER CONCIERGE CONTROL SYSTEM.

FACTORY PROVIDED HINGED ACCESS DOORS.

FACTORY FURNISHED (FIELD INSTALLED) HAIL GUARD.

FACTORY FURNISHED (FIELD INSTALLED) HAIL GUARD.

FACTORY FURNISHED WITH COASTAL CONDENSER COIL COATING.

FACTORY FURNISHED POWER EXHAUST FOR RELIEF AIR (SOME FIELD ASSEMBLY REQUIRED).

FACTORY PROVIDED WITH HOT GAS REHEAT FOR DEHUMIDIFICATION.

FACTORY PROVIDED WITH 2" FILTER RACK.

FACTORY PROVIDED MULTI-ZONE VAV FAN WITH OVERSIZED MOTOR.

FACTORY FURNISHED (FIELD INSTALLED) DUCT STATIC PRESSURE SENSOR FOR FAN CONTROL)

FACTORY PROVIDED THRU THE BASE GAS.

WIRING OF CONTROLS TO BE BY CONTRACTOR.
REFER TO CONTROL WIRING SCHEMATICS FOR ANY FIELD INSTALLED CONTROL DEVICES
NOT FACTORY INSTALLED.
FIELD SET MINIMUM OUTSIDE AIR AS SPECIFIED ABOVE. OUTSIDE AIR DAMPER SHALL
FULLY CLOSE ON UNIT SHUTDOWN.
UNIT FURNISHED AND INSTALLED BY CONTRACTOR.
CONTRACTOR TO PROVIDE ALL STRUCTURAL SUPPORT.

FAN SCHEDU	ILE				
MARK	<u>EF-1</u>	EF-2	<u>EF-3</u>	<u>EF-4</u>	<u>EF-5</u>
MANUFACTURER	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECH
MODEL	SP-A200	SP-A200	SP-A200	SP-A200	SP-B90
TYPE	CEILING	CEILING	CEILING	CEILING	CEILING
DRIVE TYPE	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT
PERFORMANCE		•			
AIR FLOW (CFM)	100	100	100	100	50
EXT. STATIC (IN W.C.)	0.375	0.375	0.375	0.375	0.375
FAN SPEED (RPM)	732	732	732	732	683
ELECTRICAL	-				
VOLTS/Ø/HZ	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
FAN MOTOR WATTS	25	25	25	25	18
APPROX. WEIGHT (LBS.)	24	24	24	24	10
SERVES	RESTROOM	RESTROOM	RESTROOM	RESTROOM	JANITOR
ACCESSORIES	1, 2	1, 2	1, 2	1, 2	1, 2
NOTES	A, B	A, B	A, B	A, B	B, C
ACCESSORIES:	·	•	•		•

PROVIDE WITH INTEGRAL BACKDRAFT DAMPER, DISCONNECT SWITCH, AND SPEED CONTRACTOR TO FURNISH AND INSTALL VIBRATION ISOLATION AS REQUIRED.

. INTERLOCK OPERATION WITH LIGHTS.
. FURNISHED AND INSTALLED BY CONTRACTOR.
. FAN SHALL RUN CONTINUOUSLY.

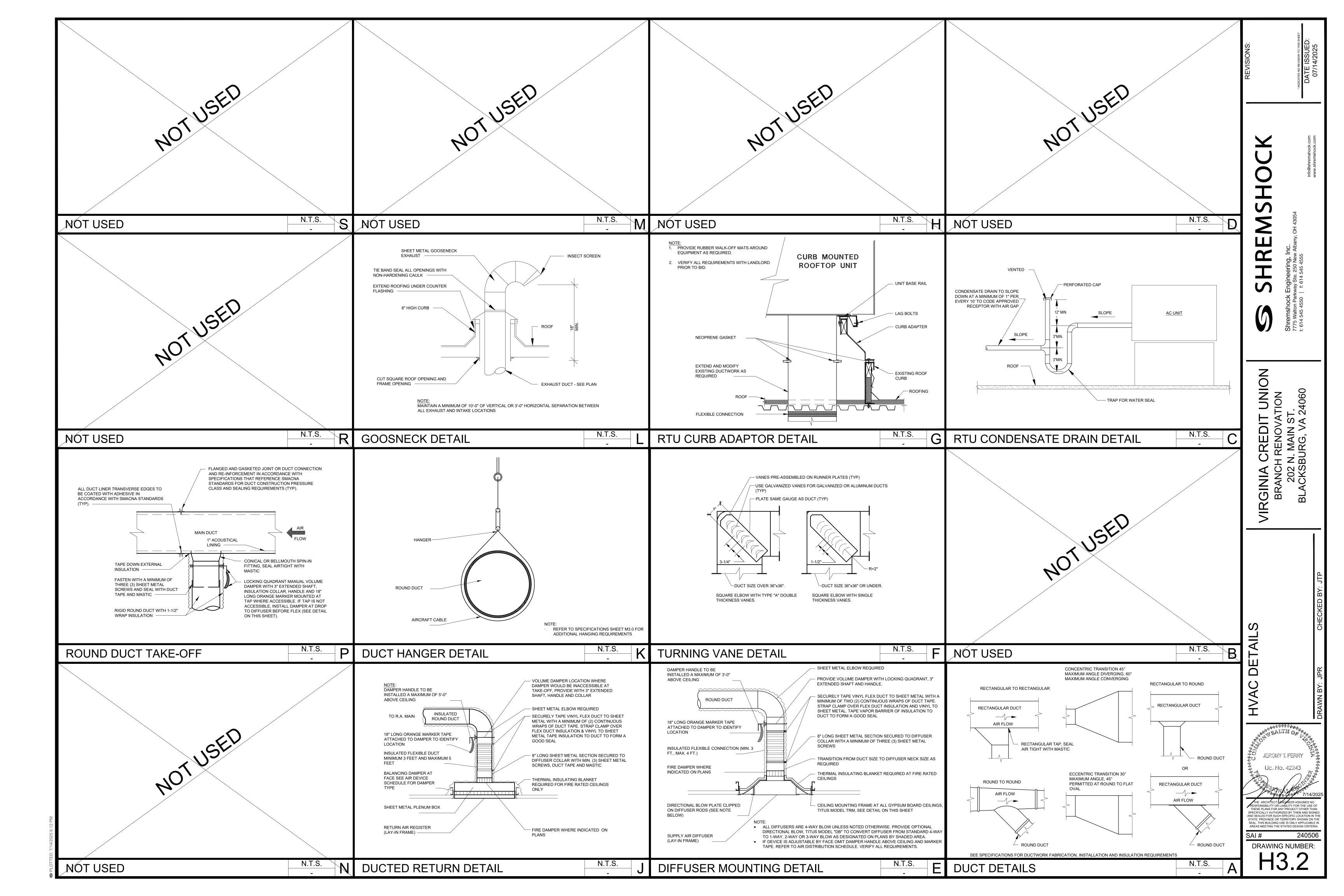
							LATION CAL 1ECHANICAL C								
	GENERAL INFORMATION				202	1 711(01141)(17		ODL		OUTSIDE AIR					
			FLOOR AREA	PEOPLE PER 1000 SQFT		REQUIRED	OUTDOOR AIR	(CFM / PERSON)		BREATHING ZONE OUTDOOR AIR		ZONE OUTSIDE AIR RATE	PRIMARY AIRFLOW	PRIMARY OUTDOOR AIR FRACTION	SYSTEM VENTILATION EFFICIENCY
IARK(S)	ROOM NAME - NUMBER	OCCUPANCY CLASS	(SQFT)	(NET AREA)	# OF PEOPLE IN SPACE	(CFM / SQFT)	(CFM / PERSON)	· ·	CFM / SQFT)* FLOOR AREA	(CFM)	AIR DISTRIBUTION EFFECTIVENESS	(REQUIRED CFM)	(CFM)		
			(Az)		(Pz)	(Ra)	(Rp)	(Rp * Pz)	(Ra * Az)	(Vbz = Rp*Pz+Ra*Az)	(Ez)	(Voz = Vbz/Ez)	(Vpz)	(Zp = Voz/Vpz)	Ev
ΓU-1	129_UNOCCUPIED & 120_CORRIDOR	MULTIPURPOSE ASSEMBLY	1506	120	114	0.06	5	570	91	661	0.8	827	3700	0.224	0.93
ΓU-1	118 CORRIDOR	CORRIDORS	148	0	0	0.06	0	0	9	9	0.8	12	100	0.120	1.00
U-1	116 BREAK	BREAKROOMS	275	50	14	0.12	5	70	33	103	0.8	129	500	0.258	0.89
J-1	124-127_RESTROOMS	TOILET ROOMS - PUBLIC	272	0	0	0.00	0	0	0	0	0.8	0	200	0.000	1.00
J-1	123_CORRIDOR	CORRIDORS	389	0	0	0.06	0	0	24	24	0.8	30	300	0.100	1.00
J-1	104_OFFICE	OFFICE SPACES	135	5	1	0.06	5	5	9	14	0.8	18	200	0.090	1.00
J-1	102_WAITING, 113_WORK AREA, 112_TELLER	SALES	1659	15	25	0.12	7.5	188	200	388	0.8	485	2650	0.183	0.97
J-1	115_STAIR	SALES	197	15	3	0.12	7.5	23	24	47	0.8	59	200	0.295	0.86
J-1	105_WORK ROOM	OFFICE SPACES	279	5	2	0.06	5	10	17	27	0.8	34	400	0.085	1.00
J-1	106_CONFERENCE	CONFERENCE ROOMS	282	50	15	0.06	5	75	17	92	0.8	115	400	0.288	0.86
-1	107_OFFICE	OFFICE SPACES	149	5	1	0.06	5	5	9	14	0.8	18	200	0.090	1.00
-1	111_WAITING	MAIN ENTRY LOBBIES	285	10	3	0.06	5	15	18	33	0.8	42	300	0.140	1.00
J-1	108_CONFERENCE	CONFERENCE ROOMS	388	50	20	0.06	5	100	24	124	0.8	155	400	0.388	0.76
J-1	109_OFFICE	OFFICE SPACES	189	5	1	0.06	5	5	12	17	0.8	22	300	0.073	1.00
J-1	110_OFFICE	OFFICE SPACES	111	5	1	0.06	5	5	7	12	0.8	15	150	0.100	1.00
									Vou	1565		TOTAL	10000		
LTI-ZONE)			6264						Vot	2053					

JEROMY T. PERRY RESPONSIBILITY OR LIABILITY FOR THE USE OF THESE PLANS FOR ANY PROJECT OTHER THAN SPECIFICALLY AUTHORIZED BY THEM AND SIGNED AND SEALED FOR SUCH SPECIFIC LOCATION IN THE STATE, PROVINCE OR TERRITORY SHOWN ON THE SEAL. THIS BUILDING USE IS ONLY APPLICABLE IN AREAS MEETING THE STATED DESIGN CRITERIA.

