

	PIPING SPA	PIPING SPACING SUPPORT										
PIPING MATERIAL	PIPING SIZE RANGE	MAXIMUM HORIZONTAL SPACING (FEET)	MAXIMUM VERTICAL SPACING (FEET)									
COPPER	UP TO 1-1/4"	6	10									
COPPER	1-1/2" AND LARGER	10	10									
CPVC	UP TO 1"	3	10 (A)									
CPVC	1-1/4" AND LARGER	4	10 (A)									
STEEL	UP TO 2"	10	15									
STEEL	2" AND LARGER	12	15									
PVC	ALL	4	10 (A)									
POLYETHYLENE (PEX)	ALL	2.67 (32")	4									

(A) FOR SIZES 2 INCH AND SMALLER A MID-SUPPORT GUIDE IS REQUIRED TO PREVENT PIPE MOVEMENT.

## HANGER ROD SUPPORT SIZING

PIPING SIZE RANGE	MAXIMUM HANGER ROD DIAMETER (INCHES)	MAXIMUM LOAD (POUNDS)
UP TO 2"	Six	610
2-1/2" TO 3"	1/2	1130
4" TO 5"	518	1810
6" AND LARGER	34	2710
PARRELLEL PIPING	7/8	3770
TRAPEZE (A)	1	4960

(A) STEEL ANGLE, CHANNEL, OR BEAM SIZING AND WEIGHT CALCULATIONS ARE THE CONTRACTORS RESPONSIBILITY

GAS PIP	ING SPACING	SUPPORT
STEEL PIPE NOMINAL SIZING (INCHES)	MAXIMUM HORIZONTAL SPACING (FEET)	MAXIMUM VERTICAL SPACING (FEET)
1/2"	6	6
3/4" OR 1"	8	8
1 1/4" OR LARGER	10	EVERY FLOOR LEVEL

## MECHANICAL (HVAC) GENERAL NOTES

- ALL MECHANICAL EQUIPMENT AND INSTALLATIONS SHALL COMPLY WITH THE REQUIREMENTS OF THE 2015 INTERNATIONAL MECHANICAL CODE, 2015 INTERNATIONAL BUILDING CODE, 2015 INTERNATIONAL ENERGY CONSERVATION CODE, 2015 INTERNATIONAL FUEL GAS CODE, NFPA 90A, UNDERWRITERS LABORATORIES, AND ALL APPLICABLE LOCAL CODES.
- 2. THESE DRAWINGS ARE GENERALLY DIAGRAMMATIC AND ARE INTENDED TO CONVEY THE SCOPE OF WORK AS WELL AS INDICATE GENERAL ARRANGEMENT OR EQUIPMENT, DUCTWORK, AND PIPING. THE CONTRACTOR SHALL ADHERE TO THESE DRAWINGS AS CLOSELY AS POSSIBLE. HOWEVER, THE RIGHT IS RESERVED TO VARY THE RUNS OF DUCTWORK AND PIPING TO MAKE OFFSETS, WHERE NECESSARY, TO ACCOMMODATE CONDITIONS ARISING AT THE JOB SITE. MECHANICAL LAYOUTS SHOWN ARE BASED ON THE AVAILABLE AS-BUILT DRAWINGS AND HAVE NOT BEEN FIELD VERIFIED.
- 3. CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL MECHANICAL EQUIPMENT, DUCTWORK, PIPING, ETC. TO FIT WITHIN THE SPACE ALLOWED BY THE ARCHITECTURAL AND STRUCTURAL CONDITIONS. CUTTING OR ALTERING ANY STRUCTURAL MEMBERS SHALL NOT BE PERMITTED WITHOUT WRITTEN PERMISSION FROM THE ARCHITECT OR STRUCTURAL ENGINEER.
- 4. PRIOR TO PURCHASING ANY MATERIALS OR COMMENCING WORK, CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS CONSISTING OF BUT NOT LIMITED TO DUCTWORK, EQUIPMENTS, PIPING LOCATIONS AND SIZING. DEVIATIONS FROM SHOWN WORK SHOULD BE REPORTED TO THE ENGINEER
- 5. PROVIDE ALL LABOR, MATERIAL, AND EQUIPMENT TO PROVIDE A COMPLETED FULLY OPERATIONAL SYSTEM.
- 6. ALL MECHANICAL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS INCLUDING OPERATION AND MAINTENANCE INSTRUCTIONS.
- 7. LONG LINE REFRIGERANT APPLICATIONS SHALL BE INSTALLED IN ACCORDANCE WITH THE UNIT MANUFACTURER'S RECOMMENDATIONS.
- DUCTWORK SIZES SHOWN ON DRAWING ARE CLEAR INSIDE DIMENSIONS. WHERE
  ACOUSTICALLY LINED DUCT IS SPECIFIED, DUCT DIMENSIONS SHALL BE

INCREASED TO ACCOMMODATE LINING.

FIRE PENETRATIONS MUST BE PROTECTED.

MECHANICAL/ELECTRICAL COORDINATION:

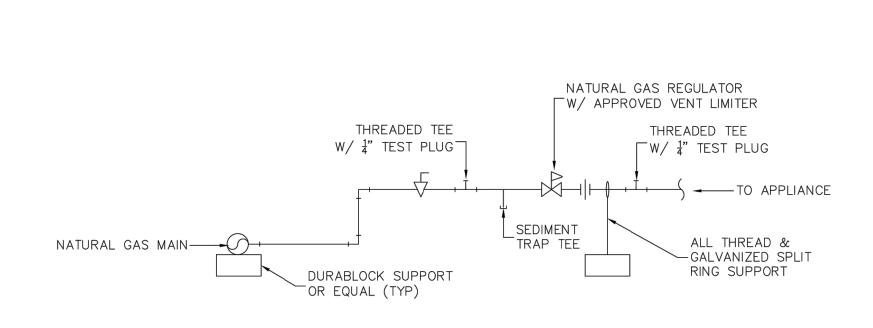
- 9. ALL PIPING AND DUCTWORK PENETRATIONS OR FIRE AND/OR SMOKE RATED ASSEMBLIES SHALL BE FIRE-STOPPED TO RESTORE ASSEMBLY TO ORIGINAL INTEGRITY. FIRE STOP PRODUCTS SHALL BE MANUFACTURED FOR SPECIFIC APPLICATION AND APPROVED BY LOCAL AUTHORITY HAVING JURISDICTION. ALL
- 10. EXTERNAL STATIC PRESSURE DOES NOT INCLUDE COIL, CASING, OR HEAT EXCHANGER PRESSURE DROP.
- 11. THERMOSTAT SHALL BE MOUNTED NO MORE THAN 48 INCHES ABOVE FINISHED FLOOR. THERMOSTAT LOCATIONS SHALL BE COORDINATED WITH ARCHITECTURAL
- 12. All PIPING OF DISSIMILAR MATERIALS SHALL HAVE DIELECTRIC FITTINGS.
- CONTRACTOR SHALL COORDINATE ELECTRICAL CHARACTERISTICS AND REQUIREMENTS OF ALL MECHANICAL EQUIPMENT WITH ELECTRICAL DRAWINGS AND ELECTRICAL CONTRACTOR PRIOR TO ORDERING OR INSTALLING EQUIPMENT. CONTRACTOR SHALL FURNISH EQUIPMENT COMPATIBLE FOR THE VOLTAGES SHOWN ON THE ELECTRICAL DRAWINGS.
- 2. ALL MECHANICAL EQUIPMENT REQUIRING ELECTRICAL POWER SHALL BE INSTALLED WITH DISCONNECT SWITCHES AT EACH PIECE OF EQUIPMENT. COORDINATE SWITCH TYPE (FUSED OR NON-FUSED) WITH EQUIPMENT CHARACTERISTIC, MANUFACTURER'S RECOMMENDATIONS, AND ELECTRICAL
- 3. INDOOR AND OUTDOOR EQUIPMENT DISCONNECTS SHALL BE PROVIDED BY THE E.C.
- ALL REQUIRED CONTROL WIRING (INCLUDING WIRING FOR TEMPERATURE CONTROLS PANELS, DEVICES, ETC.) NOT SHOWN ON THE DRAWINGS SHALL BE INCLUDED AS PART OF THE MECHANICAL WORK.
- 5. SMOKE DETECTORS PROVIDED AND WIRED BY ELECTRICAL CONTRACTOR AND MOUNTED BY MECHANICAL CONTRACTOR.

