CONTRACTORS NOTES

HVAC CONTRACTOR

1. THE HVAC CONTRACTOR IS TO FURNISH AND INSTALL THE HOODS, ROOF-TOP UNITS, EXHAUST FANS, DUCTWORK, INSULATION WRAP, DIFFUSERS, SMOKE DETECTORS, AND TEMPERATURE CONTROLS.

2. THE HVAC CONTRACTOR IS TO VERIFY LOCATIONS FOR EF-1, EF-2, EF-3, AND THE HOODS ON SITE FROM MOST-RECENT KITCHEN EQUIPMENT PLANS. ALL FANS ARE TO BE UL LISTED. SEE GENERAL NOTE THIS SHEET.

3. ALL HVAC EQUIPMENT CURBS ARE TO BE SUPPLIED BY THE HVAC CONTRACTOR.

4. ALL RTU CURBS ARE TO BE FABRICATED FROM 18 GA. GALVANIZED METAL WITH FULLY WELDED SEAMS, WATER TIGHT AND INTERNALLY INSULATED. FACTORY CURB CONVERSION SHALL NOT BE ACCEPTED.

5. SHIMS ARE TO BE PROVIDED BY HVAC CONTRACTOR BETWEEN THE ROOF DECK AND THE CURBS TO COMPENSATE FOR ROOF PITCH.

6. ALL FLEX DUCT IS TO BE U.L. LISTED, R-6, FOIL-BACKED, CLASSIFIED AS A CLASS 1 AIR DUCT.

7. ALL METAL DUCT AND AIR DISTRIBUTION DEVICES ARE TO BE INSULATED WITH R-6, 2" X .75 DENSITY FOIL-BACKED INSULATION, WITH FIRE AND SMOKE RATING [25]-[50].

8. ALL DUCTWORK IS TO BE INDEPENDENTLY HUNG FROM STRUCTURAL MEMBERS.

9. ALL DUCTWORK IS TO BE FABRICATED, INSTALLED, SEALED, AND EXTERNALLY INSULATED PER SMACNA LOW-VELOCITY DUCT MANUAL (LATEST ISSUE). INTERNALLY LINED DUCTWORK IS NOT ALLOWED.

10. UNLESS OTHERWISE NOTED, ALL SUPPLY TAKEOFFS ARE TO HAVE A MANUAL VOLUME CONTROL DAMPER.

11. THE HVAC CONTRACTOR IS TO COORDINATE DIFFUSER LOCATIONS ON SITE WITH THE MOST RECENT REFLECTED CEILING PLAN.

12. THE HVAC CONTRACTOR IS TO FURNISH A WRITTEN GUARANTEE COVERING A ONE-YEAR PERIOD FOR ALL HVAC EQUIPMENT AND PROVIDE AN ADDITIONAL FOUR-YEAR PERIOD FOR THE COMPRESSORS IN THE RTUS. ALL FANS TO BE U.L. LISTED.

13. UPON COMPLETION OF PROJECT THE HVAC CONTRACTOR IS TO HIRE AN A.A.B.C. OR N.E.B.B. CERTIFIED, INDEPENDENT TEST AND BALANCE COMPANY TO CONDUCT A COMPLETE, CERTIFIED TEST AND BALANCE OF ALL HVAC EQUIPMENT. PROVIDE A WRITTEN REPORT TO NCA CONSULTANTS. ALL CAPACITIES MUST BE SET TO AMOUNTS INDICATED ON THE FLOOR PLANS AND SCHEDULES.

14. THE HVAC CONTRACTOR IS TO FURNISH AND INSTALL ALL LOW-VOLTAGE WIRING, AND MAKE ALL LOW-VOLTAGE WIRING FINAL CONNECTIONS FOR ALL HVAC EQUIPMENT INCLUDING TEMPERATURE CONTROLS, RTUS, AND SMOKE DETECTORS.

GENERAL CONTRACTOR

1. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO RECEIVE, OFFLOAD, AND STORE ALL HVAC MATERIALS WHICH ARRIVE AT THE JOB SITE. ALL MATERIAL MUST BE STORED INSIDE THE BUILDING. HOODS MUST BE STORED IN THE KITCHEN.

2. IT IS VERY IMPORTANT THAT ACCURATE MEASUREMENTS ARE USED WHEN LOCATING EXHAUST FAN ROOF OPENING. COORDINATE ROOF OPENINGS WITH THE KITCHEN EQUIPMENT PLAN AND EXHAUST HOOD PLANS. OBTAIN THE CORRECT PLANS FROM THE KITCHEN EQUIPMENT SUPPLIER.

3. RTU ROOF OPENING SIZES AND ROOF CURBS ARE BASED ON EQUIPMENT SHOWN. IF OTHER EQUIPMENT IS USED, VERIFY ROOF OPENING REQUIREMENTS. MAKE PENETRATION AS NEEDED FOR INSTALLATION OF NEW CURB AND RTU. COORDINATE ON SITE WITH HVAC CONTRACTOR. ENSURE THAT ROOFING MATERIAL DOES NOT COVER THE TOP OF ANY HVAC EQUIPMENT CURBS.

4. ALL ROOF, CEILING, WALL, AND STRUCTURAL FRAMING REQUIRED FOR UNIT, FAN, DUCT, DIFFUSER, AND ALL OTHER HVAC WORK IS TO BE BY THE G.C. COORDINATE ON SITE WITH HVAC CONTRACTOR. GENERAL CONTRACTOR IS TO PROVIDE ANY SCREENING, GUARD RAILS, ETC. FOR ROOF-MOUNTED HVAC EQUIPMENT PER IBC AND LOCAL CODES. ANY REQUIRED PAINTING OF HVAC WORK IS TO BE BY THE GENERAL CONTRACTOR.

5. IF NECESSARY THE GENERAL CONTRACTOR IS TO REMOVE, REPLACE, AND/OR REPAIR CEILING GRID AND TILES IN ORDER FOR THE HVAC WORK TO BE PERFORMED.

ELECTRICAL CONTRACTOR

1. THE ELECTRICAL CONTRACTOR IS TO FURNISH AND INSTALL PITCH POCKETS FOR POWER AND CONTROL WIRING, AND IS TO MAINTAIN 12" MINIMUM CLEARANCE FROM BACK PANEL OF AIR CONDITIONING UNITS. DO NOT PENETRATE BOTTOM OF RTU CURB.

2. THE ELECTRICAL CONTRACTOR IS TO INSTALL LOW-VOLTAGE CONTROL WIRING FOR ALL AIR CONDITIONING CONTROLS.

3. THE ELECTRICAL CONTRACTOR IS TO FURNISH AND INSTALL DISCONNECTS FOR RTUS, WIRE THE RESTROOM EXHAUST FAN TO RUN CONTINUOUSLY WHILE THE DINING ROOM LIGHTS ARE ON, AND WIRE HOOD EXHAUST FANS, RTU BLOWERS, AND KITCHEN APPLIANCES PER NFPA96 AND LOCAL CODES.

4. THE ELECTRICAL CONTRACTOR IS TO USE A MINIMUM OF 4'-6" SEALTITE FLEXIBLE CONDUIT WHEN WIRING KITCHEN HOOD EXHAUST FANS ON ROOF SO THAT FANS MAY BE REMOVED FROM CURBS AND PLACED ON ROOF FOR CLEANING EXHAUST DUCTWORK.

5. FOR EACH UNIT, THE ELECTRICAL CONTRACTOR IS TO PROVIDE ONE SINGLE-GANG RECEPTACLE TEST STATION FOR THE REMOTE SENSOR AND/OR T-STAT, AND ONE DOUBLE-GANG RECEPTACLE TEST STATION FOR THE ANNUNCIATOR, WITH GREEN AND RED LIGHT INDICATORS. THE FIRE AND MECHANICAL INSPECTORS WILL DETERMINE SUITABLE LOCATION FOR TEST STATIONS. ANNUNCIATORS AND TEST STATION WILL BE LOOPED IN THE CIRCUITRY OF THE SMOKE DETECTION DEVICES. WIRING WILL BE INSTALLED BY ELECTRICAL CONTRACTOR.

PLUMBING CONTRACTOR

1. THE PLUMBING CONTRACTOR IS TO PROVIDE AND INSTALL CONDENSATE DRAINS/GAS PIPING FOR ALL HVAC EQUIPMENT, AND PITCH POCKETS FOR RTU CONNECTIONS. DO NOT PENETRATE BOTTOM OF RTU CURB.

2. THE PLUMBING CONTRACTOR IS TO COORDINATE PLUMBING VENT STACKS AND WATER HEATER FLUES WITH OUTSIDE AIR INTAKES OF A/C UNITS. 10'-0" MINIMUM CLEARANCE REQUIRED OR PER LOCAL CODE.

3. THE PLUMBING CONTRACTOR IS TO PROVIDE AND INSTALL FLUE GAS EXHAUST VENT FOR WATER HEATER. MAINTAIN 10'-0" MINIMUM CLEARANCE TO AIR INTAKES, OR PER LOCAL CODE. COORDINATE ON SITE WITH G.C. AND HVAC CONTRACTOR.