DRAWING NUMBER:

MECHANICAL DESIGN DATA

N MECHANICAL SCHEDULES



READ THE SPECIFICATIONS AND REVIEW DRAWINGS FOR ALL DIVISIONS OF WORK COORDINATE AND SCHEDULE ALL WORK WITH AND BETWEEN ALL CONTRACTORS AND PROVIDE ALL SUBCONTRACTORS WITH A COMPLETE SET OF BID DOCUMENTS. FIELD VERIFY AND COORDINATE WORK BETWEEN ALL TRADES, LANDLORD REQUIREMENTS, CEILING HEIGHTS AND EXISTING CONDITIONS PRIOR TO

- VERIFY ALL CONDITIONS IN FIELD PRIOR TO BID. VISIT JOB SITE AND BE FAMILIAR WITH OWNER REQUIREMENTS AND EXISTING CONDITIONS. NO ALLOWANCE WILL BE MADE FOR EXTRAS DUE TO FAILURE TO VISIT THE JOB SITE AND/OR FAILURE TO PREDETERMINE ALL REQUIREMENTS IMPOSED BY THE OWNER, EXISTING CONDITIONS OR OTHER AUTHORITIES.
- VERIFY DUCT ROUTING AND SIZES AS EARLY IN THE JOB PROCESS AS POSSIBLE. DUCT LAYOUT AND SIZES SHOWN ARE DIAGRAMMATIC, BASED ON CONSTRUCTION DOCUMENTS AND FIELD SURVEY INFORMATION. IF FIELD CONDITIONS, DUCT SIZES AND DUCT LAYOUT, VARIES SUBSTANTIALLY FROM CURRENT LAYOUT, THEN NOTIFY GENERAL CONTRACTOR IMMEDIATELY. DUCT DIMENSIONS ARE NOMINAL CLEAR INSIDE DIMENSIONS. FIELD COORDINATE ALL DUCT RUNS PRIOR TO DUCT FABRICATION. NO EXTRAS SHALL BE AWARDED FOR DUCT REVISIONS CAUSED BY LACK OF COORDINATION.
- ALIGNMENT/PLACEMENT OF HVAC DEVICES IS CRITICAL. COORDINATE ALIGNMENT WITH THE ARCHITECTURAL REFLECTED CEILING PLAN AND LIGHTING PLAN. COORDINATE BOX-OUT LOCATIONS FOR ALL DRYWALL MOUNTED AIR DEVICES WITH CEILING FRAMING. ORIENT ALL AIR DEVICES TO MINIMIZE VIEW INTO PLENUM/DUCT.
- SPIN-IN FITTINGS AND MANUAL BALANCING DAMPERS, AS DETAILED ON SHEET H5.1, TO BE USED FOR ALL ROUND BRANCH TAPS AT INACCESSIBLE LOCATIONS WITH BALANCING REQUIRED FROM REMOTE ACCESSIBLE PANELS INDICATED ON HVAC FLOOR PLAN. FLEX DUCT TO BE A MAXIMUM OF 5'-0" LONG AND SHALL BE INSULATED.
- PROVIDE AS-BUILT DRAWINGS ALONG WITH ALL EQUIPMENT SHOP DRAWINGS, INFORMATION ON THERMOSTATS, CONTROL WIRING DIAGRAMS AND OTHER PERTINENT INFORMATION TO OWNER AND ARCHITECT OF RECORD AT COMPLETION OF PROJECT.
- PROVIDE STRUCTURAL STEEL REQUIRED TO SUPPORT EQUIPMENT AND COORDINATE LOCATIONS AND REQUIREMENTS WITH THE OWNER'S REPRESENTATIVE. COST OF THIS WORK AND ANY STRUCTURAL ENGINEERING FEES REQUIRED SHALL BE INCLUDED IN THIS
- ANY EXISTING WALL, FLOOR OR CEILING SURFACE THAT IS DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED TO MATCH NEW
- COMPLETELY INSTALL ALL ACCESSORIES PER FOUIPMENT MANUFACTURER RECOMMENDATIONS, INCLUDING ALL TEMPERATURE CONTROL CONNECTIONS. PROVIDE ALL MISCELLANEOUS MATERIALS AND LABOR REQUIRED TO COMPLETE THIS WORK PER MANUFACTURER PROVIDED INSTRUCTIONS.
- CONTRACTOR SHALL UTILIZE AABC CERTIFIED AIR BALANCING CONTRACTOR. BALANCE ALL HVAC SYSTEMS TO AIRFLOW VALUES (CFM) NOTED ON PLANS AND PROVIDE AIR BALANCING REPORT TO OWNER FOR ALL HVAC SYSTEMS. CAREFULLY FOLLOW SPECIFICATIONS FOR AIR BALANCE WORK. CONTRACTOR SHALL FIELD VERIFY AND COORDINATE REQUIREMENTS PRIOR TO BID AND INCLUDE THE COST OF THIS WORK IN THIS BID.
- PROVIDE ACCESS PANELS AS DIRECTED AND AS SPECIFIED BY OWNER FOR ALL EQUIPMENT OR OTHER ITEMS REQUIRING ACCESS. VERIFY AND COORDINATE PLACEMENT OF ACCESS WITH EQUIPMENT SERVICE CLEARANCES AND WITH GENERAL CONTRACTOR.
- FURNISH AND INSTALL IDENTIFICATION ON ALL EQUIPMENT WITH PLASTIC LAMINATED PLATE OR STENCIL WITH A MINIMUM OF 4" HIGH BLACK LETTERS. VERIFY REQUIREMENTS WITH OWNER
- THIS CONTRACTOR SHALL PERFORM STARTUP ON ALL HVAC EQUIPMENT AND CONTROL SYSTEM. PRIOR TO ENERGIZING ANY HVAC UNIT FOR PERMANENT OR TEMPORARY HEATING OR COOLING, THIS CONTRACTOR MUST HAVE APPROVAL FROM GENERAL CONTRACTOR AND IS REQUIRED TO HAVE COMPLETED STARTUP PROCEDURES AS OUTLINED IN THE MANUFACTURER PROVIDED INSTALLATION AND STARTUP MANUALS FOR EACH PIECE OF HVAC EQUIPMENT.
- CONTRACTOR SHALL PROVIDE A FIRE WATCH AND PORTABLE FIRE EXTINGUISHER (MINIMUM SIZE 2A:20BC), WHENEVER ANY WELDING IS DONE WITHIN THE DEMISED PREMISES. THE PERSON PERFORMING THE FIRE WATCH SHALL REMAIN IN THE SPACE FOR AT LEAST ONE (1) HOUR AFTER THE COMPLETION OF ANY WELDING. THIS SHALL BE COORDINATED THROUGH THE LOCAL FIRE