## GAS PIPING GENERAL NOTES

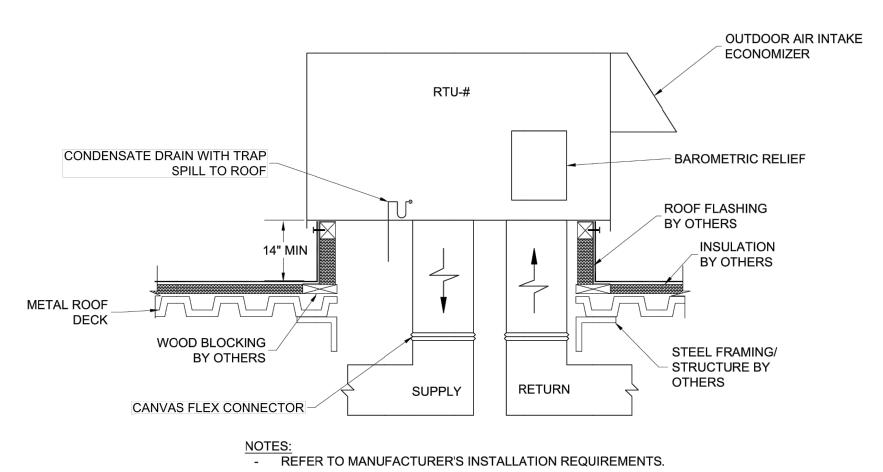
1. ALL NEW EQUIPMENT REQUIRING GAS SHALL BE PROVIDED WITH PRESSURE REGULATOR AND SHUT-OFF VALVE. COORDINATE EXACT LOCATION OF GAS CONNECTION WITH MANUFACTURER'S RECOMMENDATIONS.

FOR 1/2 HOURS PER 500 CUBIC FEET OF PIPE VOLUME.

2. ALL GAS PIPING TO BE TESTED PER 2015 IFGC SECTION 406. SYSTEM SHALL BE TESTED AT 10PSI OR 1.5 TIMES OPERATING PRESSURE (WHICH EVER IS GREATER)

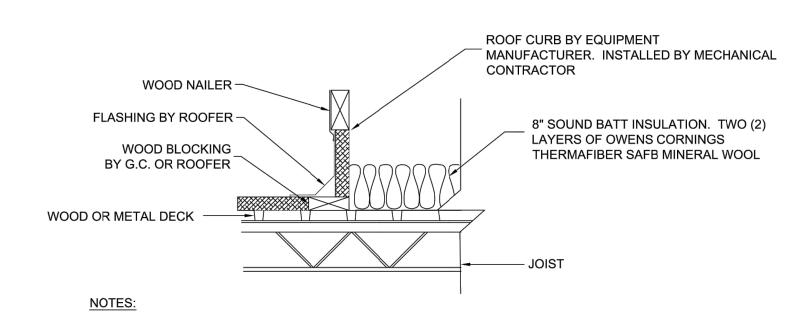


GAS PIPING BRANCH DETAIL



PACKAGE ROOFTOP UNIT DETAIL

NOT TO SCALE



COORDINATE NECESSARY ROOF OPENINGS WITH GENERAL CONTRACTOR AND ROOF. MAINTAIN DECKING UNDER UNIT EXCEPT WHERE DUCTWORK OR PIPING PASS THROUGH.
 COORDINATE METAL ANGEL OR SUPPORTS AROUND DUCTWORK OPENINGS TO SUPPORT DECKING

ROOF CURB DETAIL SOUNDS SENSITIVE AREAS

NOT TO SCALE

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THAINELINE

V G I N E E R I N

10 KACEY COURT, SUITE 2

FECHANICSBURG, PA 17055

HIGH SCHOOL S PHASE II RE DRIVE A 19533

929 LAKE SHORE DR LEESPORT, PA 195 HVAC NOTES AND DE

PROFESSIONAL

ADAM SHAMENEK

ENGINEER
PE075884

ENGINEER: ADAM SHAMENEK PE075884
PROJECT NUMBER:

20158

SCALE: AS NOTED

DATE: 4/20/2021

DRAWN BY: BCS

CHECKED BY: ALS

DATE CHECKED: 4/20/2021

REVISIONS

DATE: DESCRIPTION:

M001

								<b>PACKAGE</b>	D COO	LING A	ND HE	ATING	EQUIPI	MENT	SCHEDUL								
				SUPPLY AIR PERFORMA	NCE	MAXIMUM		COOLING PERFOR	RMANCE (DX)			HEATING P	ERFOMANCE		ELECTRIC	AL INFO	RMATION		UNIT	CONFIGURATION		FACTORY INSTALLED	
TAG	MANUFACTURER	MODEL#	MAX CFM	SUPPLY ESP (IN WG)	CONTROL	OUTSIDE AIR CFM	TONNAGE	TOTAL CAP (MBH)	CONTROL	EFF	INPUT (MBH)	OUTPUT (MBH)	CONTROL	EFF	VOLTAGE/PHASE	МСА	MOCP FA	N HP	WEIGHT (LBS)	(SUPPLY/RETURN)	ROOF CURB	ACCESSORIES	AREA SERVED
RTU-1	TRANE				•	•	•	•			EXIST	ING UNIT	4	÷	,H-	M	· · · · · ·			-			GYM
RTU-2	TRANE			_	_		_	_			EXISI	TNG UNIT						_		-			GYM
RTU-3	TRANE	YCD420B4	12250	1.00	SINGLE ZONE VAV	3400	35	410.42	3-STAGE	10.5 EER	600	480	2-STAGE	81%	460/3	87.6	100 1	5 & 1	5698	DOWNFLOW/UPFLOW	14 INCH/FLAT	A, B, C, D, E, F,G, H, I, & J	AUDITORIUM
RTU-4	TRANE	YCD420B4	12250	1.00	SINGLE ZONE VAV	3400	35	410.42	3-STAGE	10.5 EER	600	480	2-STAGE	81%	460/3	87.6	100 1	5 & 1	5698	DOWNFLOW/UPFLOW	14 INCH/FLAT	A, B, C, D, E, F,G, H, I, & J	AUDITORIUM
RTU-5	TRANE	YHC092F4RYA	2625	0.75	SINGLE ZONE VAV	600	7.5	92	2-STAGE	12.6 EER	150	120	2-STAGE	80%	460/3	20	25	2.75	1291	HORIZONTAL/HORIZONTAL	14 INCH/FLAT	A, B, C, D, E, F,G, H, I, & J	AUDITORIUM LOBBY
RTU-6	TRANE	YHC092F4RYA	2625	0.75	SINGLE ZONE VAV	600	7.5	92	2-STAGE	12.6 EER	150	120	2-STAGE	80%	460/3	20	25	2.75	1291	HORIZONTAL/HORIZONTAL	14 INCH/FLAT	A, B, C, D, E, F,G, H, I, & J	AUDITORIUM LOBBY
RTU-7	TRANE	YHC120F4RYA	3500	0.75	SINGLE ZONE VAV	500	10	113.97	2-STAGE	12.4 EER	250	200	2-STAGE	80%	460/3	22	25	2.75	1608	HORIZONTAL/HORIZONTAL	14 INCH/FLAT	A, B, C, D, E, F,G, H, I, & J	STAGE PLATFORM
RTU-8	TRANE	YHC120F4RYA	3500	0.75	SINGLE ZONE VAV	700	10	113.97	2-STAGE	12.4 EER	250	200	2-STAGE	80%	460/3	22	25	2.75	1608	DOWNFLOW/UPFLOW	14 INCH/FLAT	A, B, C, D, E, F,G, H, I, & J	LIBRARY
RTU-9	TRANE	YHC120F4RYA	3500	0.75	SINGLE ZONE VAV	700	10	113.97	2-STAGE	12.4 EER	250	200	2-STAGE	80%	460/3	22	25	2.75	1608	DOWNFLOW/UPFLOW	14 INCH/FLAT	A, B, C, D, E, F,G, H, I, & J	LIBRARY
RTU-10	TRANE	YHC120F4RYA	3500	0.75	SINGLE ZONE VAV	850	10	113.97	2-STAGE	12.4 EER	250	200	2-STAGE	80%	460/3	22	25	2.75	1608	DOWNFLOW/UPFLOW	14 INCH/FLAT	A, B, C, D, E, F,G, H, I, & J	CAFETERIA
RTU-11	TRANE	YHC120F4RYA	3500	0.75	SINGLE ZONE VAV	850	10	113.97	2-STAGE	12.4 EER	250	200	2-STAGE	80%	460/3	22	25	2.75	1608	DOWNFLOW/UPFLOW	14 INCH/FLAT	A, B, C, D, E, F,G, H, I, & J	CAFETERIA
RTU-12	TRANE	YHC067E4RYA	1750	0.75	SINGLE ZONE VAV	400	5	60	1-STAGE	17.2 SEER	130	104	1-STAGE	80%	460/3	15	20	1	999	DOWNFLOW/UPFLOW	14 INCH/FLAT	A, B, C, D, E, F,G, H, I, & J	KITCHEN
RTU-13	TRANE	YHC067E4RYA	1750	0.75	SINGLE ZONE VAV	200	5	60	1-STAGE	17.2 SEER	130	104	1-STAGE	80%	460/3	15	20	1	999	DOWNFLOW/UPFLOW	14 INCH/FLAT	A, B, C, D, E, F,G, H, I, & J	RECEIVING WAREHOUS
RTU-14	TRANE	YHD240G4RZD	7000	1	SINGLE ZONE VAV	1500	20	252.08	2-STAGE	11 EER	400	320	2-STAGE	80%	460/3	58	70	7.5	2859	DOWNFLOW/UPFLOW	PLENUM SUPPLY	A, B, C, D, E, F,G, H, I, J, K	AUXILIARY GYM
RTU-15	TRANE	YHD180G4RZD	5250	1	SINGLE ZONE VAV	975	15	183.42	2-STAGE	12 EER	350	280	2-STAGE	80%	460/3	38	45	5	2698	DOWNFLOW/UPFLOW	CURB ADAPTER	A, B, C, D, E, F,G, H, I, & J	WEIGHT ROOM
RTU-16	TRANE	YHC037E4RYA	1050	0.75	SINGLE ZONE VAV	120	3	36.21	1-STAGE	17.5 SEER	100	80	1-STAGE	80%	460/3	12	15	0.75	767	DOWNFLOW/UPFLOW	14 INCH/FLAT	A, B, C, D, E, F,G, H, I, & J	TRAINER

ACCESSORIES:

A) ECONOMIZER WITH BAROMETRIC RELIEF

B) SINGLE ZONE VAV FAN CONTROLS

C) HINGED PANELS

D) 2" MERV 8 FILTER

E) RELIATEL CONTROLS F) AIR-FI WIRELESS COMMUNICATION

G) DEMAND CONTROL VENTILATION - CO2 SENSOR DUCT MOUNTED

H) DEHUMIDIFICATION/HOT GAS REHEAT - HUMIDITY SENSOR DUCT MOUNTED

I) 120 VOLT CONVENIENCE OUTLET

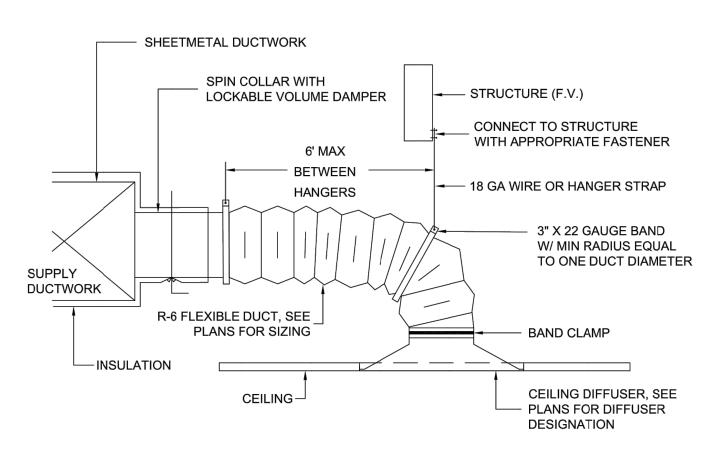
J) FACTORY MOUNTED DISCONNECT

K)	PLENUM SUPPLY CURB	

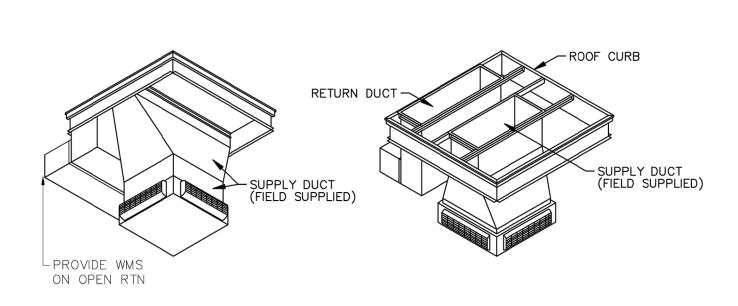
									MAKE	UP AIR	UNIT	SCHED	ULE		,	,						,			
				SUPF	PLY AIR PERFO			В		RFORMANC	E					OOLING PE	RFORMANC	E.		ELECTRICAL	NFORMA	TION	UNIT		ACCESSORIES/
TAG	MANUFACTURER	MODEL#	MIN CFM	MAX CFM	SUPPLY ESP (IN WG)	CONTROL	FUEL	HEATING TYPE	INPUT (MBH)	OUTPUT (MBH)	EAT (F)	LAT (F)	EFF	CONDENSER QTY	(MBH)	EAT (F)	EWB (F)	LAT (F)	LWB (F)	VOLTAGE/PHASE	MCA	MOCP	WEIGHT (LBS)	ROOF CURB	NOTES
MAU-1	CAPTIVE AIR	A3-D.50024DMPU	3500	4800	0.5	CONSTANT VOLUME	NATURAL GAS	DIRECT FIRED	352	324	0	70	92%	2	107.6	95	75	79.6	68.9	460V/3	29.6	35	2203	20- INCH FLAT	
341.5 f and 1 - 37.5 apr		1									•											1			

		DUCTWORK CONSTRUC				
DESIGNATION	AIR SYSTEM	MATERIAL	INSULATION	PRESSURE CLASS	SMACNA SEAL CLASS	[NOTES
#X# SA	SUPPLY DUCTWORK CONCEALED WITHIN BUILDING ENVELOPE	GALVANIZED SHEET METAL	2.2" THICK, 3/4 LBS FIBERGLAS DUCT WRAP (OR EQUIVALENT R-6)	POSITIVE 2 INCHES WATER GAUGE	C	
#φ SA OR #X# SA	SUPPLY DUCTWORK EXPOSED WITHIN BUILDING ENVELOPE	SPIRAL OR RECTANGULAR GALVANIZED SHEET METAL	2" THICK ACOUSTICAL, 1.5 LBS DUCT LINER	POSITIVE 2 INCHES WATER GAUGE	C	AUDITORIUM AND STAGE
#X# RA	RETURN DUCTWORK CONCEALED WITHIN BUILDING ENVELOPE	GALVANIZED SHEET METAL	2.2" THICK, 3/4 LBS FIBERGLAS DUCT WRAP (OR EQUIVALENT R-6)	NEGATIVE 2 INCHES WATER GAUGE		
#X# RA	RETURN DUCTWORK EXPOSED WITHIN BUILDING ENVELOPE	SPIRAL OR RECTANGULAR GALVANIZED SHEET METAL	2" THICK ACOUSTICAL, 1.5 LBS DUCT LINER	POSITIVE 2 INCHES WATER GAUGE	C	AUDITORIUM AND STAGE
#X# OA	OUTSIDE AIR DUCTWORK	GALVANIZED SHEET METAL	1.5" THICK, 3/4 LBS FIBERGLAS DUCT WRAP	POSITIVE 2 INCHES WATER GAUGE	C	
#X# EA	EXHAUST AIR DUCTWORK	GALVANIZED SHEET METAL	NONE	POSITIVE 2 INCHES WATER GAUGE	C	
#X# SA EXT	SUPPLY AIRDUCTWORK OUTSIDE BUILING ENVELOPEDOWNSTREAM OF VARIALBE AIR VOLUME BOXES	GALVENIZED SHEET METAL	2" THICK ATLAS WALL BOARD WITH WEATHER PROOFING (OR EQUIVALENT R-12)	POSITIVE 2 INCHES WATER GAUGE	(Ĉ:	VEATHER PROOFING TO BE VENTURE CLAD OR EPDM ROOFING MATERIAL
#X# RA EXT	RETURN AIR DUCTWORK OUTSIDE BUILING ENVELOPECONNECTED TO PACKAGED ROOFTOP UNITS	GALVENIZED SHEET METAL	2" THICK ATLAS WALL BOARD WITH WEATHER PROOFING (OR EQUIVALENT R-12)	NEGATIVE 2 INCHES WATER GAUGE	(C	WEATHER PROOFING TO BE VENTURE CLAD OR EPDM ROOFING MATERIAL

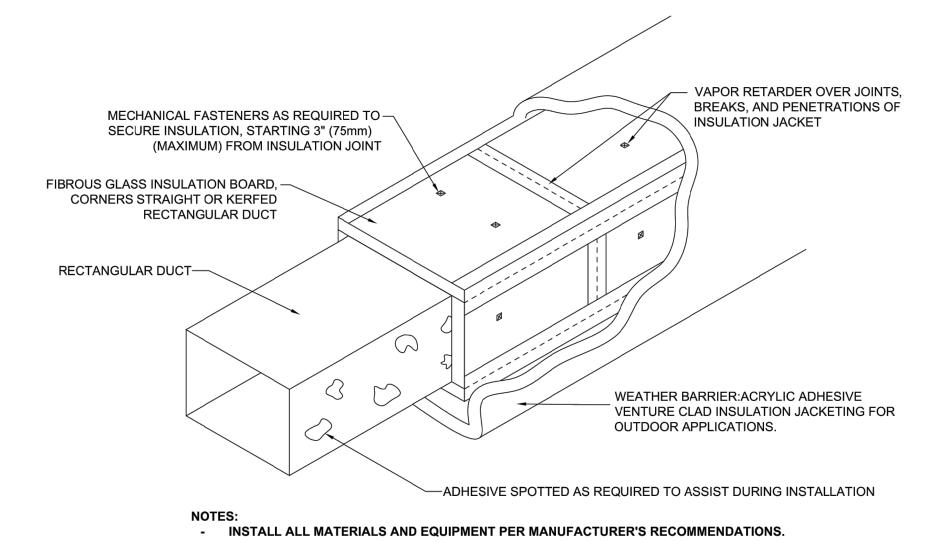
			GRILLES, REGISTERS,	& DIFFU	JSER SCHEDULE	
TAG	CFM RANGE	NECK SIZE (INCHES)	IDIEFUSER DESCRIPTION/STYLE	BASIS OF DESIGN	ACCESSORIES	NOTE
CD-A-#	350-500	12 DIA	FIXED CORE CEILING DIFFUSER,2X2 T-BAR LAY-IN	TITUS TDC		
SWD-A	250	14X6	SIDEWALL DIFFUSER, DRYWALL MOUNTED DOUBLE DEFLECTIO	TITUS S300FL	INTEGRAL VOLUME DAMPER	
SWD-B	590	18X10	SIDEWALL DIFFUSER, DRYWALL MOUNTED DOUBLE DEFLECTIO	TITUS S300FL	INTEGRAL VOLUME DAMPER	
RG-A	1000	24X24	PERFORATED RETURN GRILLE, 2FTX2FT T-BAR LAY-IN	TITUS 50F		
RG-B	2000	24X48	PERFORATED RETURN GRILLE, 2FTX4FT T-BAR LAY-IN	TITUS 50F		
RG-C	1000	20X20	DUCTMOUNTED RETURN GRILLE	TITUS S350RL		