GENERAL NOTE:

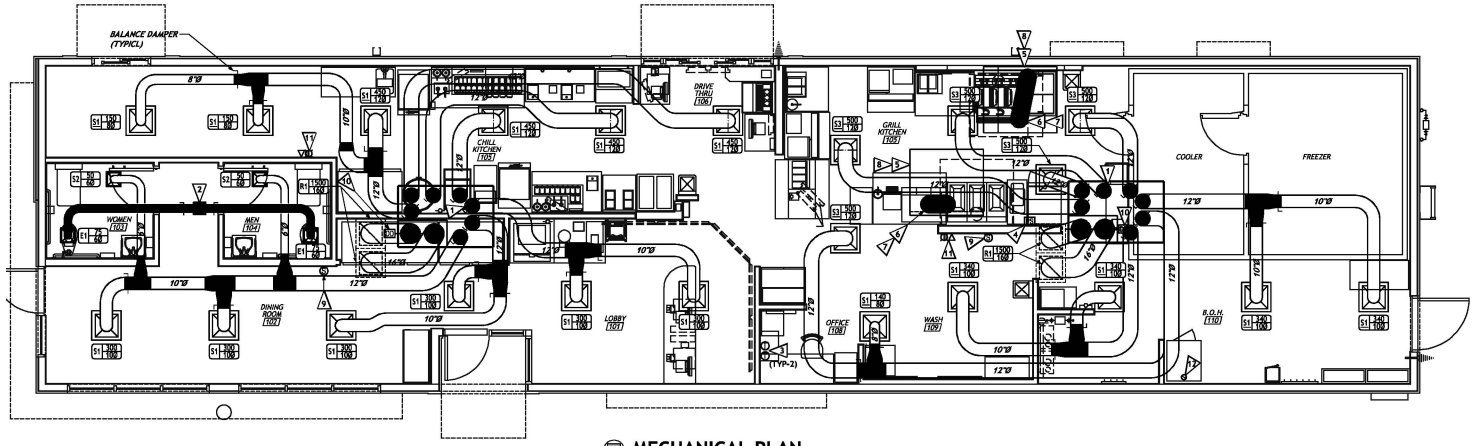
PROVIDE TYPE-I GREASE HOOD OVER COOKLINE APPLIANCES WITH UL LISTED, FACTORY MANUFACTURED, NON-WELD, DOUBLE-WALLED, FIRE INSULATED GREASE DUCT FROM CONNECTION ON HOOD TO EXHAUST FAN ON ROOF. REFER TO INSTRUCTIONS THAT SHIP WITH THE HOODS AND DUCT. OFFSET AND TRANSITION AT CONNECTIONS AS NEEDED. VERIFY DIMENSIONS PRIOR TO FABRICATION OR INSTALLATION. REFER TO HOOD DETAILS SHEET, THIS SET. CONFIRM LOCATION ON SITE WITH MOST RECENT KITCHEN PLANS. ALL WORK IS TO BE PERFORMED PER NFPA96 AND LOCAL CODES, INCLUDING THE PROVISION OF FIRE WRAP AND ACCESS DOORS.

NOTES:

1. *ALL DUCTWORK SHALL BE FLEXIBLE DUCT UNLESS OTHERWISE NOTED.*
2. *ALL DUCTWORK AND FITTINGS SHOWN SHADED SHALL BE RIGID DUCT.*
3. *DUCTWORK SHALL BE ROUTED THROUGH TRUSS SPACE.*

REFERENCE NOTES: (THESE NOTES APPLY TO THIS PLAN ONLY)

1. RIGID RETURN/SUPPLY DUCTWORK DOWN FULL SIZE FROM AIR HANDLING EQUIPMENT CURB WITH NEOPRENE FLEX CONNECTORS. SUPPORT DUCTWORK TO RELEASE TENSION IN FLEX CONNECTORS. EXTEND WITH FLEXIBLE DUCTS TO DIFFUSERS/GRILLES AS SHOWN.
2. EXTEND 10"x10" EXHAUST DUCT UP THROUGH ROOF AND TERMINATE WITH ROOF MOUNTED TOILET EXHAUST FAN WITH BACK DRAFT DAMPER. MAINTAIN 10'-0" FROM ALL OUTSIDE AIR INTAKES. SEE EQUIPMENT SCHEDULE AND DETAILS FOR ADDITIONAL INFORMATION.
3. REMOTE THERMOSTATS: REMOTE SENSORS AND THERMOSTATS TO BE MOUNTED WHERE INDICATED. FIELD-VERIFY THE LOCATION WITH ARCHITECT, OWNER, AND ON-SITE CONDITIONS PRIOR TO PERFORMING WORK.
4. MANUAL PULL STATION FOR ANSUL FIRE SUPPRESSION SYSTEM. VERIFY WITH LOCAL AUTHORITY NUMBER OF PULLS, LOCATION, AND HEIGHT ABOVE FINISH FLOOR. SEE DRAWING KH-8.
5. EXACT LOCATION OF ALL HOODS SHALL BE DETERMINED BY THE KITCHEN EQUIPMENT DRAWINGS AND EQUIPMENT CUT SHEETS. COORDINATE WITH ALL DISCIPLINES PRIOR TO INSTALLATION.
6. KITCHEN HOOD SYSTEM, EF-1, & EF-2: INSTALL KITCHEN EXHAUST SYSTEM FROM INDICATED VENDOR, THE PACKAGE TO INCLUDE THE STAINLESS STEEL EXHAUST HOOD, GREASE FILTERS, GREASE CATCH PAN, WIRE WAYS, INCANDESCENT LIGHT FIXTURE RATED FOR EXHAUST HOODS, EXHAUST FAN, AND ROOF CURB.
7. INSTALL KITCHEN HOOD EXHAUST DUCTWORK AS INDICATED ON PLANS. DUCTWORK SIZES AND LAYOUTS SHALL NOT BE MODIFIED WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
8. HOOD SYSTEM AND DUCT PROVIDED BY CAPTIVEAIRE, SEE SHEETS KH-1 THRU K-12, COORDINATE ANY MODIFICATIONS WITH HOOD VENDOR/CAPTIVEAIRE.
9. MOUNT REMOTE TEMPERATURE SENSOR AT 66" A.F.F.
10. DUCT SMOKE DETECTOR FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR TO STOP UNIT SUPPLY FAN UPON SMOKE DETECTOR ACTIVATION. MECHANICAL CONTRACTOR TO CONNECT TO A REMOTE AUDIO AND VISUAL DEVICE.
11. PROPOSED LOCATION FOR RTU-1 & 2 AUDIO AND VISUAL DEVICE.
12. 4"Ø DRYER VENT DOWN TO UNIT CONNECTION AND UP THROUGH ROOF TO VERTICAL DRYER CAP. FIELD VERIFY EXACT SIZE AND LOCATION.

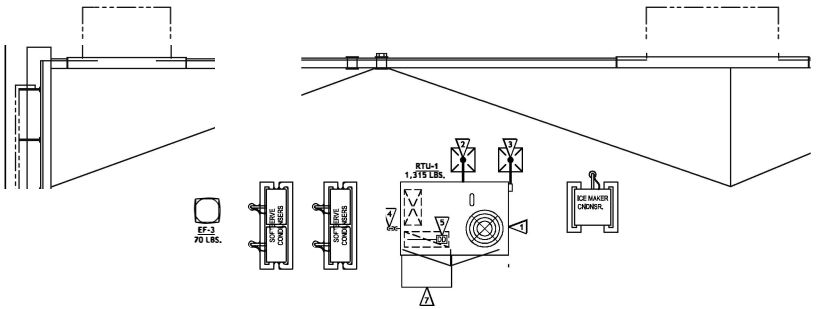


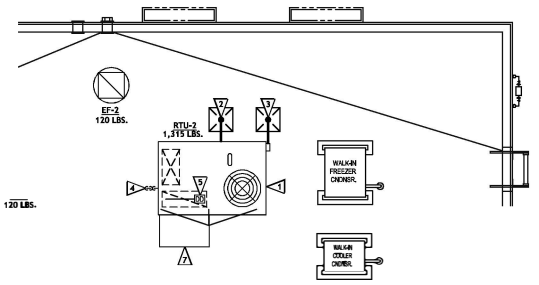
MECHANICAL PLAN
SCALE: 1/4" = 1'-0"

REVISIONS DATE 01.13.2026

PROJECT NEW BUILDING FOR:

DRAWING MECHANICAL PLAN

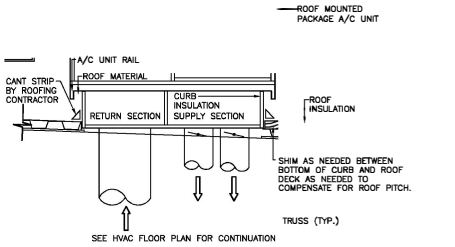




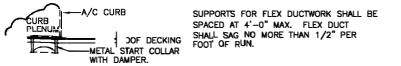
REFERENCE NOTES: (THESE NOTES APPLY TO THIS PLAN ONLY)

1. SHIMBETWEEN BOTTOM OF CURB ANDROOF DECKTO MAKE CURB LEVEL.
2. NATURAL GAS ROOF PENETRATION. CONN ECTION TO RTU BY PLUMBING CONTRACTOR.
3. ELECTRICAL CONDUIT ROOF PENETRATION. CON NECTION TO RTU BY ELECTRICAL CONTRACTOR.
4. CON DENSATE DRAIN WITH EXTERNAL 4" DEEP P-TRAP INSTALLEDBY HVAC CONTRACTOR.
5. SMOKE DETECTOR INSTALL IN RETURN SECTION OF RTU UNITS. SEEDRAWING M-1 FOR ADDITIONAL DETAILS.
6. WATERHEATER INTAKE ANDEXHAUST WITH APPROVEDCAP PROVIDED BY PLUMBING CONTRACTOR.
7. OUTSIDE AIR HOOD MAINTAIN 10'-0" MINIMUM FROMEXHAUST OR PLUMBING VENTS.