GENERAL NOTES

23 05 00 GENERAL PROVISIONS FOR HVAC

- PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL A HEATING, VENTILATING, AIR CONDITIONING SYSTEM, COMPLETE AS INDICATED ON THE DRAWINGS, AS REQUIRED BY CODE AND AS SPECIFIED HEREIN.
- THE GENERAL CONTRACTOR, UNLESS OTHERWISE NOTED IS TO PROVIDE POWER WIRING FOR EACH ITEM OF ELECTRICAL EQUIPMENT AND MAKE FINAL CONNECTIONS TO MOTORS.
- ALL FINISH PAINTING IS TO BE PERFORMED BY THE GENERAL CONTRACTOR, EXCEPT AS NOTED ELSEWHERE. GENERAL CONTRACTOR, AT THIS CONTRACTOR'S EXPENSE, SHALL RESTORE TO ORIGINAL CONDITION ANY PAINTING DEFACED DURING CONSTRUCTION AND
- D. ALL WORK SHALL CONFORM TO CODES, RULES, AND REGULATIONS:
- STANDARD FOR INSTALLATION OF AIR CONDITIONING AND VENTILATING SYSTEMS, NFPA 90A. CODE FOR SAFETY TO LIFE FROM FIRE IN BUILDINGS AND STRUCTURES, NFPA 101.
- FEDERAL OCCUPATIONAL SAFETY AND HEALTH STANDARDS.
- STATE MECHANICAL CODE.
- STATE BUILDING CODE
- STATE INDUSTRIAL COMMISSION REQUIREMENTS. LOCAL BUILDING CODE REQUIREMENTS. BUILDING INSURING AGENCY REQUIREMENTS.
- 10. STATE PLUMBING CODE.
- ALL PERMITS REQUIRED BY LAWS, ORDINANCES AND BUILDING CODES HAVING JURISDICTION SHALL BE OBTAINED AT THE PROPER TIME BY AND AT THE EXPENSE OF THIS CONTRACTOR.
- THIS CONTRACTOR SHALL OBTAIN ALL INSPECTIONS REQUIRED BY ALL LAWS, ORDINANCES AND PUBLIC AUTHORITY HAVING JURISDICTION AND SHALL OBTAIN CERTIFICATES OF SUCH INSPECTIONS AND SUBMIT SAME TO THE ARCHITECT AND SHALL PAY ALL
- FEES, CHARGES, ASSESSMENTS AND OTHER EXPENSES IN CONNECTION THEREWITH PIPING AND EQUIPMENT LAYOUT IS SCHEMATIC. EXACT LOCATIONS ARE DETERMINED BY STRUCTURAL AND OTHER CONDITIONS. DESIGN OF SYSTEM MAY NOT BE CHANGED. ONLY EXACT LOCATION OF PIPING AND DUCTS MAY BE REVISED TO SUIT CONSTRUCTION
- CONDITIONS AND AID IN COORDINATION WITH WORK OF OTHER CONTRACTORS. THE MATERIALS AND EQUIPMENT INSTALLED IN THE WORK SHALL MEET THE REQUIREMENTS OF THE CONTRACT DOCUMENTS AND NO
- MATERIALS OR EQUIPMENT SHALL BE ORDERED UNTIL REVIEWED BY THE ENGINEER, LANDLORD AND/OR ARCHITECT. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS PER THE DOCUMENTS PROVIDED BY THIS CONTRACTOR.
- CATALOG DATA FOR EQUIPMENT REVIEWED BY THE ARCHITECT SHALL NOT SUPERSEDE THE ENGINEER'S CONTRACT DOCUMENTS. THE REVIEW OF THE ENGINEER SHALL NOT RELIEVE THIS CONTRACTOR FROM RESPONSIBILITY FOR DEVIATIONS FROM DRAWINGS OR SPECIFICATIONS, PROVIDING PROPER CLEARANCE, FABRICATION PROCESS AND COORDINATION WITH OTHER TRADES.
- WHEN SUBMITTED FOR THE ARCHITECT'S REVIEW, SHOP DRAWINGS SHALL BEAR THIS CONTRACTOR'S CERTIFICATION THAT THE CONTRACTOR HAS REVIEWED, CHECKED AND APPROVED THE SHOP DRAWINGS, THAT THEY ARE IN HARMONY WITH THE REQUIREMENTS OF THE PROJECT AND WITH THE PROVISIONS OF THE CONTRACT DOCUMENTS AND THAT THIS CONTRACTOR HAS VERIFIED ALL FIELD MEASUREMENTS AND CONSTRUCTION CRITERIA, MATERIALS, CATALOG NUMBERS AND SIMILAR DATA. GENERAL CONTRACTOR SHALL ALSO CERTIFY THAT THE WORK REPRESENTED BY THE SHOP DRAWINGS AS RECOMMENDED BY THIS CONTRACTOR AND THE GENERAL CONTRACTOR'S GUARANTEE WILL FULLY APPLY.
- ALL CONTRACTORS SUBMITTING PROPOSALS FOR THIS WORK SHALL FIRST EXAMINE THE SITE AND ALL CONDITIONS THEREIN. ALL PROPOSALS SHALL TAKE INTO CONSIDERATION ALL SUCH CONDITIONS AS MAY AFFECT THE WORK UNDER THIS CONTRACT. THE SUBMITTING OF A BID AUTOMATICALLY IMPLIES THAT THIS EXAMINATION OF SITE HAS BEEN DONE.
- CONTRACTOR SHALL VERIFY LOCATION OF UTILITIES AND NOTE CONDITIONS WHICH WOULD AFFECT THE WORK. ALL DISCREPANCIES SHALL THEN BE REPORTED PRIOR TO THE BID AWARD.
- PROVIDE INSTRUCTION TO OWNER'S OPERATING PERSONNEL AS NECESSARY, SHOWING LOCATIONS AND PROPER OPERATION OF MAJOR ITEMS OF EQUIPMENT AND SYSTEM COMPONENTS AND REFERRING TO THE OPERATING INSTRUCTION MANUAL DESCRIBED
- COMPILE WRITTEN MANUAL OF OPERATING INSTRUCTIONS INCLUDING COPIES OF SHOP DRAWINGS AND A LISTING OF EQUIPMENT SUPPLIERS. ASSEMBLE IN 8-1/2" X 11" HARD BACKED INDEXED BINDER. MATERIAL SHALL BE AS FOLLOWS:
- TITLE PAGE: TITLE OF JOB, LANDLORD/TENANT, ADDRESS, DATE, SUBMISSION, CONTRACTOR AND ENGINEER.
- LIST OF MAJOR EQUIPMENT USED IN PROJECT ACCOMPANIED BY GENERAL CONTRACTOR PURCHASE ORDER NUMBERS AND
- SUPPLIERS NAMES AND ADDRESSES. ONE COPY OF EACH SHOP DRAWING GROUPED BY TYPES OF EQUIPMENT (I.E., ROOFTOP UNITS, FANS, ETC.)
- SECTION FOR EACH SYSTEM INCLUDING:
 - BRIEF DESCRIPTION OF SYSTEM OPERATION WITH LOCATION OF MAJOR COMPONENTS HVAC SYSTEM MAINTENANCE AND CALIBRATION INFORMATION, INCLUDING WIRING DIAGRAMS AND SCHEMATICS.
- SUBMIT A COMPLETED COPY TITLED "HVAC OPERATING INSTRUCTION MANUAL" ON THE BINDING EDGE OF BINDER TO ARCHITECT FOR APPROVAL. AFTER ARCHITECT'S REVIEW AND ANY CORRECTIONS REQUIRED ARE COMPLETED, SUBMIT A COPY OF THE MANUAL TO
- WITHIN 90 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE, RECORD DRAWINGS OF THE ACTUAL INSTALLATION SHALL BE PROVIDED TO THE BUILDING LANDLORD. RECORD DRAWINGS SHALL INCLUDE AS A MINIMUM THE LOCATION AND PERFORMANCE DATA ON EACH PIECE OF EQUIPMENT, GENERAL CONFIGURATION OF DUCT DISTRIBUTION SYSTEM INCLUDING SIZES, AND THE AIR DESIGN FLOW
- ANY REFERENCE TO OWNER OR OWNER CONSTRUCTION MANAGER, OR FURNISHED BY ANY OF THE ABOVE, REFERS TO VACU.
- TRADE NAMES, MANUFACTURERS AND SHOP DRAWINGS
- WHERE TRADE NAMES AND MANUFACTURERS ARE USED ON THE DRAWINGS OR IN THE SPECIFICATIONS. THE EXACT EQUIPMENT SHALL BE USED. THE USE OF ANY UNAUTHORIZED EQUIPMENT SHALL BE SUBJECT TO REMOVAL AND REPLACEMENT AT THIS CONTRACTOR'S EXPENSE
- GENERAL CONTRACTOR SHALL SUBMIT ONLY SUBSTITUTION REQUESTS TO TENANT CONSTRUCTION MANAGER FOR APPROVAL SUBMISSIONS SHALL BE MADE EARLY ENOUGH IN PROJECT TO ALLOW FOUR (4) WORKING DAYS FOR TENANT CONSTRUCTION MANAGER'S REVIEW WITHOUT CAUSING DELAYS OR CONFLICTS TO THE JOB'S PROGRESS. SUBMITTALS SHALL BEAR THE STAMP OF THE GENERAL CONTRACTOR AND THE SUB-CONTRACTOR SHOWING THAT HE HAS REVIEWED AND CONFIRMED THAT THE SUBMITTALS ARE IN CONFORMANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS OR INDICATE WHERE EXCEPTIONS HAVE BEEN TAKEN.

DEMOLITION

- CONTRACTOR SHALL BE RESPONSIBLE FOR THE DEMOLITION AND REMOVAL OF EXISTING WORK. FIELD VERIFY AND COORDINATE ANY EXISTING EQUIPMENT REQUIRED TO BE LEFT INTACT AND PROTECT EQUIPMENT TO REMAIN DURING
- J. FINAL HVAC INSPECTIONS
- ASIDE FROM NORMAL INTERIM INSPECTIONS OF WORK IN PLACE. TENANT SHALL HAVE AN INDEPENDENT CONTRACTOR INSPECT THE FINISHED INSTALLATION UPON COMPLETION FOR COMPLIANCE WITH THE PLANS, SPECIFICATIONS AND CODES. THE INSTALLING CONTRACTOR WILL BE RESPONSIBLE TO BRING ALL ITEMS REPORTED BY THE INDEPENDENT CONTRACTOR UP TO PLANS AND SPECIFICATION REQUIREMENTS.
- WARRANTY AND GUARANTEE
 - CONTRACTOR SHALL GUARANTEE ALL MATERIALS AND LABOR PROVIDED UNDER THIS CONTRACT AND SHALL MAKE GOOD, REPAIR OR REPLACE AT NO ADDITIONAL COST ANY DEFECTIVE WORK, MATERIAL, OR EQUIPMENT DISCOVERED WITHIN 12 MONTHS FROM THE DATE OF CERTIFICATE OF OCCUPANCY. THIS GUARANTEE SHALL EXTEND TO LABOR AND MISCELLANEOUS MATERIALS REQUIRED FOR THE INSTALLATION OF EQUIPMENT. BUT SHALL NOT OVERLAP WITH WARRANTY PROVIDED BY MANUFACTURER. THE CONTRACTOR IS RESPONSIBLE TO VERIFY, COORDINATE AND FOLLOW ALL PROPER HANDLING AND INSTALLATION TECHNIQUES WITH MANUFACTURER(S) IN ORDER TO MAINTAIN MANUFACTURER'S WARRANTY.

23 05 01 HVAC BASIC MATERIALS AND METHOD

- THIS CONTRACTOR IS TO BECOME INFORMED OF THE EXACT DIMENSIONS OF FINISHED WORK WHERE PIPES, DUCTS AND EQUIPMENT ARE TO BE PLACED AND WILL ARRANGE THE WORK ACCORDINGLY, ASSUMING ALL RESPONSIBILITY FOR PROPER LOCATION AND COORDINATION OF THE WORK.
- IN THE ERECTION OF THE DUCTWORK, SPECIAL CARE SHALL BE USED PROVIDING SUPPORT.

CONTRACTOR IS TO PROVIDE ALL LABOR AND MATERIALS REQUIRED TO BALANCE THE SYSTEM.