FLEXIBLE DUCTWORK DETAIL NOT TO SCALE



BOTTOM VIEW \_ TOP VIEW ISOMETRIC PLENUM SUPPLY DIFFUSERS DETAIL NOT TO SCALE



OUTDOOR DUCTWORK DETAIL NOT TO SCALE

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DE

AND

SCHEDULES

ADAM SHAMENEK

ENGINEER: ADAM SHAMENEK PE075884
PROJECT NUMBER: **AS NOTED** 4/20/2021 BCS CHECKED BY: ALS DATE CHECKED: 4/20/2021 **REVISIONS** DESCRIPTION:

M002

## **HVAC SPECIFICATIONS SECTION 15500:** PROVIDE LOW AMBIENT CONTROLS. PROVIDE FACTORY MOUNTED CONVENIENCE OUTLET. PROVIDE FAULT DETECTION AND DIAGNOSTICS. • THE WORK OF THIS SECTION INCLUDES, BUT IS NOT LIMITED TO, THE HVAC SYSTEM. QUALITY ASSURANCE: COMPLY WITH THE CURRENT: PROVIDE FACTORY MOUNTED DISCONNECT. •• INTERNATIONAL MECHANICAL CODE (IMC), INTERNATIONAL PLUMBING CODE (IPC), INTERNATIONAL FUEL GAS CODE (IFGC), INTERNATIONAL PROVIDE FIELD DUCT MOUNTED CARBON DIOXIDE SENSOR. BUILDING CODE (IBC), INTERNATIONAL ENERGY CONSERVATION CODE (IECC); LOCAL CODES AND AMENDMENTS PROVIDE FIELD DUCT MOUNTED RELATIVE HUMIDITY SENSOR. NFPA 70; UL LISTING; NFPA 90A & 90; EXTERIOR SURFACES OF ALL UNITS SHALL BE PHOSPHATIZED, ZINC-COATED STEEL WITH EPOXY RESIN PRIMER AND BAKED ENAMEL FINISH. ACCESS TO FILTERS, BLOWER, HEATING SECTION, AND OTHER ITEMS NEEDING PERIODIC CHECKING OR MAINTENANCE SHALL BE THROUGH HINGED ACCESS DOORS WITH QUARTER-TURN LATCHES. DOOR FASTENING SCREWS ARE NOT ACCEPTABLE. B. SUBMITTALS: PRODUCT DATA FOR HEATING AND COOLING UNITS. • ALL OPENINGS THROUGH THE BASE PAN OF THE UNIT SHALL HAVE UPTURNED FLANGES OF AT LEAST ½" IN HEIGHT AROUND THE OPENING THROUGH DUCTWORK SHOP STANDARDS AND ACCESSORIES. • THE INTERIOR AIR SIDE OF THE CABINET SHALL BE ENTIRELY INSULATED ON ALL EXTERIOR PANELS WITH 1 INCH THICK, 1-1/2 LB DENSITY FIBERGLASS PIPING SHOP STANDARDS AND ACCESSORIES. WARRANTIES AND GUARANTEES • ALL BELT DRIVE BLOWER(S) SHALL HAVE BACKWARD INCLINED AIRFOIL BLADES. ALL DIRECT DRIVE BLOWER(S) SHALL HAVE FORWARD CURVED BLADES. GENERAL: PROVIDE STEEL PIPE SLEEVES FOR MASONRY WALL PENETRATIONS, TIGHT FITTING SHEET METAL SLEEVES IN WOOD PENETRATIONS AND OVER SIZED FAN FOR VAV APPLICATION WITH SHAFT GROUND RINGS. 3M FIRE STOPPING IN RATED WALL OR FLOOR PENETRATIONS. PROVIDE DIELECTRIC FITTINGS OR UNIONS IN ALL PIPE CONNECTIONS OF DISSIMILAR • COORDINATE ROOF OPENINGS AND LOCATIONS WITH STRUCTURAL OPENINGS AND REINFORCEMENT. • REFRIGERANT: ASTM B 743 COPPER TUBE WITH WROUGHT COPPER FITTINGS AND BRAZED JOINTS. REFER TO MANUFACTURER'S RECOMMENDATION H. ROOFTOP MAKE UP AIR UNITS: • DESCRIPTION: 100% OUTSIDE AIR ROOFTOP HEATING AND COOLING VENTILATION UNIT, DIRECT FIRED, RAIN HOOD, INLET SCREEN, FILTER SECTION W/ FOR INSULATION THICKNESS. 2" PLEATED FILTERS, ROOF CURB, TWO (2) CONDENSING UNIT. • CONDENSATE PIPING: TYPE M DWV, DRAWN-TEMPER COPPER TUBING, WROUGHT-COPPER FITTINGS, AND SOLDER JOINTS. ½" FIBERGLASS INSULATION: DOUBLE WALL, FROM BURNER SECTION THROUGH END OF UNIT. INSULATION. BURNER: CAST ALUMINUM BURNER MANIFOLD WITH STAINLESS STEEL MIXING PLATES. ELECTRONICALLY MODULATED. CHILLED/HOT WATER: • FAN & MOTOR: FORWARD CURVED CENTRIFUGAL FAN, BELT DRIVE, W/ STARTER & OVERLOADS. •• PIPE SIZE 2" AND SMALLER: TYPE "L" DRAWN-TEMPER COPPER TUBING, WROUGHT-COPPER FITTINGS, AND BRAZED JOINTS. CONTROLS: REMOTE CONTROL STATION, DISCHARGE AIR SENSOR CONTROL WITH SPACE OVERRIDE SENSORS. •• PIPE SIZE 2-1/2" AND OVER: SCHEDULE 40 STEEL PIPE, GROOVED, MECHANICAL JOINT COUPLING AND FITTINGS, AND GROOVED, MECHANICAL •• INTERLOCK TO ASSOCIATED EXHAUST FAN OPERATION. AIR BALANCE BASED ON FUTURE HOOD REQUIREMENTS. •• INSULATION: TO MATCH EXISTING WHERE SYSTEMS WERE CAPPED. • NATURAL GAS ABOVE GRADE: RUN IN SCHEDULE 40 ASTM A53 BLACK STEEL PIPE AND THREADED FITTINGS. USE WELDED FITTINGS FOR 10 PSIG AND • SEE DRAWING SCHEDULE FOR MANUFACTURER/MODEL. AND ADDITIONAL INFORMATION. ABOVE. THREADED JOINTS WITH MALLEABLE FITTINGS MAY BE MADE AT UNIT CONNECTIONS. PAINT EXTERIOR EXPOSED STEEL PIPING FOR DUCTWORK, ACCESSORIES AND INSULATION: CORROSION PROTECTION, COLOR SELECTED BY OWNER OR ARCHITECT. DUCTWORK: GALVANIZED G90 SHEET METAL FABRICATED IN ACCORDANCE WITH SMACNA STANDARDS. BLANKET INSULATION (FIBERGLASS): 3/4 LB/CF GLASS FIBERS BONDED WITH A THERMOSETTING RESIN (MIN R-6), ASTM C 1290 TYPE III WITH ASTM C D. PIPE HANGERS AND SUPPORTS: 1136 TYPE II FOIL REINFORCED KRAFT (FRK) LOW PERMEANCE VAPOR RETARDER FACING. PROVIDE CLEVIS TYPE HANGER WITH OVER-SIZED YOKE WHERE REQUIRED FOR INSULATION. INSULATION APPLICATION: APPLY INSULATION AS FOLLOWS: PROVIDE JOIST HANGERS AND ALL-THREAD RODS. SEE DUCTWORK CONSTRUCTION MATERIAL SCHEDULE: PROVIDE PIPE CLAMPS TO SUPPORT VERTICAL PIPING THROUGH FLOOR. INDOOR CONCEALED SUPPLY AIR: 2.2" BLANKET WITH VAPOR BARRIER (R-6). PROVIDE INSULATION SHIELDS WHERE INSULATION OCCURS. INDOOR EXPOSED SUPPLY AIR: 1" THICK, 1.5 LB DUCT LINER. PROVIDE B-LINE DURA-BLOCK (OR EQUAL) SUPPORTS WITH UNISTRUCT PIPE CLAMP FOR ROOF PIPING. INDOOR CONCEALED RETURN AND TRANSFER AIR: 2.2" BLANKET WITH VAPOR BARRIER (R-6). REFER TO DRAWING TABLES [DWG M001]: INDOOR EXPOSED RETURN AIR: NONE EXCEPT 1" THICK, 1.5 LB DUCT LINER FROM UNIT TO 15FT UPSTREAM DUCTWORK PIPING SPACING SUPPORT INDOOR CONCEALED OUTSIDE AIR: 1.5" BLANKET WITH VAPOR BARRIER. GAS PIPING SPACING SUPPORT INDOOR EXHAUST