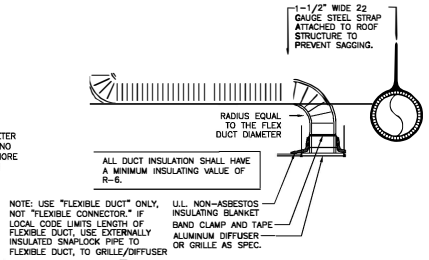
ROOF PLAN
SCALE: 1/4" = 1'-0"



1/M2 DUCT RISER/LEVELING DETAIL

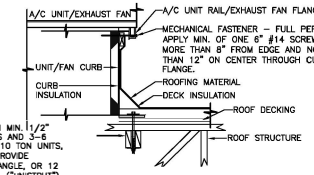


SUPPORTS FOR FLEX DUCTWORK SHALL BE SPACED AT 4'-0" MAX. FLEX DUCT SHALL SAG NO MORE THAN 1/2" PER FOOT OF RUN.



DUCT SCHEDULE	
SIZE	GAUGE
6"ø – 8"ø	28
10"ø – 12"ø	26
14"ø – 16"ø	24
18"ø – 20"ø	22

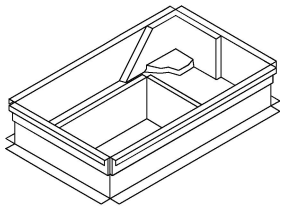
DUCT SUPPORT
SUPPORT DUCTWORK WITH 1-1/2" WIDE 22 GAUGE STEEL STRAPS FIRMLY ATTACHED TO THE BUILDING STRUCTURE. SPACING SHALL BE MAXIMUM 10-0" FOR RIGID DUCTWORK, AND MINIMUM 4'-0" FOR FLEXIBLE DUCTWORK. 12 GAUGE WIRE MAY BE SUBSTITUTED FOR STRAPS IF 1-1/2" WIDE 22 GAUGE STEEL SADDLES ARE USED TO FULLY ENCIRCLE DUCT. REFER TO THE HVAC DUCT CONSTRUCTION STANDARDS PUBLISHED BY SMACNA FOR ADDITIONAL DETAILS. FULLY COMPLY WITH MECHANICAL CODES.



SECURE A/C CURB TO STRUT WITH MIN. 1/2" BOLTS. USE 2 PER SIDE FOR FANS AND 3–6 TON UNITS; 3 PER SIDE FOR 7.5–10 TON UNITS, EQUALLY SPACED. THE G.C. WILL PROVIDE BLOCKING 2"x 4" WOOD, WELDED ANGLE, OR 12 GAUGE PERFORATED IRON CHANNEL ("UNISTRUT") EACH SIDE FOR FRAMING. NOTE: DO NOT DRI THROUGH ROOF FRAMING MEMBER

ACCEPTABLE FOR 140 MPH ZONE

VERIFY ON SITE WITH GENERAL CONTRACTOR



PLENUMIZED CURB INSTALLATION NOTES

1. CAREFULLY LOCATE AND MARK ROOF CURB LOCATIONS SO THAT DUCT WORK CAN BE INSTALLED IN THE APPROXIMATE LOCATIONS AS SHOWN BY THE FLOOR PLAN. PAY ATTENTION TO THE LOCATION OF THE ROOF STRUCTURE IN ORDER TO ACCOMMODATE THE DUCT DROPS.
2. MARK THE EXACT LOCATION OF EACH ROOF CURB. LAY OUT ALL EQUIPMENT LOCATIONS IN ORDER TO MAINTAIN PROPER CLEARANCES FROM EXHAUST FANS AND VENTS AS WELL AS PROVIDING FOR PROPER SERVICE CLEARANCES.
3. GENERAL CONTRACTOR SHALL CUT ROOF DECKING MATERIAL TAKING CARE TO AVOID CUTTING ANY STRUCTURAL COMPONENTS. GENERAL CONTRACTOR SHALL ALSO INSTALL ANY NECESSARY FRAMING OR BLOCKING AT OPENINGS.
4. WITH ROOF CURB UPSIDE DOWN (SOLID METAL BOTTOM UP) MEASURE AND MARK THE LOCATION OF ANY JOISTS OR OTHER FRAMING MEMBERS THAT MUST BE AVOIDED. MEASURE AND MARK THE LOCATION OF ALL THE DUCT TAPS.
5. CUT ALL DUCT TAPS INTO THE BOTTOM PANEL OF THE ROOF CURB. BE CAREFUL NOT TO DAMAGE THE ROOFING SURFACE WHILE MAKING THESE CUTS.
6. INSTALL DUCT TAP FITTINGS AND MANUAL DAMPERS INTO THE OPENINGS PREVIOUSLY CUT. SEAL ALL CONNECTIONS ON BOTH THE BOTTOM AND THE TOP SIDES OF THE TAPS.
7. FLATTEN TAB OF START COLLAR INSIDE CURB, TIGHT AGAINST INSULATION. SEAL INSIDE OF COLLAR AND TABS TO INSULATION USING MASTIC DUCT SEALER. ALLOW SEALER TO DRY PRIOR TO PROCEEDING.
8. APPLY DUCT SEALER TO OPEN END OF COLLAR. SLIDE INNER CORE OF FLEXIBLE DUCT ONTO COLLAR, AND CONNECT PANDUIT STRAP PER MANUFACTURERS INSTRUCTIONS.
9. SLIDE OUTER INSULATION SLEEVE OF FLEX TIGHT TO BOTTOM OF CURB. SEAL INSULATION TO BOTTOM OF CURB WITH PRESSURE-SENSITIVE FOIL TAPE. DO NOT USE TAPE MEANT FOR RIGID DUCTBOARD. SQUEEGEE OUT ALL AIR BUBBLES FOR PROPER ADHESION.
10. TURN CURB RIGHT SIDE UP, LEVEL CURB BETWEEN BOTTOM OF CURB AND DECK, INSTALL IN ROOF OPENING. SECURE CURB TO ROOF FRAMING AS REQUIRED.
11. GENERAL CONTRACTOR OR ROOFING CONTRACTOR SHALL FLASH AND ROOF IN THE CURB AS DETAILED ON THE DRAWINGS.
12. INSIDE BUILDING, THE DUCT RUNS SHALL BE INSTALLED FROM THE TAPS TO THE DIFFUSER LOCATIONS AS SHOWN ON THE PLANS. SUPPORT PER SMACNA AND LOCAL CODES.
13. NOTE: IF NECESSARY, FLEX DROPS MAY BE CONNECTED TO TAPS AFTER CURB HAS BEEN INSTALLED. REFER TO STEPS #8 AND #9.

1/M2 ROOF EQUIP. CURB MOUNTING DETAIL

1/M2 RIGID/FLEX DUCT CONNECTION/INSTALL DETAIL

1/M2 NCA PLENUMIZED AC CURB DETAIL

PROJECT NEW BUILDING FOR:

ROOF PLAN

PROJECT NO.

SHEET NO.