- ALL DUCTWORK SHALL BE PLACED SO AS TO AVOID INTERFERENCE WITH PLUMBING PIPES, ELECTRIC CONDUITS OR PIPES OF OTHER CONTRACTORS.
- ALL DUCTWORK MUST BE PROVIDED WITH SUFFICIENT DISTANCE FROM WALLS, PIPES AND OTHER OBSTACLES TO PERMIT THE APPLICATION OF FULL THICKNESS OF INSULATION SPECIFIED.
- THIS CONTRACTOR SHALL PERFORM AN ACCURATE AND COMPLETE BALANCE OF AIR SYSTEMS AS PART OF THIS CONTRACT, WHICH SHALL BE COMPLETED BEFORE FINAL ACCEPTANCE OF THE WORK OF THIS CONTRACT. AIR BALANCE SHALL BE SUBCONTRACTED TO A CERTIFIED MEMBER OF THE ASSOCIATED AIR BALANCE COUNCIL OR THE NATIONAL ENVIRONMENTAL BALANCING BUREAU.
- VIBRATION ISOLATION DEVICES
- VIBRATION ISOLATION DEVICES SHALL BE FURNISHED AND INSTALLED WITH SUPPORTS BETWEEN VIBRATING EQUIPMENT AND HE STRUCTURE (FANS, AIR HANDLERS, ETC.) BY THIS CONTRACTOR.
- VIBRATING EQUIPMENT HUNG FROM STRUCTURE SHALL BE ISOLATED WITH RUBBER AND SPRING DEVICES, VIBRATING EQUIPMENT SUPPORTED FROM FLOOR OR DECK SHALL BE ISOLATED WITH HOUSED SPRING MOUNT DEVICES.
- EXAMINE DEAD LOAD AND OPERATING LOAD CONDITIONS WHEN SELECTING DEVICES, ADJUST FOR PROPER ALIGNMENT AND LOADING. AVOID "GROUNDING" THE ISOLATOR.
- CHECK HANGER ROD SIZE FOR ALLOWABLE LOADS AT THE ISOLATING DEVICE AND AT THE UPPER AND LOWER ATTACHMENTS TO STRUCTURES, DUCTS, EQUIPMENT, ETC.
- CONSULT MANUFACTURER FOR APPLICATION DATA

23 05 93 TESTING, ADJUSTING AND BALANCING FOR HVAC

- ALL AIR DISTRIBUTION SYSTEMS ARE TO BE BALANCED IN ACCORDANCE WITH GENERALLY ACCEPTED ENGINEERING STANDARDS BY AABC OR NEBB CERTIFIED AIR BALANCER. DUCTED AIR RATES ARE TO BE MEASURED AND ADJUSTED TO DELIVER FINAL FLOW RATES WITHIN 10% OF DESIGN RATES. GENERAL CONTRACTOR TO DO ALL ADJUSTMENTS REQUIRED TO BALANCE THE SYSTEM WITHIN THE DESIGN PARAMETERS. UNITS RPMS ARE TO BE ADJUSTED FIRST TO GET THE UNIT TO THE LOWEST RPMS TO DELIVER THE REQUIRED CFM TO THE DIFFUSERS. THEN THE DAMPERS TO THE DIFFUSERS ARE TO BE ADJUSTED TO BALANCE THE SYSTEM. GENERAL
- AFTER CORRECTING BALANCE OF ALL AIR SYSTEMS TO WITHIN 10% OF DESIGNED VALUES, SUBMIT FINAL AIR BALANCE REPORTS TO ARCHITECT, ENGINEER AND THE TENANT. FINAL BALANCE REPORT MUST INDICATE AIR VALUES WITHIN 10% OF DESIGN, OR MUST STATE THE REASON THAT THE APPROPRIATE BALANCE COULD NOT BE ACHIEVED.
- CONTRACTOR SHALL REVIEW AIR BALANCE REPORT PRIOR TO SUBMISSION OF REPORT TO ENGINEER AND ARCHITECT. IF ENGINEER OR ARCHITECT REVIEW THE AIR BALANCE REPORT MULTIPLE TIMES DUE TO THE CONTRACTOR NOT FOLLOWING THESE GUIDELINES OR SENDING A PRELIMINARY REPORT FOR REVIEW IN LIEU OF THE FINAL REPORT, THE GENERAL CONTRACTOR WILL BE

- D. VERIFY CONTROLS DURING BALANCING, INCLUDING HUMIDITY CONTROLS WHERE APPLICABLE
- AT THE COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL SUBMIT FINAL AIR/WATER BALANCE REPORT TO OWNER AND AUTHORITY HAVING JURISDICTION AS REQUIRED.

23 06 00 CEILING EXHAUST FANS

- A. CONTRACTOR SHALL PROVIDE CENTRIFUGAL DIRECT DRIVE CEILING EXHAUST FAN(S), BASIS OF DESIGN BROAN OR EQUAL FANS BY LOREN COOK OR GREENHECK MEETING THE SAME REQUIREMENTS. THE FAN HOUSING SHALL BE CONSTRUCTED OF HEAVY GAUGE GALVANIZED STEEL. THE HOUSING INTERIOR SHALL BE LINED WITH 1/2" ACOUSTICAL INSULATION. THE OUTLET DUCT COLLAR SHALL
- INCLUDE AN ALUMINUM BACKDRAFT DAMPER AND SHALL BE ADAPTABLE FOR HORIZONTAL DISCHARGE THE ACCESS FOR WIRING SHALL BE EXTERNAL. THE MOTOR DISCONNECT SHALL BE INTERNAL AND OF THE PLUG TYPE.
- C. THE MOTOR SHALL BE MOUNTED ON VIBRATION ISOLATORS. THE FAN WHEEL SHALL BE OF THE FORWARD CURVED CENTRIFUGAL TYPE AND DYNAMICALLY BALANCED.
- D. ALL FANS SHALL BEAR THE AMCA CERTIFIED RATINGS SEAL FOR SOUND AND AIR PERFORMANCE AND SHALL BE U.L. LISTED.
- CAPACITIES AS SHOWN ON THE DRAWINGS.
- E. WIRING BY THE CONTRACTOR.
- 23 07 00 HVAC INSULATION
- A. DUCT INSULATION AND APPURTENANCES SHALL HAVE A FLAME SPREAD RATING NOT EXCEEDING TWENTY-FIVE (25) AND A SMOKE DEVELOPED RATING NOT EXCEEDING FIFTY (50).
- B. RECTANGULAR DUCTWORK CONCEALED FROM VIEW SHALL HAVE 1" THICK FIBERGLASS DUCT LINER LAMINATED AND PINNED TO DUCT WITH 1.0 PCF DENSITY AND R-VALUE OF 4.2 MIN. OWENS-CORNING COMMERCIAL GRADE FIBERGLASS DUCT LINER.
- ROUND DUCTWORK CONCEALED FROM VIEW SHALL HAVE FLEXIBLE FIBERGLASS DUCT WRAP LAMINATED TO FOIL REINFORCED KRAFT VAPOR BARRIER FACING WITH 2" STAPLING FLANGE AND MIN. INSTALLED R-VALUE OF 4.2. OWENS-CORNING COMMERCIAL GRADE FIBERGLASS DUCT WRAP TYPE 100.
- EXPOSED ROUND AND RECTANGULAR DUCTWORK SHALL HAVE NO INSULATION.
- ALL DUCTWORK IN UNCONDITIONED SPACES SHALL HAVE INSULATION DUCT WRAP WITH A MINIMUM INSTALLED R-VALUE OF 6.0.
- INSULATION SHALL NOT BE APPLIED UNTIL THE GENERAL CONSTRUCTION HAS PROGRESSED SUFFICIENTLY TO INSURE AGAINST PHYSICAL OR MOISTURE DAMAGE TO THE INSULATION. ALL INSULATION DAMAGED THROUGH FAILURE TO OBSERVE THIS DIRECTIVE SHALL BE REPLACED AT THIS CONTRACTOR'S EXPENSE.
- HANGER RODS MUST BE PERPENDICULAR TO DUCTWORK BEFORE INSULATION IS INSTALLED.
- H. INSTALL ALL INSULATION ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
- INSULATION SHALL BE APPLIED OVER FLANGES, JOINTS AND SEAMS IN PIPING AND DUCTWORK. J. ALL JOINTS AND SEAMS IN INSULATION SHALL BE PROPERLY SEALED TO MAINTAIN VAPOR BARRIER INTEGRITY.
- K. INSULATION SHALL BE OWENS-CORNING. EQUAL PRODUCT BY ARMSTRONG, CERTAINTEED, SCHULLER OR KNAUF MAY BE FURNISHED AT THE CONTRACTOR'S OPTION.