AIR: BARE METAL HANGER ROD SIZING TURNING VANES: PROVIDE GALVANIZED STEEL AIRFOIL TYPE TURNING VANES IN DUCT ELBOWS AS INDICATED. CONTROL DAMPERS: PROVIDE ULTRA-LOW LEAK GALVANIZED STEEL DAMPERS GALVANIZED STEEL SHAFTS AND STEEL BEARINGS, NEOPRENE BLADE • GENERAL: PROVIDE PERMANENT LABELS ON ALL EQUIPMENT WITH DRAWING TAG, CAPACITY, AND ELECTRICAL CHARACTERISTICS. • FLEXIBLE DUCTWORK: VINYL LINER, 2" FIBERGLASS INSULATION (MIN R-6) WITH STEEL WIRE REINFORCEMENT AND VINYL JACKET, MEETING FLAME OUTDOOR EQUIPMENT: PROVIDE STAMPED METAL NAMEPLATES. SPREAD AND SMOKE DEVELOPED REQUIREMENTS OF UL 181. PROVIDE PIPE LABELS SHOWING TYPE OF DUTY (I.E. "HOT WATER SUPPLY" AND DIRECTION OF FLOW) AT 15 FOOT INTERVALS. GENERAL: PROVIDE STARTERS, RELAYS, CONTROLS, POWER FOR ACTUATORS, SWITCHES, MEANS OF DISCONNECT, JUNCTION BOXES, CONTROLLERS, CONSTRUCTION: PROVIDE REGISTERS, GRILLES, AND DIFFUSERS WITH BAKED WHITE ENAMEL ALUMINUM OR STEEL CONSTRUCTION, SUITABLE FOR ET CETERA REQUIRED FOR A COMPLETE FUNCTIONING SYSTEM. FOLLOW THE REQUIREMENTS OF THE ELECTRICAL SECTION OF THE SPECIFICATION. • CEILING DIFFUSERS: ASPIRATING TYPE, SQUARE FACE, WITH ROUND NECK OR SQUARE TO ROUND TRANSITION AND OPPOSED BLADE DAMPER. SEE MOTORS: PROVIDE MOTORS FOR MECHANICAL EQUIPMENT SUPPLIED BY THE EQUIPMENT MANUFACTURER WHEN POSSIBLE. PROVIDE MOTORS OF SCHEDULE OR EQUAL. PHASE AND VOLTAGE INDICATED ON DRAWINGS AND SUITABLE FOR THE LOADING AND ENVIRONMENT. PROVIDE OPEN DRIP PROOF (ODP) MOTOR • GRILLES & REGISTERS: HORIZONTAL FACE BARS WITH 45° DEFLECTION ON 1/2" CENTERS, OPPOSED BLADE DAMPER FOR REGISTERS. SEE SCHEDULE ENCLOSURES FOR NORMAL USE OR TOTALLY ENCLOSED FAN COOLED (TEFC) ENCLOSURES FOR OUTDOOR USE, HAZARDOUS OR DIRTY ENVIRONMENTS. PROVIDE MOTORS WITH 1.15 SERVICE FACTOR, INSULATION CLASS F, AND PRE-LUBRICATED BALL BEARINGS RATED FOR CONTINUOUS DUTY UP TO 105°F AMBIENT TEMPERATURE AND 3300FT ALTITUDE. POLY-PHASE MOTORS SHALL BE PREMIUM EFFICIENCY AND WHEN USED WITH VARIABLE SPEED DRIVES, SHALL BE RATED FOR INVERTER DUTY. SINGLE PHASE MOTORS LARGER THAN 1/6HP SHALL BE K. CONTROLS: OPEN-CAPACITOR START, CAPACITOR RUN TYPE UNLESS OTHERWISE INDICATED. SINGLE PHASE MOTORS 1/6HP AND SMALLER MAY BE SPLIT PHASE • PROVIDE TRANE DIGITIAL CONTROL PACKAGE TO CONNECT TO EXISTING BUILDING MANANGEMENT SYSTEM. COORDINATE WITH TRANE. PROVIDE ALL DEVICES, AND LOW VOLTAGE CONTROL WIRING NECESSARY TO ACCOMPLISH THE SPECIFIED SEQUENCE OF OPERATION, PLUS 120V START, CAPACITOR RUN TYPE OR PERMANENT-SPLIT CAPACITOR TYPE. POWER FOR DAMPER AND VALVE ACTUATORS. STARTERS: PROVIDE EACH MOTOR WITH A MOTOR STARTER OF PROPER DESIGN TO MEET THE REQUIREMENTS OF THE MOTOR AND DRIVE. STARTER TYPES SHALL INCLUDE MAGNETIC, MANUAL, SOLID-STATE REDUCED VOLTAGE, OR VARIABLE SPEED DRIVE. COORDINATE STARTER REQUIREMENTS • PROVIDE 120 TO 24 VAC TRANSFORMERS, RELAYS, WIRING, SWITCHES, ELECTRIC AND ELECTRONIC CONTROLS EQUIPMENT, ACTUATORS, ENGINEERING, COMMISSIONING, START-UP, ET CETERA REQUIRED FOR A COMPLETE CONTROL SYSTEM WITH SPECIFIED SEQUENCE OF OPERATION: WITH THE EQUIPMENT AND CONTROL SEQUENCE. PROVIDE ACCESSORIES SUCH AS CONTACTS, OVERLOADS, EXTERNAL RESETS, CONTROL CIRCUIT TRANSFORMERS, PILOT LIGHTS, PUSH BUTTONS, HOA AND OTHER SELECTOR SWITCHES AS NEEDED FOR THE SPECIFIED OPERATION. BALANCING AND COMMISSIONING: VERIFY PROPER INSTALLATION OF MECHANICAL EQUIPMENT PRIOR TO BALANCING AND REPORT ANY DEFICIENCIES. G. PACKAGED HEATING AND COOLING ROOFTOP UNIT [RTU-1 & RTU-2]: • FURNISH AND INSTALL GAS HEATING/COOLING SYSTEMS, SELF CONTAINED, FULLY CHARGED, FACTORY ASSEMBLED, WIRED AND TESTED UNITS WITH • VERIFY ALL NECESSARY COMPONENTS ARE INSTALLED SUCH AS BALANCING VALVES AND DAMPERS. • VERIFY OPERATION OF SYSTEMS AND EQUIPMENT COMPLIES WITH THE SPECIFIED SEQUENCE OF OPERATION IN ALL MODES. VERTICAL DISCHARGE AIRFLOW AND 12" ROOF CURB. BALANCE AIR SYSTEMS TO WITHIN 0 TO 10% OF INDICATED VALUES. • PROVIDE 100% MODULATING OUTSIDE AIR ECONOMIZER DAMPERS AND GRAVITY RELIEF OR POWERED EXHAUST. INCLUDE DUAL ENTHALPY SUBMIT REPORTS SPECIFIED UNDER SUBMITTALS. CONTROLS. PROVIDE CAPACITY, PERFORMANCE, STAGES, AND OPTIONS LISTED ON THE DRAWING SCHEDULE. UNIT SHALL HAVE STAGED COOLING. • TRAIN OWNERS REPRESENTATIVE TO ADJUST, OPERATE, AND MAINTAIN ALL EQUIPMENT AND ASSOCIATED CONTROLS. UNIT SHALL HAVE STAGED GAS HEAT. ALL UNITS SHALL BE FACTORY ASSEMBLED, PIPED, INTERNALLY WIRED AND FULLY CHARGED WITH R-410. N. RECORD DOCUMENTS/CLOSEOUT SUBMITTALS: ALL UNITS SHALL BE DESIGNED TO OPERATE AT OUTDOOR AMBIENT TEMPERATURES FROM 0°F TO 120°F. • PROVIDE OPERATIONAL AND MAINTENANCE MANUALS TO BE DELIVERED ELECTRONICALLY AND IN THREE RING BINDER. COOLING AND HEATING CAPACITIES SHALL BE RATED IN ACCORDANCE WITH A.R.I. STANDARDS. AS-BUILT DRAWINGS: DELIVER TO OWNER AT THE COMPLETION OF THE PROJECT A SET OF PRINTS OF THE DRAWINGS MARKED IN RED SHOWING THE UNIT DESIGN SHALL BE CERTIFIED BY THE AGA OR CSA, SPECIFICALLY FOR OUTDOOR APPLICATIONS USING PROPANE OR NATURAL GAS. CHANGES IN LOCATIONS, MODELS AND CAPACITIES OF THE SYSTEM. UNITS SHALL BE WEATHERPROOFED AND DESIGNED FOR OUTDOOR ROOFTOP INSTALLATION. BALANCING AND COMMISSIONING REPORTS: SUBMIT PRE-TEST VERIFICATION AND BALANCING DATA REPORTS PROVIDE HOT GAS REHEAT COIL AND DEHUMIDIFICATION CONTROLS.