MECHANICAL ABBREVIATIONS

ARCH	ARCHITECTURAL	MAT	MIXED AIR TEMPERATURE
BTUH	BRITISH THERMAL UNIT PER HOUR	MBH	1,000 BTUH
CFM	CUBIC FEET PER MINUTE	MC	MECHANICAL CONTRACTOR
CD	CONDENSATE	MERV	MINIMUM EFFICIENCY REPORTING VALUE
DIA / Ø	DIAMETER	MFR	MANUFACTURER
DN	DOWN	NC	NOISE CRITERIA / NORMALLY CLOSED
DX	DIRECT EXPANSION	NEC	NATIONAL ELECTRIC CODE
EA	EXHAUST AIR	NIC	NOT IN CONTRACT
EAT	ENTERING AIR TEMPERATURE	NTS	NOT TO SCALE
EC	ELECTRICAL CONTRACTOR	OA	OUTSIDE AIR
EF	EXHAUST FAN	PH/ɸ	PHASE
ELEC	ELECTRICAL	PSIG	POUNDS PER SQUARE INCH, GAUGE
ESP	EXTERNAL STATIC PRESSURE	QTY	QUANTITY
FPM	FEET PER MINUTE	RLA	RUNNING LOAD AMPS
FLA	FULL LOAD AMPS	RPM	REVOLUTIONS PER MINUTE
FT	FEET	RTU	ROOF TOP UNIT
GC	GENERAL CONTRACTOR	TSTAT	THERMOSTAT
HP	HORSEPOWER	TYP	TYPICAL
KW	KILOWATT	W	WATTS
LAT	LEAVING AIR TEMPERATURE	WC	WATER COLUMN

ROOFTOP UNIT SCHEDULE (DX/GAS)

TAG ID	MANUFACTURER	MODEL	SERVICE	OUTSIDE AIR (CFM)	SUPPLY FAN SECTION				COOLING COIL SECTION					HEATING COIL SECTION						FILTER SECTION		ELECTRICAL DATA				OPERATING WEIGHT (LBS)	REMARKS
					AIRFLOW (CFM)	ESP / TSP ("W.C.)	RPM	BHP / HP	REFRIG. TYPE	CAPACITY TOT/SENS (MBH)	EFFICIENCY (EER)	EAT DB/WB (°F)	LAT DB/WB (°F)	FUEL TYPE	INPUT / OUTPUT (MBH)	# OF STAGES	AFUE (%)	EAT (°F)	ΔT (°F)	TYPE	MERV	VOLT	PHASE	MCA	MOCP		
RTU-1	CARRIER	48FETN12	DINING	1,000	4,000	0.5/0.9	1,866	2.28 / -	R454B	127.3 / 96.6	11.0	80.8/67.6	58.4/57.7	NAT. GAS	200 / 164	2	82	61.3	47.4	2"	8	208	3	56	60	1,315	ALL
RTU-2	CARRIER	48HCRE11	KITCHEN	1,000	4,000	0.5/0.9	1,866	2.28 / -	R454B	127.3 / 96.6	11.0	80.8/67.6	58.4/57.7	NAT. GAS	200 / 164	2	82	61.3	47.4	2"	8	208	3	56	60	1,315	ALL

REMARKS:
1. PROVIDE WITH FACTORY MOUNTED MICROPROCESSOR CONTROLLER AND 7-DAY PROGRAMMABLE, AUTO-CHANGEOVER, DIGITAL THERMOSTAT WITH REMOTE TEMPERATURE SENSORS.
2. PROVIDE WITH FULLY MODULATING ENTHALPY ECONOMIZER AND FIELD INSTALLED POWER EXHAUST WITH CONTROLLER. POWER EXHAUST SHALL BE POWERED THROUGH UNIT.
3. PROVIDE WITH MOTORIZED DAMPERS WITH LOW AMBIENT CONTROL.
4. PROVIDE WITH FACTORY MOUNTED AND UNPOWERED CONVENIENCE OUTLET.
5. E.C. TO PROVIDE AND INSTALL DISCONNECT SWITCH.
6. UNIT SHALL BE ASHRAE 90.1 COMPLIANT.
7. PROVIDE WITH STAINLESS STEEL HEAT EXCHANGERS.
8. ALL RTU'S SHALL BE INTERLOCKED WITH CAPTIVEAIRE HOOD SYSTEM. RTU'S SHALL BE OPERATIONAL WHENEVER HOOD SYSTEM IS OPERATIONAL.
9. AQUAGUARD AG-3180G MOISTURE SENSOR FOR PRIMARY PAN.
10. PROVIDE ONE YEAR COMPLETE PARTS AND LABOR WARRANTY.
11. PROVIDE ADDITIONAL FOUR YEAR PARTS WARRANTY COVERING COMPRESSORS.
12. PROVIDE WITH HOT GAS REHEAT.
13. PROVIDE WITH REFRIGERANT LEAK SENSOR.

MECHANICAL SYMBOL LEGEND

UC →	3/4" DOOR UNDERCUT
S1 200/8"Ø	SUPPLY AIR DEVICE DESIGNATION
R1 –/24x12	RETURN AIR DEVICE DESIGNATION
⊠	AIR DEVICE, EXHAUST
◻	AIR DEVICE, RETURN
⊠	AIR DEVICE, SUPPLY/OUTSIDE
→	AIRFLOW DIRECTION
	BALANCE DAMPER
EQ-#(E) EQ-#	EQUIPMENT DESIGNATION (EXISTING/NEW)
(T) EQ-# (T) EQ-#	THERMOSTAT

VENTILATION SCHEDULE

UNIT	RM NUMBER / RM NAME	AREA (SF)	OCCUPANT DENSITY (PEO/1000SF)	OCCUPANTS	VENTILATION PER PERSON (CFM)	VENTILATION PER SF (CFM)	SUB-TOTALS		
							V_{bz} (CFM)	E_z	V_{ot} (CFM)
RTU-1	DINING	480	70	34	7.5	0.18	341	0.8	426
	CHILL KITCHEN	421	10	4	5	0.06	45	0.8	56
								TOTAL REQ'D:	482
								TOTAL PROVIDED	1,000
RTU-2	GRILL KITCHEN	242	-	-	-	.7	169	0.8	211
	PREP/WASH	191	10	2	5	0.06	31	0.8	39
	OFFICE	35	5	1	5	0.06	7	0.8	9
	B.O.H.	492	10	5	5	0.06	80	0.8	100
								TOTAL REQ'D:	359
								TOTAL PROVIDED	1,000

REMARKS:
1. CALCULATIONS BASED ON 2017 OHIO MECHANICAL CODE, TABLE 403.1.1.
2. OCCUPANT COUNT BASED ON NUMBER OF CHAIRS.
3. REFER TO EQUIPMENT SCHEDULES FOR TOTAL VENTILATION AIR PROVIDED.

FAN SCHEDULE

TAG ID	MANUFACTURER	MODEL	SERVICE	AIRFLOW (CFM)	ESP ("W.C.)	FAN RPM	FAN POWER (HP)	DRIVE	ELECTRICAL DATA				OPERATING WEIGHT (LBS)	REMARKS
									VOLT	PHASE	FLA / MCA	MOCP		
EF-1	CAPTIVEAIRE	DU50HFA	HOOD	800	.75	1,216	.50	DIRECT	120	1	6.3 / -	-	120 LBS.	4
EF-2	CAPTIVEAIRE	DU50HFA	HOOD	800	.75	1,216	.50	DIRECT	120	1	6.3 / -	-	120 LBS.	4
EF-3	CAPTIVEAIRE	DR10HFA	RESTROOMS	150	.25	1,103	.166	DIRECT	120	1	1.9 / -	-	70 LBS.	3 & 4

REMARKS:
1. ACCEPTABLE MANUFACTURERS (STANDARD): CAPTIVEAIRE, DAYTON, GREENHECK, LOREN COOK.
2. (INLINE/CEILING) PROVIDE WITH VIBRATION ISOLATORS, BACKDRAFT DAMPER AND INTEGRAL DISCONNECT SWITCH.
3. FAN SHALL BE INTERLOCKED WITH MOTION DETECTOR.
4. FAN IS PART OF CAPTIVEAIRE PACKAGE. REFER TO ATTACHED CAPTIVEAIRE DRAWINGS FOR FURTHER INFORMATION.

AIR BALANCE SCHEDULE

UNIT	SUPPLY AIR	OUTSIDE AIR	RETURN AIR	EXHAUST AIR
RTU-1	4000	1000	3000	-
RTU-2	4000	1000	3000	-
EF-1	-	-	-	800
EF-2	-	-	-	800
EF-3(*)	-	-	-	150 (*)
TOTALS:	8,000	2,000	6,000	1,600

* FAN IS INTERLOCKED WITH MOTION DETECTOR AND SHALL OPERATE INTERMITTENTLY.

BUILDING: 400 CFM / 20% POSITIVE

NOTE:
IT IS THE RESPONSIBILITY OF THE MC TO COORDINATE THE TEST AND BALANCE OF EACH SYSTEM. THE MECHANICAL AIR BALANCE AND KITCHEN HOOD AIR BALANCE SHALL BE COMPLETED SIMULTANEOUSLY TO ENSURE PROPER AIR BALANCE IN EACH SPACE AND PROPER BUILDING PRESSURIZATION.

GRILLES, REGISTERS, & DIFFUSERS SCHEDULE

TAG ID	MANUFACTURER	MODEL	TYPE	MODULE SIZE	DUCT SIZE	MOUNTING (FRAME)	REMARKS
S-1	PRICE	AMD-4A	SUPPLY 4 WAY	24x24	SEE PLANS	LAY-IN	1, 2, 3, 4
S-2	PRICE	AMD-1S	SUPPLY 1 WAY	12x12	6"Ø	SURFACE	1, 2, 3
S-3	PRICE	APDMC	SUPPLY PERF.	24x24	12"Ø	LAY-IN	1, 2, 3, 5
R-1	PRICE	630TB	RETURN	24x24	16"Ø	LAY-IN	1, 2, 3
E-1	PRICE	630	EXHAUST	12x12	6"Ø	SURFACE	1, 2, 3

REMARKS:
1. ACCEPTABLE MANUFACTURERS: KRUEGER, TITUS, PRICE.
2. SHALL BE 100% ALUMINUM CONSTRUCTION.
3. SHALL BE COLOR WHITE.
4. PROVIDE WITH PVCR9 SLIDING BLADE DAMPER.
5. PROVIDE WITH PVCR9 SLIDING BLADE DAMPER AND FOUR 14"Ø TO 12"Ø REDUCERS FOR TOPS OF DIFFUSERS.
6. DIFFUSERS AND GRILLES SELECTED PER PROTOTYPE SCHEDULE, COORDINATE WITH BUILDING SUPPLIER.