23 31 13 HVAC AIR DISTRIBUTION AND RETURN SYSTEMS

- A. PROVIDE AND INSTALL DUCTWORK AND PLENUMS OF SIZE AND LOCATION AS SHOWN ON DRAWINGS. ALL DUCTS FOR AIR VELOCITIES LESS THAN 2000 FPM AND STATIC PRESSURE IN DUCT 2" OR LESS SHALL BE CONSTRUCTED OF GALVANIZED SHEET METAL. THE GAUGE OF STEEL USED IN ALL DUCTS SHALL BE AS FOLLOWS:
 - WHERE GREATER RECTANGULAR DIMENSION IS 12" OR LESS USE 26 GAUGE. WHERE GREATER RECTANGULAR DIMENSION IS FROM 12" THROUGH 30" USE 24 GAUGE.
 - WHERE GREATER RECTANGULAR DIMENSION IS FROM 31" THROUGH 54" USE 22 GAUGE
 - WHERE GREATER RECTANGULAR DIMENSION IS FROM 55" THROUGH 84" USE 20 GAUGE.
- B. TRANSVERSE JOINTS AND BRACING TO CONFORM TO "HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE" (CURRENT
- C. ALL DUCTS SHALL BE RIGID AND SHALL BE CROSS-BROKEN, PROPERLY STIFFENED WITH SUITABLE BRACES, TOES, OR ANGLES TO KEEP THEM TRUE TO SHAPE AND PREVENT BUCKLING. ALL VERTICAL DUCTS SHALL BE OF STRONG ENOUGH CONSTRUCTION TO CARRY 100 LBS. SUSPENDED LOAD FROM HANGERS WITHOUT BUCKLING. SOLDER ALL JOINTS WHERE NECESSARY TO INSURE TIGHT WORK, SEAMS OF ALL DUCTS AND JOINTS SHALL BE HAMMERED TO A SMOOTH SURFACE ON THE INSIDE.
- D. CONSTRUCTION INCLUDING HANGERS AND SUPPORTING SYSTEMS OF ALL DUCTWORK SHALL ALSO BE IN ACCORDANCE WITH "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" (CURRENT SMACNA)
- E. FLEXIBLE CONNECTIONS SHALL BE INSTALLED ON THE OUTLET AND INTAKE OF AIR HANDLING UNITS AND FANS. THESE CONNECTIONS SHALL BE AT LEAST 6" LONG, MADE OF NFPA 90A APPROVED FLAMEPROOF FABRIC.
- FURNISH AND INSTALL VOLUME CONTROLLER AND EXTRACTOR AT ALL BRANCH TAKEOFFS IN SUPPLY AND RETURN FROM MAIN DUCTS TO ALL BRANCH DUCTS WHERE SHOWN. UNIT SHALL BE OF TWO GAUGES HEAVIER THAN THE DUCT.
- PROVIDE MANUAL ADJUSTING LEVER FOR EACH UNIT. UNITS SHALL MOVE FROM FULL OPEN TO FULLY CLOSED POSITION TO CONTROL AIR DIRECTION AND VOLUME.
- H. FURNISH AND INSTALL TURNING VANES IN ALL ELBOWS OF RECTANGULAR DUCTS. THE BLADES TO BE HOLLOW-FORMED DOUBLE THICKNESS VANES.
- I. INSTALL SUPPLY AND RETURN REGISTERS, GRILLES AND DIFFUSERS AS SHOWN ON THE DRAWINGS AND SCHEDULE. J. FLEXIBLE SUPPLY AIR DUCTWORK SHALL BE BY FLEXMASTER TYPE 1B OR FOUAL WITH 1" THICK FIBERGLASS BLANKET INSULATION WITH METALIZED FILM VAPOR BARRIER OUTER JACKET. FLEXIBLE DUCT IN RETURN AIR PLENUM TO BE CLEARLY LABELED "CLASS 1

EVERY FOUR FEET. FLEXIBLE DUCT LENGTH MAY NOT EXCEED FIVE FEET. INSULATION SHALL HAVE MIN. INSTALLED R-VALUE OF 4.2

- K. METAL DUCTWORK NO FIBERGLASS DUCT ALLOWED.
- DUCT CONSTRUCTION SHALL BE AS FOLLOWS:
- 1. EXCEPT WHERE OTHERWISE INDICATED, CONSTRUCT ALL LOW PRESSURE DUCT IN ACCORDANCE WITH THE LATEST EDITION OF SMACNA STANDARDS WITH THE FOLLOWING PRESSURE CLASSIFICATIONS:
- a SUPPLY DUCTS: 2" W G POSITIVE RETURN AND EXHAUST DUCTS: 2" W.G. NEGATIVE.
- SEAL ALL LOW PRESSURE DUCTS PER SMACNA CLASS B AND ALL MEDIUM PRESSURE DUCTS TO SMACNA CLASS A. REGARDLESS OF ABOVE DUCT CONSTRUCTION AND SEALANT PRESSURE CLASSIFICATIONS, MAXIMUM DUCT AIR LEAKAGE WILL NOT EXCEED 5% AS REQUIRED FOR FINAL AIR BALANCE APPROVAL

M. ROUND DUCTWORK SHALL BE GALVANIZED STEEL WITH SPIRAL LOCK SEAM CONSTRUCTION FOR ALL SIZES 12" DIAMETER AND

- LARGER, ROUND DUCTWORK SIZES 10" DIAMETER AND SMALLER MAY BE SNAP-LOCK CONSTRUCTION, ALL SNAP-LOCK SEAMS SHALL BE SEALED AS DESCRIBED IN THESE SPECIFICATIONS. ROUND FITTINGS SHALL BE GALVANIZED STEEL WITH SPOT WELDED AND BONDED CONSTRUCTION. DUCTWORK SHALL BE AS MANUFACTURED BY UNITED MCGILL, SEMCO, OR APPROVED EQUAL. N. ALL JOINTS AND SEAMS SHALL BE SEALED WITH 2" WIDE. GLASS- FIBER FABRIC REINFORCED TAPE. JOINTS ALSO SHALL BE RIVETED
- OR CONNECTED WITH SHEET METAL SCREWS. LIQUID SEALANTS BY UNITED MCGILL CORP., DOW CORNING, MIRACLE ADHESIVES AND SUREBOND INC. WILL BE ACCEPTED IN LIEU OF TAPE.
- O. DUCT TRANSITIONS SHALL NOT EXCEED 30 DEGREES SLOPE EXCEPT AS SPECIFICALLY NOTED OTHERWISE
- A. RECTANGULAR DUCT GALVANIZED STEEL MANUAL BALANCE AND MOTORIZED DAMPER 6" WIDE 16 GAUGE OPPOSED BLADES, CHANNEL FRAME WITH BRACED CORNERS. CONCEALED LINKAGE. TEFLON FILLED BEARINGS. 3/8" DIAMETER AXLE. 6" LONG CONTROL SHAFT. MOTORIZED DAMPER TO HAVE REPLACEABLE BUTYL RUBBER SEALS INSTALLED ALONG THE TOP, BOTTOM AND SIDES OF THE FRAME, AS WELL AS, ALONG ALL SIDES OF EACH BLADE
- ROUND GALVANIZED STEEL MANUAL BALANCE DAMPER WITH SINGLE 16 GAUGE BLADE, CHANNEL FRAME, STAINLESS STEEL SLEEVE BEARINGS PRESSED INTO FRAME, 3/8" DIAMETER AXLE EXTENDED 6" FOR CONTROL SHAFT, BLADE STOP.
- C. EQUIP DAMPERS WITH LOCKING QUADRANTS.
- D. INSTALL BALANCE DAMPERS WHERE SHOWN ON THE DRAWINGS AND ELSEWHERE AS NECESSARY TO OBTAIN PROPER SYSTEM E. CHECK DAMPERS FOR PROPER OPERATION BEFORE AND AFTER INSTALLATION.
- DAMPERS SHALL BE GREENHECK. EQUAL PRODUCT BY RUSKIN, AMERICAN WARMING AND VENTILATING, LOUVERS AND DAMPERS, OR
- PREFCO MAY BE FURNISHED AT THE CONTRACTOR'S OPTION.
- 23 37 13 AIR DISTRIBUTION DEVICES A. SQUARE CEILING SUPPLY AIR DIFFUSER - STEEL SQUARE CEILING DIFFUSER, REMOVABLE PLAQUE FACE PANEL, ROUND NECK, AS
- NOTED IN THE AIR DISTRIBUTION SCHEDULE. B. SUPPLY AIR GRILLE - STEEL DOUBLE DEFLECTION SUPPLY GRILLE, 3/4" BLADE SPACING, FRONT BLADES PARALLEL TO THE SHORT
- DIMENSION, AS NOTED IN THE AIR DISTRIBUTION SCHEDULE. RETURN AIR GRILLE - STEEL RETURN AIR GRILLE, 1/2" BLADE SPACING WITH 35° FIXED DEFLECTION BLADES, FRONT BLADES PARALLEL
- TO THE SHORT DIMENSION, AS NOTED IN THE AIR DISTRIBUTION SCHEDULE. . FINISHES - AS NOTED IN THE AIR DISTRIBUTION SCHEDULE.
- E. COORDINATE AIR DISTRIBUTION DEVICE LOCATIONS WITH ALL AFFECTED CONTRACTORS BEFORE INSTALLING DUCTWORK. SIGNIFICANT DEVIATIONS IN LOCATIONS FROM THOSE SHOWN ON THE DRAWINGS MUST BE APPROVED BY ARCHITECT BEFORE
- SUSPEND CEILING AIR DEVICES FROM STRUCTURE ON WIRE HANGERS OR FROM RIGID DUCTWORK. CEILING MUST NOT BE USED TO SUPPORT AIR DISTRIBUTION DEVICES.
- SECURELY FASTEN SIDE WALL AIR DEVICES TO RIGID DUCTWORK OR STRUCTURE.
- H. AIR DISTRIBUTION DEVICES FURNISHED AND INSTALLED BY THE GENERAL CONTRACTOR SHALL BE TITUS OR EQUALS BY PRICE, KRUEGER OR NAILOR MEETING REQUIREMENTS ON SHOWN ON SHEET H3.1.
- 23 75 14 SPLIT SYSTEM UNITS
- A. CONSTRUCTION: STEEL CABINET, FILTERS, ELECTRIC HEAT, AND CONTROLS.
- B. BLOWER: EVAPORATOR BLOWER TO BE DIRECT DRIVE CENTRIFUGAL, DYNAMICALLY BALANCED, MULTI-BLADE, FORWARD CURVED, CLASS 1.

- C. DX SYSTEM: FULLY HERMETIC COMPRESSORS WITH CRANKCASE HEATERS, INTERNAL THERMAL OVERLOAD, SINGLE REFRIGERATION CIRCUIT AND HEAD PRESSURE CONTROLS. COMPRESSOR TO HAVE FIVE (5) YEAR WARRANTY.
- D. HEATER AND OVER TEMPERATURE PROTECTION-PRIMARY SHALL BE BUILT IN AUTOMATIC RESET THERMAL CUTOUTS. SECONDARY SHALL BE AN INDEPENDENT MANUAL RESET THERMAL CUTOUTS. PROVIDE AIR FLOW SWITCH TO DE-ENERGIZE HEATER ON LOSS OF AIR FLOW. UL LISTED AND UL APPROVED.

 - CONTROLS FACTORY INSTALLED AND WIRED. FAN ON-OFF CONTROL, MANUAL RESET HIGH LIMIT RESET. INDOOR FAN RELAY - FACTORY INSTALLED.
- F. LIFTING AND PLACING OF UNITS SHALL BE BY CONTRACTOR.
- G. WIRE HEATERS TO ENERGIZE ONLY WHEN HVAC UNIT FAN STARTER IS ENERGIZED.