SEQUENCE OF OPERATION: (ALL SET POINTS SHALL BE ADJUSTABLE THROUGH TRANE CONTROL SYSTEM)

CONSTANT VOLUME PACKAGED UNITS [RTU-#]:

• COOLING AND HEATING CYCLES WILL BE BASED ON DIGITAL CONTROLLER. ALL SET POINTS, SCHEDULES, AND SETBACKS WILL BE ADJUSTABLE BY OCCUPANT.

 OCCUPIED CYCLE (BASED ON T-STAT PROGRAM): OPEN OUTSIDE AIR DAMPER TO MINIMUM POSITION, AND OPERATE SUPPLY FAN CONTINUOUSLY. ON A RISE IN SPACE TEMPERATURE ABOVE THE COOLING SET POINT (74°F) WITH ECONOMIZER DISABLED, OPERATE COMPRESSOR(S) IN STAGES TO SATISFY THE THERMOSTAT. ON A RISE IN SPACE TEMPERATURE ABOVE THE COOLING SET POINT (74°F) WITH ECONOMIZER ENABLED, MODULATE THE RETURN AIR AND OUTSIDE AIR DAMPERS TO SATISFY THE THERMOSTAT. ON A CONTINUED RISE IN SPACE TEMPERATURE ABOVE THE COOLING SET POINT (74°F), OPERATE THE COMPRESSOR(S) IN STAGES TO SATISFY THE THERMOSTAT. ON A FALL IN SPACE TEMPERATURE BELOW THE HEATING SET POINT (70°F) AND THE OUTSIDE AIR DAMPER AT MINIMUM, OPERATE THE GAS BURNER TO SATISFY THE THERMOSTAT.