HVAC MECHANICAL EQUIPMENT/KITCHEN VENTILATION SYSTEM RESPONSIBILITY MATRIX

EQUIPMENT	TAG	SPECIFIED MFG.	PRICE QUOTE & ORDER THRU	EQUIPMENT PROVIDED BY	ROOF CURB PROVIDED BY	CHECK TEST & BALANCE	EQUIPMENT INSTALLED BY	EQUIPMENT STARTUP BY	1ST YEAR LABOR WARRANTY
EXHAUST FANS	EF-1, EF-2	NCA/CAPTIVEAIRE	NCA/NHP	NCA/NHP	NCA/NHP	NCA/CAPTIVEAIRE	MECH. CONTR.	MECH. CONTR.	MECH. CONTR.
KITCHEN HOOD	HOOD 1, HOOD 2	NCA/CAPTIVEAIRE	NCA/NHP	NCA/NHP	NCA/NHP	NCA/CAPTIVEAIRE	MECH. CONTR.	MECH. CONTR.	MECH. CONTR.
HOOD FIRE SYS.	HOOD 1, HOOD 2	NCA/CAPTIVEAIRE	NCA/NHP	NCA/NHP	NCA/NHP	NCA/CAPTIVEAIRE	NCA/CAPTIVEAIRE	NCA/CAPTIVEAIRE	NCA/CAPTIVEAIRE
ROOFTOP UNITS	RTU-1, RTU-2	NCA/CARRIER	NCA/NHP	NCA/NHP	NCA/NHP	CAPTIVEAIRE	MECH. CONTR.	MECH. CONTR.	MECH. CONTR.
GRILLES/DIFFUSERS	-	NCA	NCA/NHP	NCA/NHP	NCA/NHP	N/A	MECH. CONTR.	MECH. CONTR.	MECH. CONTR.

NCA/NHP NATIONAL ACCOUNTS PROVIDED HVAC EQUIPMENT AND MATERIAL PACKAGE
- THE HVAC EQUIPMENT AND MATERIALS OUTLINED IN THE RESPONSIBILITY MATRIX SHALL BE PROVIDED AND INSTALLED BY THE MECHANICAL CONTRACTOR THROUGH "NCA NATIONAL ACCOUNTS". FOR NATIONAL ACCOUNT PRICING & SHIPPING REFER TO NATIONAL VENDORS LIST.
- THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR ORDERING, DELIVERY, AND STORAGE OF THE EQUIPMENT AND MATERIALS PACKAGE.
- THE CONTRACTOR IS RESPONSIBLE FOR THE COMPLETE INSTALLATION OF THE EQUIPMENT AND MATERIALS PACKAGE.

NCA/NHP NATIONAL ACCOUNTS - PROVIDED ROOF TOP EQUIPMENT PACKAGE
- INCLUDES ALL ROOFTOP HEATING AND AIR CONDITIONING EQUIPMENT WITH ALL ACCESSORIES AS SPECIFIED ON THESE PLANS AND SPECIFICATIONS. SEE SCHEDULE ON SHEET M3.

NCA/NHP NATIONAL ACCOUNTS - PROVIDED AIR DEVICE PACKAGE
- INCLUDES ALL REGISTERS, GRILLES & DIFFUSERS WITH SQUARE TO ROUND TRANSITIONS WHERE REQUIRED AS SPECIFIED ON THESE PLANS & SPECIFICATIONS. KITCHEN: WHITE, DINING ROOM: FINISH M.24 SHEETS A5.3 & A7.1.

NCA/NHP NATIONAL ACCOUNTS - PROVIDED CURB PACKAGE
- INCLUDES ROOF CURBS FOR RTU-1, RTU-2, & RTU-3.

NCA/CAPTIVEAIRE - FRANCHISEE PROVIDED KITCHEN VENTILATION SYSTEMS PACKAGE
- THE KITCHEN VENTILATION SYSTEM COMPONENTS OUTLINED IN THE RESPONSIBILITY MATRIX SHALL BE PROVIDED AS PART OF THE FRANCHISEE'S EQUIPMENT PACKAGE. COORDINATED AND INSTALLED BY THE MECHANICAL CONTRACTOR. REFER TO NATIONAL VENDORS LIST FOR CONTACT INFORMATION.

NCA/CAPTIVEAIRE - PROVIDED FIRE SUPPRESSION SYSTEM PACKAGE
- A FACTORY INSTALLED FIRE SUPPRESSION SYSTEM WILL BE PROVIDED FOR THE KITCHEN EXHAUST HOODS UNDER THE FRANCHISEE'S EQUIPMENT PACKAGE. LOCAL PERMITS, HOOK UP OF DETECTION AND SUPPLY LINES, INSTALLATION OF PULL STATION AND FIRE SUPPRESSION AGENT AND CHECKOUT ARE PROVIDED BY CAPTIVEAIRE UNDER THE FRANCHISEE'S EQUIPMENT PACKAGE.
- ITEMS THAT ARE NOT INCLUDED: SPECIAL DRAWINGS THAT MAYBE REQUIRED BY STATE/LOCAL AUTHORITIES, INSTALLATION OF GAS SHUNT TYPE VALVE, ELECTRICAL INTERLOCK TO EXHAUST FAN BY OTHERS, FULL DUMP TEST IF REQUIRED IS NOT INCLUDED.

NCANHP - PROVIDED THIRD PARTY CHECK, TEST & BALANCE PACKAGE
- A COMPLETE BUILDING AIR BALANCE, INCLUDING THE AIR CONDITIONING EQUIPMENT, TO ENSURE CORRECT KITCHEN HOOD CAPTURE & OCCUPANT COMFORT PROVIDED BY NCA/CAPTIVEAIRE UNDER THE FRANCHISEE'S EQUIPMENT PACKAGE.

HVAC/KITCHEN VENTILATION SERVICES AND WARRANTY PACKAGE
- MECHANICAL CONTRACTOR WILL PROVIDE THE HVAC SERVICES AND WARRANTY PACKAGE.
- HVAC SERVICES AND WARRANTY PACKAGE: SEE MATRIX ABOVE.
- MECHANICAL CONTRACTOR IS RESPONSIBLE TO CORRECT INSTALLATION DEFICIENCIES THAT OBSTRUCT THE COMPLETION OF THE BUILDING AIR BALANCING AND HVAC SERVICES WARRANTY PACKAGE.

[redacted]

PROJECT
NEW BUILDING FOR:

DRAWING
MECHANICAL SCHEDULES

[redacted]

MECHANICAL SPECIFICATIONS

GENERAL

A. General Requirements
1. Drawings and specifications are intended to supplement one another. Work specified but not shown or shown but not specified shall be provided as though mentioned in both drawings and specifications.
2. Contractor shall review all Architectural, structural, electrical, and any drawings and specifications pertinent to this project and fully coordinate with all other trades.
3. All the above-mentioned drawings and specifications are considered a part of the "construction documents".
4. Before submitting a bid, each contractor is requested to visit the job site to familiarize themselves with construction condition, check facilities and conditions and make all necessary observations and measurements. Note conditions under which work is to be performed and take all items into consideration in bid. No consideration will be given for their failure to do so.
5. Contractor shall protect their work, existing, and adjacent property against weather.
6. Contractor shall protect their work, materials, apparatus, and fixtures from damage. Any work damaged by failure to provide protection required, shall be removed and replaced with new material at the contractor's expense.
7. Contractor shall confirm all utility company requirements and connection points in field, prior to start of any work.
8. Contractor shall include cost of utility companies work in their bid.
9. Contractor shall confirm size, location and materials at point of tie in connections in the field prior to rough-in of new work.
10. Contractor shall arrange for and obtain written Owner's and/or Insurance Representative's permission for any service shutdowns a minimum of two (2) weeks prior to required shutdown.
11. Contractor shall be solely responsible for construction means, methods, including but not limited to: all cutting/patching required for a complete installation, demolition as required by renovation, temporary heat for construction, and construction phasing.
12. Contractor shall be solely responsible for the safety of all workers.
13. Contractor shall not install any equipment, piping, ductwork, wiring, etc. above or below electrical panels, equipment, and service clearances; thru elevator equipment rooms, elevator shafts, and elevator controller closets; stairways or stairwells; telecommunication or data rooms.
    a. Equipment, piping, ductwork, wiring, etc. shall be allowed to be installed locations listed above only if they are dedicated to that location.
14. Contractor shall coordinate with all other trades prior to purchasing equipment. No change orders will be approved due to lack of contractor coordination.
15. Work related to the existing building shall be coordinated to minimize interference or interruption of normal building use by the owner.
16. The drawings, as prepared, are diagrammatic but shall be followed as closely as possible while maintaining operation or the building and in full coordination of all other trades. All changes from the drawings necessary to make the work conform to the building as constructed and to allow for the work of all other trades shall conform to the rules and regulations of the local authority having jurisdiction. Contractor shall provide these changes as no expense to the Owner.
17. Do not scale drawings.
18. Contractor shall coordinate and schedule the installation of mechanical and plumbing equipment and piping with minimum alterations to masonry, drywall, studs, etc.
19. Contractor shall report discrepancies in the work of others which affect work.
20. Contractor shall protect all openings during construction. Any opening in ductwork or equipment that is inactive shall be provided with plastic sheathing and sealed airtight. Any opening in ductwork or equipment that is active during construction shall be protected with a minimum MERV 8 filter. Filter shall be replaced as required during construction period to maintain proper operation of equipment and at completion of each phase of construction.
21. Contractor shall be responsible for proper size and location of anchors, chases, recesses, openings, etc. required for the proper installation of their work.
22. Contractor shall provide OSHA approved guard system for all roof mounted equipment within 10'-0" of roof edge where the roof edge does not have a minimum 42" high parapet.