PROVIDE AUXILIARY CONTACTS FOR REQUIRED INTERLOCKS.

- H. COORDINATE LOCATION OF CONDENSING UNITS WITH THE CONTRACTOR. UNITS TO BE INSTALLED ON HOUSEKEEPING PADS AND EQUIPMENT RAILS PROVIDED BY THIS CONTRACTOR.
- I. INSTALL TRAPPED DRAIN LINE FROM DRAIN PANS TO LOCATION SHOWN ON THE PLANS.
- J. MOUNT AND WIRE UNIT CONTROLS.
- K. MOUNT SPLIT SYSTEM UNITS REFRIGERANT PIPING ON PIPE SUPPORTS NEATLY RACKED. SEAL WALL PENETRATIONS AIR AND WATER
- ROOF AND WALL PENETRATIONS TO BE MADE WEATHERTIGHT. M. CONTRACTOR TO MAKE POWER CONNECTIONS TO UNITS.
- N. CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL CONTROLS, CONTROL WIRING AND TO MAKE OPERATIONAL.
- O. CONDENSING UNITS AND AIR HANDLERS SHALL BE AS NOTED IN THE SCHEDULES, PROVIDED BY THE CONTRACTOR. UPON DELIVERY OF UNITS, CONTRACTOR SHALL VERIFY ALL EQUIPMENT IS AS SPECIFIED ON DRAWINGS INCLUDING ALL ELECTRICAL REQUIREMENTS ACCESSORIES AND OTHER REQUIREMENTS. ANY DISCREPANCIES MUST BE REPORTED TO TENANT CONSTRUCTION MANAGER WITHIN THE FIRST TWENTY-FOUR (24) HOURS AFTER DELIVERY. EQUALS BY DAIKIN OR LG.
- 23 76 10 REFRIGERANT PIPING SYSTEM
- A. PIPE TYPE L-ACR HARD DEHYDRATED SCALE FREE COPPER TUBING. ALL FITTINGS AND JOINTS SHALL BE WROUGHT COPPER OR CAST
- B. SHUT-OFF VALVES IN REFRIGERANT LINES SHALL BE SIMILAR TO HENRY, BALANCED-ACTING DIAPHRAGM TYPE WITH BRASS BODY
- C. PROPERLY CLEAN ENDS OF ALL TUBING BEFORE BRAZING. ALL COPPER TO COPPER JOINTS SHALL BE BRAZED WITH

COPPER-PHOSPHORUS ALLOY AND ALL OTHER JOINTS SHALL BE BRAZED WITH "SILFOS-5" ALLOY.

- D. DURING CONSTRUCTION, THIS CONTRACTOR SHALL TAKE PRECAUTION TO MINIMIZE CONTAMINATION OF SYSTEM BY DIRT, SCALE,
- MOISTURE OR OTHER FOREIGN MATTER. ALL FOREIGN MATERIAL AND MOISTURE IN THE SYSTEM SHALL BE REMOVED. E. THIS CONTRACTOR SHALL PROVIDE OIL FOR COMPRESSOR AND PROPER REFRIGERANT CHARGE FOR THE SYSTEM.
- 23 74 15 SINGLE DUCT VARIABLE AIR VOLUME HVAC UNITS
- A. UNIT SHALL BE FACTORY ASSEMBLED VARIABLE AIR VOLUME BOX, FULLY INSULATED CONSTRUCTION, DDC CONTROLS AND CAPABLE
- B. CABINET SHALL BE GALVANIZED STEEL, BONDERIZED AND COATED WITH BAKED ENAMEL. CABINET SHALL BE LINED WITH 1" THICK NEOPRENE-COATED FIBERGLASS WITH EASILY REMOVABLE SERVICE PANELS TO ALL OPERATING COMPONENTS.
- HEATING/COOLING SENSORS TO PROVIDE STAGED HEATING AND CONTROL OF AIR VALVE FOR COOLING. MOUNT THE TOP OF
- THE SENSOR 48" ABOVE THE FLOOR. WHEN SENSOR CALLS FOR COOLING, AIR VALVE SHALL OPEN IN 5% INCREMENTS UNTIL FULLY OPEN, OR UNTIL SPACE TEMPERATURE IS SATISFIED. 3. WHEN SENSOR CALLS FOR HEATING, AIR VALVE SHALL CLOSE IN 5% INCREMENTS UNTIL FULLY CLOSED, THEN EACH STAGE OF
- HEATING SHALL BE ENERGIZED AS REQUIRED UNTIL SPACE TEMPERATURE IS SATISFIED. RTU FAN SHALL BE ENERGIZED AT ALL TIMES DURING OCCUPIED HOURS. HVAC CONTROL SYSTEMS SHALL BE TESTED TO ENSURE THAT CONTROL ELEMENTS ARE CALIBRATED, ADJUSTED, AND IN PROPER WORKING CONDITION.
- PROVIDE VIBRATION ISOLATION HANGERS AND SUPPORTS AS REQUIRED TO SUPPORT UNIT PER MANUFACTURER'S RECOMMENDATIONS. FIELD VERIFY AND COORDINATE ALL REQUIREMENTS.
- E. CONTRACTOR TO MAKE POWER CONNECTIONS TO UNITS. F. CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL CONTROLS, CONTROL WIRING AND TO MAKE OPERATIONAL.
- G. VAV BOX AND CONTROL SHALL BE AS NOTED IN THE PLANS & SCHEDULES. PROVIDED BY THE CONTRACTOR, UPON DELIVERY OF UNITS. CONTRACTOR SHALL VERIFY ALL EQUIPMENT IS AS SPECIFIED ON DRAWINGS INCLUDING ALL ELECTRICAL REQUIREMENTS. ACCESSORIES AND OTHER REQUIREMENTS. ANY DISCREPANCIES MUST BE REPORTED TO TENANT CONSTRUCTION MANAGER WITHIN THE FIRST TWENTY-FOUR (24) HOURS AFTER DELIVERY. EQUALS BY PRICE, TITUS, OR ENVIRO-TEC.
- 23 75 13 ROOFTOP PACKAGED HVAC UNITS
- A. UNIT SHALL BE FACTORY ASSEMBLED AIR TO AIR ELECTRIC COOLING, GAS / ELECTRIC HEATING UNIT WITH REFRIGERATION SYSTEM,
- B. CABINET SHALL BE GALVANIZED STEEL, BONDERIZED AND COATED WITH BAKED ENAMEL. UNIT SHALL BE ARRANGED FOR ALL EXTERIOR CONNECTIONS TO BE WITHIN ROOF CURB. CABINET SHALL BE LINED WITH 1" THICK NEOPRENE-COATED FIBERGLASS WITH EASILY REMOVABLE SERVICE PANELS TO ALL OPERATING COMPONENTS.
- EVAPORATOR COIL, EXPANSION VALVES, SERVICE VALVES, VIBRATION ISOLATORS, CRANKCASE HEATERS, SIGHT GLASSES, FILTER DRIERS, HOT GAS MUFFLERS, AND REFRIGERANT PIPING. SAFETY CONTROLS SHALL INCLUDE FUSIBLE PLUG, LOW AND HIGH PRESSURE THERMOSTATS, COMPRESSOR MOTOR OVERLOADS, TIMER TO PREVENT SHORT CYCLING COMPRESSORS.

C. REFRIGERATION SYSTEM SHALL INCLUDE SERVICEABLE HERMETIC COMPRESSORS. CONDENSERS. INTERWINDED CIRCUIT

LUBRICATED MOTORS E. COILS SHALL BE ALUMINUM PLATE FINS MECHANICALLY BONDED TO SEAMLESS COPPER TUBES WITH ALL JOINTS BRAZED. COILS

D. CONDENSER FANS SHALL BE VERTICAL DISCHARGE PROPELLER TYPE DIRECT DRIVEN BY INHERENTLY PROTECTED, PERMANENTLY

- F. INDOOR BLOWER SHALL BE FORWARD-CURVED, CENTRIFUGAL, BELT-DRIVEN TYPE, EQUIPPED WITH PERMANENTLY LUBRICATED
- G. CONTROLS 1. THE COOLING SYSTEM SHALL BE PROTECTED WITH HIGH PRESSURE THERMOSTATS, LOW PRESSURE THERMOSTATS,
- LOSS-OF-CHARGE PROTECTION, INDOOR COIL FREEZE THERMOSTATS, AND CURRENT AND TEMPERATURE SENSITIVE OVERLOAD DEVICES ALL DEVICES SHALL BE WIRED TO PREVENT COMPRESSOR RESTART LINTIL RESET OF CIRCUIT BREAKER THIS CONTRACTOR SHALL INSTALL HEATING/COOLING "S" SENSOR(S) AND "T" THERMOSTAT(S) PER PLAN TO PROVIDE CONTROL OF STAGED COOLING AND STAGED HEATING WITH AUTOMATIC CHANGEOVER AND "FAN ON" CONTROL. MOUNT DEVICES AT 48" AFF TO BOTTOM PER ADA. PROVIDE INITIAL PROGRAMMING OF SYSTEM. COORDINATE PROGRAMMING REQUIREMENTS WITH
- WHEN THERMOSTAT/SENSOR CALLS FOR COOLING, FIRST STAGE OF COMPRESSOR SHALL ENERGIZE UNTIL SPACE TEMPERATURE IS SATISFIED. AFTER TEN MINUTES, SECOND STAGE OF COMPRESSOR (IF APPLICABLE) SHALL ENERGIZE UNTIL SPACE TEMPERATURE IS SATISFIED. WHEN THERMOSTAT/SENSOR CALLS FOR HEATING, FIRST STAGE OF HEAT SHALL ENERGIZE UNTIL SPACE TEMPERATURE IS SATISFIED. AFTER TEN MINUTES, SECOND STAGE OF HEAT SHALL ENERGIZE UNTIL SPACE TEMPERATURE IS SATISFIED.
- HVAC CONTROL SYSTEMS SHALL BE TESTED TO ENSURE THAT CONTROL ELEMENTS ARE CALIBRATED, ADJUSTED, AND IN PROPER WORKING CONDITION.

THAN 3°F UP OR DOWN FROM DEFAULT.