 UNOCCUPIED CYCLE: CLOSE THE OUTSIDE AIR DAMPER. ON A FALL IN SPACE TEMPERATURE BELOW THE HEATING SETBACK TEMPERATURE (65°F), START THE SUPPLY FAN AND OPERATE THE GAS BURNER TO SATISFY THE THERMOSTAT. ECONOMIZER: ENABLE ECONOMIZER CYCLE WHEN OUTSIDE AIR ENTHALPY IS LESS THAN 28 BTU/LB.

• DEHUMIDIFICATION (HOT GAS REHEAT): OPERATE DEHUMIDIFICATION CYCLE, WHEN COOLING IS NOT ENABLED, UPON RISE IN SPACE

 CO2 CONTROL: MODULATE OUTSIDE AIR DAMPER, WHEN NOT IN ECONOMIZER MODE, TO MAINTAIN A CARBON DIOXIDE LEVEL AT OR BELOW 1000 PPM. MAINTAIN MINIMUM OUTSIDE AIR DAMPER SETTING WHEN UNIT IS OPERATING IN OCCUPIED MODE.

KITCHEN MAKEUP AIR UNIT (MAU-1): UNIT CONTROLS: THE UNIT SHALL BE PROVIDED FROM THE FACTORY WITH:

24VAC TRANSFORMER

 TERMINAL STRIP •• EXHAUST FAN MOTOR STARTER [KEF-1] PROVIDE FIELD WIRING.

•• FACTORY MOUNTED AND WIRED OUTDOOR AIR INLET DAMPER WITH ACTUATOR •• REMOTE CONTROL PANEL: MOUNTED AT COOKLINE HOOD [KH-1]

 KITCHEN REMOTE CONTROL PANEL: •• INTEGRATE INTO EXISTING KITCHEN CONTROL PANEL OR POWER SWITCH. UNIT STARTUP:

 EXHAUST FAN ENABLED. SUPPLY FAN ENABLE IS RECEIVED. •• EXHAUST FAN CONTRACTORS ARE PROVED ELECTRICALLY.

•• OUTDOOR AIR INLET DAMPER ACTUATOR IS ENERGIZED.

•• OUTDOOR AIR INLET DAMPER ACTUATOR LIMIT SWITCH IS PROVEN CLOSED. SUPPLY FAN IS ENABLED.

 COOLING CYCLE: ON A RISE IN DISCHARGE AIR TEMPERATURE ABOVE SET POINT (76°F) THE UNIT SHALL OPERATE COMPRESSOR (S) IN STAGES TO REDUCE DISCHARGE AIR TEMPERATURE. AN OUTDOOR AIR TEMPERATURE SENSOR (MOUNTED IN UNIT INLET) WILL ALLOW COOLING OR LOCKOUT COOLING BASED ON OUTDOOR TEMPERATURE SET POINT (76°F). UPON DROP IN OUTDOOR TEMPERATURE BELOW SET POINT, COOLING SHALL BE DISABLED., ADJUSTABLE DISCHARGE AIR SET POINT.

 HEATING CYCLE: ON A FALL IN DISCHARGE AIR TEMPERATURE BELOW SET POINT (65°F) THE UNIT SHALL MODULATE GAS HEATING TO MAINTAIN A 55°F TO 95°F, ADJUSTABLE DISCHARGE AIR SETPOINT.

•• COOLING CYCLE: ON A RISE IN DISCHARGE AIR TEMPERATURE ABOVE SETPOINT (80°F) THE UNIT SHALL OPERATE COOLING (STAGES) TO DROP DISCHARGE AIR TEMP TO SETPOINT (70°F)

•• ROOM OVERRIDE: A ROOM OVERRIDE THERMOSTAT SHALL ELEVATE THE SUPPLY AIR TEMPERATURE SET POINT 5°F TO 40°F UPON A CALL

• BUILDING FREEZE PROTECTION: IF SUPPLY AIR DROPS BELOW 35°F FOR 5 MINUTES THE SUPPLY FAN SHALL DISABLE.

•• CYCLING THE THE FAN SWITCH WILL RESET THE TIMER. SEQUENCE IS INTENDED TO PREVENT THE UNIT FROM SUPPLYING COLD AIR TO THE BUILDING.

				VENTI	LATION S	SUMMARY SC	HEDULE					
ZONEIN	IFORMATION	_				2015 INTERNATIONAL N	MECHANICAL CODE	-SECTION 403.3				
Zone Name	Occupancy Category	Area (sf) - Az	People Oair Rate (cfm/person) - Rp	Area Oair Rate (cfm/sf) - Ra	Actual Occupancy (if known) - Pz	Occupant Density (if Actual is not known) (#/1000sf) - PZ	Breathing Zone Oair Flow - Vbz (cfm)	Zone Air Distribution Effectiveness - Ez (Table 6.2)	Zone Oair Flow - Voz (cfm)	Type of Zone: (S)ingle; (M)ulti; (100%)Oair	Oair Intake Flow - Vot (cfm)	Design Oaii Intake (cfm)
RTU-3 & 4					ļ		<del> </del>		11		<u>,                                      </u>	J
AUDITORIUM	AUDITORIUM	6,600	5.0	0.06	1000	<u>O</u>	5,396	1.0	5,396	S	5396	6400
RTU-5 & 6												
LOBBY	LOBBY	1,800	7.5	0.06	55	0	521	1.0	521	S	521	1200
RTU-7												
STAGE	STAGE	3,400	5.0	0.06	55	O	479	1.0	479	S	479	500
RTU-8 & 9											,	
LIBRARY	LIBRARY	3,900	7.5	0.06	100	0	984	1.0	984	S	984	1400
RTU-10 & 11		<u> </u>									<u> </u>	<u> </u>
CAFETERIA	CAFETERIS	3,300	7.5	0.18	150	0	1,719	1.0	1,719	S	1719	1700
RTU-12		:										
KITCHEN	KITCHEN	2,100	5.0	0.06	12	O	186	1.0	186	S	186	400
RTU-13		· · ·		1								
STORAGE	STORAGE	1,500	0.0	0.18	0	0	270	1.0	270	S	270	300
RTU-14												
AUXILIARY GYM	GYM	4,300	0.0	0.30	O	O	1,290	1.0	1,290	S	1290	1500
RTU-15												
WEIGHT ROOM	WEIGHT ROOM	3,100	20.0	0.06	31	0	806	1.0	806	S	806	975
RTU-16												
TRAINING ROOM	OFFICE	750	5.0	0.06	3	<b>O</b> .	60	1.0	60	S	60	120

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ADAM SHAMENEK

	20158
SCALE:	AS NOTED
DATE:	4/20/2021
DRAWN B	BCS
CHECKED	ALS
DATE CHE	4/20/2021
,	REVISIONS
	DESCRIPTION:

M003