B. Regulatory Agencies & Standards
1. Contractors shall install work in full accordance with rules and regulations of all applicable codes, government regulations, utility company requirements, and applicable standards having jurisdiction over premises. This shall include safety requirements of the state department. Do not construe this as relieving contractor from compliance with any requirements of specifications which are in excess of code requirements and not in conflict therewith. This includes, but is not limited to:
    a. 2024 Ohio Building Code (OBC)
    b. 2024 Ohio Mechanical Code (OMC)
    c. 2024 Ohio Fire Code (OFC)
    d. Ohio Life Safety Code
    e. 2021 International Energy Conservation Code (IECC)/ASHRAE 90.1-2019
    f. National Fire Protection Association (NFPA)
    g. National Electric Code (NEC)
    h. ANSI Standards A117.1 (Accessibility)
    i. All Local City/County Rules, Regulations, and Ordinances
    j. ASHRAE Guidelines
    k. SMACNA Guidelines
2. Contractors shall secure and pay for all fees, permits, and certificates of inspection incidental to this work required by foregoing authorities. Arrange for all required inspections and approvals.
3. Contractor shall be responsible for payments to all public utilities for work performed by them in connection with provision of service connections required under this division of specifications.
4. Deliver all permits and certificates to Architect in duplicate.

C. Substitutions
1. All equipment and materials shall be new, free of defects, and UL listed.
2. Contractor is required to bid upon the basis of design, or any manufacturer listed as an "approved equal".
3. Contractor is also invited to bid on any other similar products the contractor desires to propose as substitutions, stating any difference in cost (add or deduct from base bid cost) for each proposed substitution. Bids concerning the use of substitute products must be accompanied by complete specifications and performance characteristic covering these products. Contractor shall provide all available test data and experience records which may be helpful to the Architect in evaluating the quality and/or suitability of alternate products.
    a. Substitutions are subject to the approval of the Owner. If a substitution is submitted, it is the contractor's responsibility to evaluate and certify that the substitution is equivalent in all respects to the base specifications.
    b. If approved, contractor shall notify all trades affected by the substitution and fully coordinate with them. Any additional costs resulting from the substitution shall be the responsibility of and paid for by the substituting contractor. Approved shop drawings do not absolve this contractor from this responsibility.
4. Where several manufacturers are mentioned in the construction documents and the contractor fails to state that he prefers a manufacturer in their bid, the Owner shall have the right to choose any of the manufacturers mentioned without change in price.
5. All equipment shall be installed in full accordance with the manufacturer's installation instructions and service clearances.

D. Shop Drawing Submittals
1. Contractor shall submit shop drawings for all mechanical, plumbing, fire protection, and control systems with adequate information to clearly show construction and operating characteristics for each required item. Each item shall be labeled using the same identification as provided in the construction documents.
2. Contractor shall submit completed air and water balance reports.
3. Sheet metal shop drawings shall be fully dimensioned and coordinated based on field verified building dimensions and clearances and Architectural ceiling layouts. Indicate structural systems, lighting, ductwork and piping at all critical locations.
4. Contractor shall review and indicate their approval of each shop drawing prior to submitting for engineering review.
5. Submittals will be reviewed general compliance with the construction documents only and not for dimensions, clearances or quantities.
6. Submittals will be reviewed and returned within ten (10) business days upon receipt.
7. Each manufacturer or their representative must check the application of their equipment and certify at time of shop drawing submittal that the equipment specified has been properly applied and can be properly installed, serviced, and maintained where indicated on the drawings. The manufacturer shall advise the Engineer in writing of any potential problems at the time of the submittal. The manufacturer shall be responsible for any changes that might be necessary because of physical characteristics of equipment that have not been called to the Engineer's attention at the time of submittal.
8. Submittals returned marked "Reviewed - No Exceptions Taken" or "Reviewed - With Qualifications" shall be used for procurement. It is solely the contractor's responsibility for correct procurement of each product in full compliance with the construction documents.
9. Submittals returned marked "Make Corrections & Resubmit", "Reject - Resubmit" or "Submit Specified Item" shall be resubmitted and shall not be used for procurement.
10. Approved submittals do not absolve the contractor from providing a complete and code compliant installation of materials, equipment or other devices.

E. As-Built Record Drawings
1. Contractor shall maintain a complete set of the contract drawings and equipment submittals on the job site. Contractor shall regularly record any deviations from contract drawings made during construction.
2. Contractor shall additionally record the installed location of all concealed equipment or valves requiring maintenance or service with dimensions to an identifiable and accessible location.
3. Contractor shall provide a complete hard or electronic copy of as-built record drawings to the Owner, Architect, and Engineer upon completion of the project.

F. Guarantees and Warranties
1. Contractor shall guarantee all materials, equipment, and workmanship provided under this contract for one (1) year from date of final acceptance by Owner.
2. Contractor shall extend all manufacturers' warranties to Owner, including material and labor.
3. Contractor shall repair or replace without cost to the Owner all items found defective during the guarantee and warranty periods.
    a. In the case of replacement or repair due to failure within the warranty period, the warranty on that portion of the work shall be extended for a minimum period of one (1) year from the date of such replacement or repair.

G. Installation, Operating, and Maintenance Manuals
1. Contractor shall submit to the Owner, Architect and Engineer a complete set of operations and maintenance manuals for all systems as well as a copy of all fixture cut sheets with manufacturer and model number.
2. Contractor shall train Owner in operation of all equipment.

BASIC MATERIALS AND METHODS

A. General
1. Contractor shall provide all materials, labor, equipment, and accessories required for a complete install as outlined by the construction documents.
2. Contractor shall review construction documents for interferences with any structural or Architectural members.
3. Contractor shall furnish and install all miscellaneous steel required for supports, hangers, anchors, guides, etc., required for proper installation of equipment and materials.
4. Contractor shall notify Architect and Engineer of any interferences prior to start of any work. It will be Architect's or Engineer's responsibility to determine which material or equipment shall be relocated.

B. Excavation and Backfill
1. Contractor shall perform all excavation and backfill required for installation of below-grade piping and ductwork.
2. Pipe shall be laid on sand bedding to give uniform pitch and bearing along length of pipe.
3. Backfill with bedding material to a minimum of 12" above top of pipe and compact. Each later of backfill shall be compacted to minimum 95% density for cohesion-less soil materials and 90% density for cohesive soil materials. All compaction must be tested by third party and report submitted to the Architect.
    a. Backfill in outdoor grass areas shall be clean earth to 6" above surrounding grades.
    b. Backfill below finished floors shall be sand.
    c. Backfill under paved areas shall be interlocking aggregate and shall be compacted in a maximum of 10" layers.
    d. Backfill all other areas with clean earth, without rubbish and boulders.
4. Backfilling shall not be done until piping has been properly tested in the presence of the Architect and/or inspection of the authority having jurisdiction.
5. Contractor shall patch floor and/or paving to match existing adjacent surfaces.
6. Contractor shall include in their bid all required barricades and signage for protection of all trenches.
7. Contractor shall include in their bid replacement of all streets or sidewalks disturbed during excavation to the requirements and satisfaction of the Architect and the authorities having jurisdiction.