CONSTRUCTION REPRESENTATIVE.

TENANT'S REPRESENTATIVE, AND PROGRAMMING SECTION BELOW.

FAN SHALL ENERGIZE AND RUN CONTINUOUSLY DURING OCCUPIED HOURS.

PRIOR TO MALL OPENING. UNOCCUPIED MODE SHALL HAVE MANUAL OVERRIDE

SHALL BE COATED WHEN WITHIN FIVE (5) MILES OF COAST.

- H. PROGRAMMING OF CONTROLS/SEQUENCE OF OPERATION:
- 1. CONTRACTOR SHALL PROVIDE PROGRAMMING OF HVAC CONTROL SYSTEM PER MANUFACTURER'S INSTRUCTIONS AND AS REQUIRED TO MEET THE BELOW OPERATION. SPACE TEMPERATURE SETPOINT - UNOCCUPIED SETPOINTS SHALL BE 78°F COOLING AND 60°F HEATING. WARM-UP/OCCUPIED SETPOINTS SHALL BE 72°F COOLING AND 68°F HEATING. SETPOINTS SHALL BE LOCKED OUT TO PREVENT ADJUSTMENT MORE
- UNIT OPERATION DURING OCCUPIED HOURS, FAN SHALL RUN CONTINUOUSLY ("FAN ON") AND UNIT SHALL STAGE COOLING O HEATING. DURING UNOCCUPIED HOURS, FAN SHALL RUN ONLY WHEN HEATING OR COOLING ARE CALLED FOR ("FAN AUTO"). 5. OCCUPIED/UNOCCUPIED/WARM-UP - UNOCCUPIED MODE SHALL BE SET FOR ONE HOUR AFTER MALL CLOSING TO ONE HOUR

3. ALL SETPOINTS ARE ADJUSTABLE - PRIOR TO PROGRAMMING OF CONTROLS SYSTEM, VERIFY SETPOINTS WITH TENANT

- REFER TO CONTROLS SECTION ABOVE FOR ADDITIONAL REQUIREMENTS. PROVIDE CIRCUIT TO PREVENT COMPRESSOR SHORT CYCLING AS A RESULT OF A RAPID CHANGE IN THERMOSTAT SETTING AND
- AUTOMATICALLY PREVENT COMPRESSOR RESTART AT LEAST FIVE MINUTES AFTER SHUTDOWN J. CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL CONTROLS, CONTROL WIRING AND TO MAKE OPERATIONAL.
- K. ROOFTOP UNITS SHALL BE AS NOTED IN THE SCHEDULES, PROVIDED BY CONTRACTOR. UPON DELIVERY OF UNITS, CONTRACTOR SHALL VERIFY ALL EQUIPMENT IS AS SPECIFIED ON DRAWINGS INCLUDING ALL ELECTRICAL REQUIREMENTS. ACCESSORIES AND OTHER REQUIREMENTS. ANY DISCREPANCIES MUST BE REPORTED TO TENANT CONSTRUCTION MANAGER WITHIN THE FIRST TWENTY-FOUR (24) HOURS AFTER DELIVERY. EQUALS BY CARRIER AND YORK.

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240506

SEAL. THIS BUILDING USE IS ONLY APPLICABLE I

AREAS MEETING THE STATED DESIGN CRITER

Owner/Agent: Designer/Contractor: Adrenaline Shremshock Engineering, Inc. 195 New Hampshire Avenue, Suite 7775 Walton Parkway New Albany, Ohio 43054 Portsmouth, New Hampshire 03801 6145454550

Proposed Efficiency = 10.80 EER, Required Efficiency = 9.80 EER Proposed Part Load Efficiency = 16.00 IEER, Required Part Load Efficiency = 13.00 IEER Fan System: FAN SYSTEM 1 -- Compliance (Motor nameplate HP and fan efficiency method): Passes

1 HP-1 / AHU-1 (Unknown): VRF Condensing Unit, Air Cooled Heat Pump Heating Mode: Capacity = 14 kBtu/h, Proposed Efficiency = 10.70 HSPF, Required Efficiency = 7.70 HSPF Cooling Mode: Capacity = 12 kBtu/h, Proposed Efficiency = 25.60 SEER, Required Efficiency = 13.00 SEER Proposed Part Load Efficiency = 0.00 , Required Part Load Efficiency = 0.00 Fan System: None

HP-2 / AHU-2 (Unknown): VRF Condensing Unit, Air Cooled Heat Pump Heating Mode: Capacity = 60 kBtu/h, Proposed Efficiency = 9.40 HSPF, Required Efficiency = 7.70 HSPF Cooling Mode: Capacity = 48 kBtu/h, Proposed Efficiency = 19.40 SEER, Required Efficiency = 13.00 SEER Proposed Part Load Efficiency = 0.00 , Required Part Load Efficiency = 0.00

Compliance Statement: The proposed mechanical alteration project represented in this document is consistent with the building

Name - Title

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Mechanical Rough-In Inspection | Complies? **Comments/Assumptions** C402.2.6 Thermally ineffective panel surfaces of Complies **Exception:** Requirement does not apply. □Does Not □Not Observable □Not Applicable C403.12.3 HVAC piping insulation insulated in ☐Complies Requirement will be met.

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Comments/Assumptions

Exception: Requirement does not apply.

fan system motor nameplate hp or fan Sold Observable □Not Applicable C403.8.3 Fans have a fan energy index (FEI) $>= \square$ Complies **Exception:** Single fans with motor nameplate horsepower of = [ME117]² 1.00. Variable volume fans will have \square Does Not 1 hp or 0.89 kW. an FEI >= 0.95. □Not Observable □Not Applicable C403.8.3 Fans have a fan energy index (FEI) $>= \square$ Complies **Exception:** Single fans with motor nameplate horsepower of = 1 hp or 0.89 kW.

Requirement will be met.

Requirement will be met.

See the Mechanical Systems list for values.

[ME117]² 1.00. Variable volume fans will have Does Not an FEI >= 0.95. □Not Observable □Not Applicable C403.8.4 Motors for fans that are not less than Complies Requirement will be met. [ME142]² 1/12 hp and less than 1 hp are □Does Not electronically commutated motors or ☐Not Observable have a minimum motor efficiency of □Not Applicable 70 percent. These motors have the

□Not Observable

□Not Applicable

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

means to adjust motor speed. C403.8.6 Each DX cooling system > 65 kBtu ☐Complies Requirement will be met. [ME143]² and chiller water/evaporative cooling Does Not system with fans > 1/4 hp are designed to vary the indoor fan airflow as a function of load and comply with detailed requirements of this section. \square Complies C403.9 Large diameter fans where installed **Exception:** Requirement does not apply. [ME144]² shall be tested and labeled in \square Does Not accordance with AMCA 230. □Not Observable □Not Applicable C403.13.1 Systems that heat outside the building \square Complies **Exception:** Requirement does not apply. [ME71]² envelope are radiant heat systems Does Not controlled by an occupancy sensing □Not Observable

C403.3 HVAC equipment efficiency verified. ☐ Complies See the Mechanical Systems list for values. □Does Not □Not Observable □Not Applicable C403.2.1 Zone isolation devices and controls ☐ Complies Requirement will be met. [ME112]³ installed where applicable. \square Does Not □Not Observable □Not Applicable

 \square Complies

□Not Observable

□Not Applicable

└─Does Not

□Not Applicable

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

Project Information Energy Code:

Project Title: Location: Blacksburg (Montgomery), Virginia Climate Zone: Project Type: Alteration

Construction Site: 202 N. Main St. Blacksburg, Virginia 24060

Mechanical Systems List Quantity System Type & Description

1 RTU-1 (Multiple-Zone): Heating: 1 each - Central Furnace, Gas, Capacity = 400 kBtu/h Proposed Efficiency = 81.00% Et, Required Efficiency: 81.00 % Et Cooling: 1 each - Single Package DX Unit, Capacity = 300 kBtu/h, Air-Cooled Condenser, Air Economizer

FAN 1 Supply, Multi-Zone VAV, 10000 CFM, 4.6 motor nameplate hp, 0.00 fan energy index , fan exception: 3rd party air/energy performance certified

Fan System: None

Mechanical Compliance Statement

plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2021 IECC requirements in COMcheck Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist. Jeromy Perry - Principal In Charge, Mechanical Eng.

Project Title: 240506_Blacksburg_VACU Data filename:

COMcheck Software Version COMcheckWeb

Inspection Checklist Energy Code: 2021 IECC

Requirements: 100.0% were addressed directly in the COMcheck software Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [PR2] ¹	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical and service water heating systems and document where exceptions to the standard are claimed. Load calculations per acceptable engineering standards and handbooks. Hot water system sized per manufacturer's sizing guide.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

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

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C403.4.3. Closed-circuit cooling tower within **Exception:** Requirement does not apply. heat pump loop have either automatic Does Not [ME121]³ bypass valve or lower leakage positive closure dampers. Open-circuit tower within heat pump loop have automatic Not Applicable valve to bypass all heat pump water flow around the tower. Open- or closed-circuit cooling towers used in conjunction with a separate heat exchanger have heat loss by shutting down the circulation pump on the cooling tower loop. Open- or closed circuit cooling towers have a separate heat exchanger to isolate the cooling tower from the heat pump loop, and heat loss is controlled by shutting down the circulation pump on the cooling tower loop. C403.6.1 Supply air systems serving multiple Complies Requirement will be met. [ME130]³ zones have VAV systems with controls □Does Not configured to reduce the volume of air that is reheated, recooled or mixed in □Not Applicable each zone. See section for details. Single-duct VAV systems use terminal \square Complies Requirement will be met. ME131]³ devices configured to reduce the □Does Not supply of primary supply air before □Not Observable reheating or recooling takes place. □Not Applicable

Data filename:

Mechanical Rough-In Inspection

C403.7.1 Demand control ventilation provided Complies

served by systems with air side

air damper control, or design airflow

C403.7.2 Enclosed parking garage ventilation Complies

[ME115]³ has automatic contaminant detection Does Not

temperature greater than 60°F when

the majority of zones require cooling.

automatically manage temperature setpoint and ventilation (see sections

C403.7.6 HVAC systems serving guestrooms in Complies

C403.7.5 Kitchen exhaust systems comply with Complies

rating requirements and maximum

accordance with C403.11.1 and

occur during Foundation Inspection.

provide a means to relieve excess outside air during operation.