C. Supports and Hangers
1. Contractor shall provide all hangers and supports as required to properly secure and align ductwork and piping to meet field conditions.
2. Hangers and supports shall be manufactured by Grinnell, Michigan Hanger, or Caddy.
3. Contractor shall provide copper-plated, stainless steel hangers, or isolate all copper lines form ferrous hangers and supports by using foil filler or vinyl tape.
4. All ductwork, piping, conduit, wiring, etc. shall be independently supported from the structure. Ceilings shall not be suspended from ductwork, piping, conduit, wiring, etc. and vice versa. All hangers or supports shall be installed so as not to interfere with proper operation or maintenance of any equipment or valves.
5. All vertical piping passing through floors shall be supported at the floor by a riser clamp.
6. Pipe hangers located in non-corrosive environments shall be galvanized steel or stainless-steel rods and nuts.
7. Pipe hangers located in corrosive environments shall be zinc-plated, galvanized steel or stainless-steel rods and nuts.
8. Contractor shall provide thermal shielded hangers for all insulated piping. Shields shall be minimum 12" in length for piping 4" and less; 24" in length for piping 5" and up.
9. Hanger Installation Schedule (for steel piping, all temperatures):
    a. Pipe diameter 1/2" to 1-1/4": Maximum hanger span, 5'-0"; minimum rod diameter 1/4".
    b. Pipe diameter 1-1/2" to 3": Maximum hanger span, 10'-0"; minimum rod diameter 3/8".
    c. Pipe diameter 4" to 6": Maximum hanger span, 15'-0"; minimum rod diameter 1/2".
    d. Pipe diameter 8": Maximum span, 20'-0"; minimum rod diameter 5/8".
    e. Pipe diameter 10": Maximum span, 20'-0"; minimum rod diameter 3/4".
    f. Pipe diameter 12": Maximum span, 20'-0"; minimum rod diameter 7/8".
    g. Pipe diameter 14" and 16": Maximum span, 25'-0"; minimum rod diameter 1".
    h. Pipe diameter 18" and 20": Maximum span, 30'-0"; minimum rod diameter 1-1/4".
10. Hanger Installation Schedule (for copper piping, all temperatures):
    a. Pipe diameter 1/2" to 1-1/4": Maximum hanger span, 5'-0"; minimum rod diameter 1/4".
    b. Pipe diameter 1-1/2" and 2": Maximum hanger span, 8'-0"; minimum rod diameter 3/8".
    c. Pipe diameter 2-1/2" and 3": Maximum hanger span, 10'-0"; minimum rod diameter 3/8".
11. Hanger Installation Schedule (for plastic piping, conveying temperatures up to 120-degrees-F):
    a. Pipe diameter 1/2" to 1": Maximum hanger span, 4'-0"; minimum rod diameter 1/4".
    b. Pipe diameter 1-1/4" to 2": Maximum hanger span, 5'-0"; minimum rod diameter 3/8".
    c. Pipe diameter 2-1/2" and 3": Maximum hanger span, 6'-0"; minimum rod diameter 3/8".
    d. Pipe diameter 4": Maximum hanger span, 6'-6"; minimum rod diameter 1/2".
    e. Pipe diameter 6": Maximum hanger span, 7'-6"; minimum rod diameter 1/2".
    f. Pipe diameter 8": Maximum span, 8'-0"; minimum rod diameter 5/8".
    g. Pipe diameter 10": Maximum span, 8'-0"; minimum rod diameter 3/4".
    h. Pipe diameter 12": Maximum span, 10'-0"; minimum rod diameter 7/8".
    i. Pipe diameter 14" and 16": Maximum span, 10'-0"; minimum rod diameter 1".
12. Hanger Installation Schedule (for plastic piping, conveying temperatures 120-degrees-F and up):
    a. Pipe diameter 1/2" to 1": Maximum hanger span, 2'-6"; minimum rod diameter 1/4".
    b. Pipe diameter 1-1/4" to 2": Maximum hanger span, 3'-6"; minimum rod diameter 3/8".
    c. Pipe diameter 2-1/2" and 3": Maximum hanger span, 4'-0"; minimum rod diameter 3/8".
    d. Pipe diameter 4": Maximum hanger span, 4'-6"; minimum rod diameter 1/2".
    e. Pipe diameter 6": Maximum hanger span, 6'-0"; minimum rod diameter 1/2".
    f. Pipe diameter 8": Maximum span, 8'-0"; minimum rod diameter 5/8".
    g. Pipe diameter 10": Maximum span, 8'-0"; minimum rod diameter 3/4".
    h. Pipe diameter 12": Maximum span, 10'-0"; minimum rod diameter 7/8".
    i. Pipe diameter 14" and 16": Maximum span, 10'-0"; minimum rod diameter 1".
13. Hanger Installation Schedule (for ductwork)
    a. All rectangular ductwork: Hanger size and spacing shall comply with Table 5-1 of SMACNA Guidelines.
    b. All round or flat-oval ductwork: Hanger size and spacing shall comply with Table 5-1 of SMACNA Guidelines.
    c. Cables or strap hangers for galvanized- or galvannealed-steel ducts shall be galvanized-steel complying with ASTM A 603 with all brackets, swivels, and bolts required for duct hanger service. Provide with automatic locking and clamping device.
    d. Cables or strap hangers for stainless-steel ducts shall be stainless-steel complying with ASTM M 492 with all brackets, swivels, and bolts required for duct hanger service. Provide with automatic locking and clamping device.

D. Pipe Sleeves, Floor and Ceiling Plates, Escutcheons
1. Contractor shall provide machine cut SCH 40 steel pipe sleeves for all pipes passing through concrete or masonry. The diameter of the sleeve shall be a minimum of the pipe diameter + 1/2", extend an additional 2" past concrete or masonry, and be properly sealed.
2. Contractor shall provide steel escutcheon plates, factory primed, and field painted, or chrome plated for all pipe passing through walls, floors or ceilings in finished rooms. Where surface is to receive a paint finish, make escutcheons prime painted; otherwise, make escutcheons nickel or chrome plated. Where piping is insulated, fit escutcheons outside insulation.
3. Unused sleeves shall be filled with insulation and finished to match adjoining surface.

E. Firestopping
1. Contractor shall provide all firestopping material required at penetration of all rated walls, floors, or ceilings as indicated in the construction documents.
2. Contractor shall review Architectural plans for location, construction, and rating of all fire rated assemblies.
3. Contractor shall provide only UL-listed firestopping material in accordance with ASTM E 84.
4. Contractor shall provide firestopping assemblies with a rating equal to the assembly being penetrated.
5. No insulation is permitted at firestopping penetrations unless specifically part of the firestopping systems.
6. All fire dampers shall be UL 555 listed, Type B dampers.
7. Contractor shall provide dynamic type fire dampers within duct systems where fans continue to operate under fire and/or smoke conditions.
8. Contractor shall provide access doors as required for permit inspection and maintenance of fire damper. Access door shall be labeled with minimum of 1/2" high lettering stating, "STATIC FIRE DAMPER" or "DYNAMIC FIRE DAMPER".
9. Refer to fire damper schedule for specific types and applications.

F. Pipe, Valve & Equipment Identification
1. All piping shall be clearly labeled and affixed to the pipe in accordance with ANSI A13.1 "Scheme for the Identification of Piping Systems". Labels shall be located where piping passes thru walls, floors, adjacent to valves, adjacent to branch takeoffs, changes in direction, and on 20'-0" intervals.
2. All valves shall be provided with brass numbered tags attached to handle with a brass chain or ring. Wiring of tags will not be acceptable. Upon completion of the work, the contractor shall provide valve schedules to the Owner. The schedule shall indicate the line or equipment controlled, the normal position, the emergency/shutdown position, and a location diagram.
3. All controls, starters, switches, etc., shall be provided with an engraved plastic plate as to purpose and/or equipment controlled.
4. All control wiring shall be provided with a program number and device its services.
5. All equipment shall be provided with an engraved plastic or stamped brass strip affixed to the equipment or adjacent wall. The lettering shall be a minimum of 1/2" high.

G. Access Panels / Doors
1. Contractor shall provide access panels as indicated on the drawings as well as all access panels necessary for complete and proper installation of their work.
2. Contractor shall provide access panels as required to allow for proper access to any existing conditions.
3. Contractor shall coordinate exact size and location of required access with architectural reflected ceiling plans prior to start of any work.
4. Contractor shall coordinate with architectural life-safety plans for any rating requirements prior to start of any work.
5. Color/Finish shall be selected by architect.
6. Access Panel / Access Door Schedule:
    a. Non-Rated Drywall Application - JL Industries model 'WB' or equal
       16-gauge steel construction, concealed frame type with concealed hinge for 90-degree access, flush screwdriver operator steel camlock
    b. 1-Hour Fire Rated Drywall Application - JL Industries model 'FDWB/C' or equal
       UL-listed, 16-gauge steel construction, concealed frame type with concealed hinge for 90-degree access, universal key operator steel camlock, 20-gauge steel door with minimum 2" insulation.
    c. 2-Hour Fire Rated Drywall Application - JL Industries model 'FD2W/C' or equal
       UL-listed, 16-gauge steel construction, concealed frame type with concealed hinge for 90-degree access, automatic-closer, self-latching lock mechanism with allen key operator, 18-gauge steel door with 22-gauge liner and minimum 1-1/2" insulation.
    d. 3-Hour Fire Rated Drywall Application - JL Industries model 'FD3W/C' or equal
       UL-listed, 16-gauge steel construction, concealed frame type with concealed hinge for 90-degree access, automatic-closer, self-latching lock mechanism with allen key operator, 18-gauge steel door with 22-gauge liner and minimum 1-1/2" insulation.