C403.5.1, required, meet the requirements for \square Does Not

C403.5.2 Economizer operation will not increase Complies

C403.12.1 HVAC ducts and plenums insulated in \square Complies

[ME60]² C403.11.2, verification may need to

[ME62]¹ ventilation controls, high-limit shut-off, Not Observable

integrated economizer control, and

Mechanical Rough-In Inspection | Complies?

C403.5.3. Air economizers automatically reduce \square Complies

outdoor air intake to the design

outdoor air intake will not reduce

cooling energy usage. See Table

outdoor air during air economizer

the building. The relief air outlet

shut when not in use and meet

mechanical or electrical variable

speed drive per Table C403.4.1.1.

section C403.7.7 for details.

[ME75]² controls are VAV fans driven by

W.C..

C403.5.3. Return, exhaust/relief and outdoor air Complies

C403.6.1 Hydronic and multizone HVAC system Complies

C403.6.9 VAV fans have static pressure sensors Complies

 $[ME67]^2$ located so controller setpoint <=1.2 \square Does Not

C403.4.1. Reset static pressure setpoint for DDC Complies

[ME24]² central controller based on the zones

controlled VAV boxes reporting to

requiring the most pressure.

C403.5.3.3 for applicable device types

| ME125]¹ | operation to prevent over pressurizing | Not Observable

located to avoid recirculation into the Not Applicable

maximum leakage rates. Reference

dampers used in economizers have \square Does Not [ME126]¹ motorized dampers that automatically Not Observable

[ME124]¹ minimum outdoor air quantity when

C403.5.3. System capable of relieving excess

and climate zones.

supply air limitations, and satisfy hood

representative building loads or outdoor air temperatures indicate that

guestrooms: Each guestroom is

provided with controls that

C403.7.6.1 and C403.7.6.2).

[ME57]¹ systems meeting Table C403.7.4(1)

[ME116]³ replacement air and conditioned

exhaust rate criteria.

C403.12.2 constructed in accordance with

C403.5, Air economizers provided where

[ME16]¹ heating energy use during normal

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& Req.ID

Chapter 4. Mechanical ventilation has capability to reduce outdoor air supply \square Not Applicable

people/1000 ft2 occupant density and

economizer, auto modulating outside Not Applicable

has automatic containmant detection and capacity to stage or modulate fans to 50% or less of design capacity.

| Not Observable | Not Applicable |

combination with zone heating and cooling systems do not use heating or

heat recovery to warm supply air to a Not Applicable

C403.2.2 Natural or mechanical ventilation is

International Mechanical Code

to minimum per IMC Chapter 4.

[ME59]¹ provided in accordance with

[ME59]¹ for spaces >500 ft2 and >15

C403.7.3 Units that provide ventilation air to

[ME140]³ multiple zones and operate in

[ME141]³ Group R-1 buildings with > 50

C403.7.4 Exhaust air energy recovery on

and C403.7.4(2).

& Req.ID

Comments/Assumptions

Requirement will be met.

Requirement will be met.

Requirement will be met.

Exception: Requirement does not apply.

Requirement will be met.

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Comments/Assumptions

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└─Complies

☐ Complies

 \square Does Not

□Not Observable

☐Not Applicable

□Not Observable

□Not Applicable

□Not Applicable

 \square Not Applicable

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□Not Observable

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

□Not Applicable

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device or timer switch.

C403.5.5 Fault detection and diagnostics

economizers.

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[ME113]² installed with air-cooled unitary DX

units or VRF units having

Plumbing Rough-In Inspection

C404.5, Heated water supply piping conforms \square Complies

C404.5.1, to pipe length and voiding requirements. Refer to section details. Not Observable

□Not Applicable

C404.5.1, to pipe length and volume

Additional Comments/Assumptions:

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[ME41]³ sensible heating panels have

insulation >= R-3.5.

[ME61]² accordance with Table C403.11.3.

C403.8.1 HVAC fan systems at design

Insulation exposed to weather is

provided with shielding from solar

[ME65]³ conditions do not exceed allowable Does Not

protected from damage and is

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& Req.ID

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SPECIFICALLY AUTHORIZED BY THEM AND SIG AND SEALED FOR SUCH SPECIFIC LOCATION IN T STATE, PROVINCE OR TERRITORY SHOWN ON TH SEAL. THIS BUILDING USE IS ONLY APPLICABLE I AREAS MEETING THE STATED DESIGN CRITERIA

JEROMY T. PERRY

Lic. No. 42243

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Additional	Comments/Assumptions:	

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Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.7 [EL26] ²	Low-voltage dry-type distribution electric transformers meet the minimum efficiency requirements of	□Complies □Does Not □Not Observable	Exception: Requirement does not apply.
	Lable C4US.b.	□Not Observable □Not Applicable	
C405.8 [EL27] ²	Electric motors meet the minimum efficiency requirements of Tables C405.7(1) through C405.7(4). Efficiency verified through certification under an approved certification program or the equipment efficiency ratings shall be provided by motor manufacturer (where certification programs do not exist).	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
C405.9.1, C405.9.2 [EL28] ²	Escalators and moving walks comply with ASME A17.1/CSA B44 and have automatic controls configured to reduce speed to the minimum permitted speed in accordance with ASME A17.1/CSA B44 or applicable local code when not conveying passengers.	□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply.
C405.10 [EL29] ²	Total voltage drop across the combination of feeders and branch circuits <= 5%.	□Complies □Does Not	Exception: Requirement does not apply.
		□Not Observable □Not Applicable	
C405.1.1 [EL30] ²	At least 90% of dwelling unit permanently installed lighting shall have lamp efficacy >= 65 lm/W or luminaires with efficacy >= 45 lm/W or comply with C405.2.4 or C405.3.	□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply.
C405.11, C405.11.1 [EL31] ²	50% of 15/20 amp receptacles installed in enclosed offices, conference rooms, copy rooms, break rooms, classrooms and workstations and > 25% of branch circuit feeders for modular furniture will have automatic receptacle control in accordance with C405.11.1.	□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply.

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Mechanical Rough-In Inspection Complies?

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Section # Req.ID	Final Inspection	Complies?	Comments/Assumptions
303.3, 408.2.5. I8] ³	Furnished O&M manuals for HVAC systems within 90 days of system acceptance.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
403.1.1 [150] ³	HVAC systems and equipment design loads calculated in accordance with ANSI/ASHRAE/ACCA Standard 183 or by an approved equivalent computational procedure	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
403.3.1 [27] ³	HVAC systems and equipment capacity does not exceed calculated loads.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
403.4.1 (147] ³	Heating and cooling to each zone is controlled by a thermostat control. Minimum one humidity control device per installed humidification/dehumidification system.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
403.4.1. I42] ³	Heat pump controls prevent supplemental electric resistance heat from coming on when not needed.	□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply.
403.4.1. I38] ³	Thermostatic controls have a 5 °F deadband.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
403.4.1. [20] ³	Temperature controls have setpoint overlap restrictions.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
403.4.2 I39] ³		☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
	Automatic Controls: Setback to 55°F (heat) and 85°F (cool); 7-day clock, 2- hour occupant override, 10-hour backup	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
403.4.2. I41] ³	Systems include optimum start controls.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
408.1.1 I57] ¹	Building operations and maintenance documents will be provided to the owner. Documents will cover manufacturers' information, specifications, programming procedures and means of illustrating to owner how building, equipment and systems are intended to be installed, maintained, and operated.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.

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C403.3.3			
[ME35] ¹	Hot gas bypass limited to: <=240 kBtu/h - 50% >240 kBtu/h - 25%	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.2.2. 1 [ME53] ³	Air outlets and zone terminal devices have means for air balancing.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
, C403.11.3 .1, C403.11.3 .2	Refrigerated display cases, walk-in coolers or walk-in freezers served by remote compressors and remote condensers not located in a condensing unit, have fan-powered condensers that comply with Sections C403.11.3.1 and refrigeration compressor systems that comply with C403.11.3.2.	□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply

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Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C403.6.3 [ME132] ³	Systems that have 1 warm air duct and 1 cool air duct use terminal devices configured to reduce the flow from one duct to a minimum before mixing of air from the other duct takes place.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Exception: Requirement does not apply.
C403.6.4 [ME133] ³	Individual dual-duct or mixing heating and cooling systems with a single fan and with total capacities > 90,000 Btu/h not equipped with air economizers.	□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply.
C403.6.5 [ME134] ³	Multiple zone HVAC systems have supply air temperature reset controls based on building loads or outside temperatures.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
C403.6.7 [ME136] ³	Parallel-flow fan-powered VAV air terminals have automatic controls configured to 1) turn off the terminal fan except when space heating is required or where required for ventilation, 2) turn on the terminal fan as the first stage of heating before the heating coil is activated, and 3) during heating for warmup or setback temperature control, either operate the terminal fan and heating coil without primary air or, reverse the terminal damper logic and provide heating from the central air handler by primary air.	□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply.
C403.6.8 [ME137] ³	Systems with DDC of individual zones reporting to the central control panel configured to reset the static pressure setpoint based on zone requiring the most pressure. The DDC is capable of monitoring zone damper positions or have an alternative method of indicating the need for static pressure. See section for details.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
C403.6.9 [ME138] ³	Static pressure sensors used to control VAV fans located such that the controller setpoint is <= 1.2 inches w.c Where this results in one or more sensors being located downstream of major duct splits, not less than one sensor located on each major branch.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.4.1. 4 [ME63] ²	Heating for vestibules and air curtains with integral heating include automatic controls that shut off the heating system when outdoor air temperatures > 45F. Vestibule heating and cooling systems controlled by a thermostat in the vestibule with heating setpoint <= 60F and cooling setpoint >= 80F.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
C403.6.6 [ME135] ³	Multiple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. See the Mechanical Systems list for values.

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ENERGY

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