H. Piping Specialties
1. Expansion joints for heating hot water and condenser water piping shall be as follows.
    a. Pipe diameter 2-1/2" and below - Stainless steel Flexicraft ML Loop
    b. Pipe diameter 3" and larger - Stainless steel Flexonics bellow type with control rings & flanged connections.
2. Expansion joints shall be provided on all pipe runs over 100'-0" and shall be sized per manufacturer's recommendations.
3. Thermometers shall be a red mercury in-glass type with adjustable angle feature, 7" minimum scale length with range and bulb length suitable for the application and insertion well and installed as indicated in the construction documents.
4. Pressure gauges shall be bourdon tube type with 3" minimum dial 1/4" male NPT connection, steel cages with pressure ranges suitable for indicating the normal operating pressure at the two-third point of the scale range and installed as indicated in the construction documents.
5. All pressure gauges shall be provided with shutoff valve and surge snubber.

I. Roof Curbs
1. Curbs shall be provided for all roof mounted equipment, as well as pipe & duct penetrations.
2. Curbs shall be 18-gauge galvanized steel with continuously welded seams, wood nailer, counterflashing, and minimum R-8 insulation. Curbs shall be as manufactured by the equipment provider, Pate, PRS, or Thybar.
3. Curbs shall be level and top of curb shall be a minimum of 14" above the high point of roof where curb attaches.
4. All cutting and patching of existing roof shall be by the owner's roofing contractor and paid for by the mechanical contractor.

J. Painting
1. Contractor shall perform all painting incidental to their work.
2. All exposed insulation shall be painted at the time of install with one coat of water based paint and again upon completion of the project with an one (1) coat of alkyd resin paint of a color to match existing building structure or as selected by the Architect.
3. All uncovered black iron pipe, fittings, valves, hangers, structural steel, expansion tanks, cooling tower sumps and all other black iron work shall be thoroughly cleaned and painted with two (2) coats of alkyd resin paint of a color to match existing building structure or as selected by the Architect.
4. All uncovered exposed sheet metal shall be thoroughly cleaned and neutralized and painted with two (2) coats of alkyd resin paint of a color to match existing building structure or as selected by the Architect.

K. Clean-Up
1. Contractor shall be responsible for their and their subcontractor's own clean-up, removal, and legal disposal of all rubbish daily.
2. Contractor shall remove their and their subcontractor's own tools, equipment, surplus materials, and legal disposal of rubbish upon completion of work.
3. Contractor shall clean all apparatus, piping, fixtures, and equipment thoroughly upon completion of work.
4. Contractor shall replace all equipment filters upon completion of work.

AIR DISTRIBUTION SYSTEMS AND MATERIALS

A. General
1. Contractor shall provide all materials, labor, equipment, and accessories for a complete install as outlined by the construction documents.
2. Contractor shall field verify exact size, location, and condition of the existing system prior to start of any work.
3. Contractor shall be fully responsible for coordinating duct routing and location with all disciplines.
4. Contractor shall report any discrepancies between what is shown in the construction documents and the actual field conditions immediately to the attention of the Architect or Engineer before proceeding with any work.

B. Ductwork
1. Contractor shall fabricate and erect all ductwork in conformance with ASHRAE, SMACNA, and the local mechanical code, whichever is most stringent.
2. All low-pressure ductwork shall be fabricated and erected in conformance with SMACNA and ASHRAE 6.4.4.2.1, seal class "A". Refer to SMACNA Table 1-2 for further information.
3. All medium- & high-pressure ductwork shall be fabricated and erected in conformance with ASHRAE and SMACNA Standards for 6" static pressure, seal class "A". Refer to SMACNA Table 1-2 for further information.
4. Duct Schedule:
    a. All concealed ductwork, unless noted otherwise: G-60 coated galvanized steel, minimum 26 gauge, conforming to ASTM A 653, ASTM A 924, ASTM E 84, and NFPA 90A.
    b. All flexible ductwork:
        1) Insulated black polymer firm, helically wound spring steel, polyethylene vapor barrier film conforming to ASTM E 84, NFPA 90A, and UL 181 Class 1.
    c. All ductwork located in high-moisture areas, conveying of wet air, or serving Type II Hoods:
        1) Type 304 stainless steel, minimum 20-gauge, No. 3 finish conforming to ASTM A 480, ASTM E 84, and NFPA 90A.
    d. All exhaust ductwork serving Type I Hoods:
        1) Black carbon steel, minimum 16 gauge conforming to ASTM A 1008, ASTM E 84, NFPA 96, UL 1978, and UL 222.
        2) Double-wall insulated Type 430 stainless steel, inner layer shall be minimum 20 gauge and outer layer shall be minimum 24-gauge, No. 3 finish conforming to ASTM E 84, NFPA 96, UL 1978, and UL 2221.
        3) All exhaust ductwork serving Type I Hoods shall be constructed and/or wrapped allowing for zero-clearance to combustible installation.
    e. All dryer exhaust ductwork:
        1) Aluminum, minimum 26 gauge conforming to SMACNA and dryer manufacturer's recommendation.
    f. All water heater flues shall be as specified by equipment manufacturer, unless noted otherwise.
    g. All condensing boiler flues shall be as specified by equipment manufacturer, unless noted otherwise.
    h. Gas-fired equipment flue/intake shall be as specified by equipment manufacturer, unless noted otherwise.
5. All radius elbows shall be 1-1/2 times the radius (or horizontal width).
6. All turning vanes shall be constructed of same material as the duct and shall be twice the thickness.
7. Contractor shall provide all balancing dampers as required for complete and proper balance of the system and as indicated in the construction documents.
8. All manual dampers shall be opposed blade type with regulator.
    a. Unless noted otherwise, all regulators shall be Young Regulator Company model "401" or "403" or equal.
    b. Regulator shall be fully accessible, visible, and external to the insulation.
9. Contractor shall provide low-leak type automatic dampers as indicated in the construction documents.
10. All branch connection shall be 45-degree entries, bell-mouth, or conical tap only. No straight taps shall be permitted.
11. All exposed sheet metal to be painted shall be thoroughly cleaned and neutralized prior to painting. Contractor shall provide two (2) coats of alkyd resin paint of a color to match existing building structure or as selected by the Architect.
12. Contractor shall paint the interior of all ductwork exposed to viewing within a finished space with two (2) coats of black, matte finish paint.
13. Contractor shall pitch exhaust ductwork serving Type I hoods at minimum of 2% slope towards hood. If continuous slope cannot be maintained, contactor shall pitch at 2% slope to low points in the system.
14. Contractor shall provide two (2) hour fire rated access panel in exhaust ductwork serving Type I hoods at each low point, change in direction greater than 90 degrees, and at 20'-0" intervals.
15. All exhaust ductwork serving Type I hoods shall be continuously welded and watertight.
16. Contractor shall pitch exhaust ductwork serving Type II hoods at a minim of 1% slope towards hood.
17. Flex ductwork shall not exceed 60" in length.
18. No flex ductwork shall be permitted to pass thru walls, floors, or ceilings.
19. Connections made to equipment shall be made using flexible canvas duct and shall be full-size of the equipment opening.

C. Drain Pans
1. Contractor shall provide a minimum 2" deep drain pan below any concealed equipment. Drain pan shall have 3/4" outlet and be piped, independently of other condensate drains to the nearest approved location.

D. Duct Liner
1. Contractor shall provide acoustic duct liner as follows:
    a. Where indicated in the construction documents.
    b. First 10'-0" of return air ductwork connecting to any other equipment.
    c. First 5'-0" of supply air ductwork downstream of fan-powered boxes.
2. Duct liner shall be minimum 1" thick fibrous glass, Type I conforming to ASTM C 518, ASTM C 665, ASTM C 1071, ASTM C 1104, ASTM C 1304, and ASTM E 84.

HVAC PIPING SYSTEMS AND MATERIALS

A. General
1. Contractor shall provide all materials, labor, equipment, and accessories for a complete install as outlined by the construction documents.
2. Contractor shall install all piping as indicated in the construction documents.
3. All horizontal piping shall be installed in a straight & and direct manner, free of unnecessary offsets or bends, no sagging, and installed as high as possible.
4. All vertical piping shall be installed in straight & direct manner, free of unnecessary offsets or bents, plumb and secured.
5. Contractor shall accurately field cut, clean, and swab piping free of debris prior to installation.
6. Contractor shall provide a valved connection for equipment provided by other.
7. Contractor shall coordinate all rough-in requirements, sizes, and locations with equipment suppliers prior to start of any work.
8. Contractor shall not install PVC piping in return air plenums. Only piping labeled and tested in conformance with ASTM E 84 for use in return air plenums.

B. Refrigerant Piping
1. All pipe installation shall conform to ASHRAE 15.
2. Contractor shall provide flexible connector at each compressor.
3. Contractor shall remove all burrs, scale, flag, and other debris from pipe prior to fittings.
4. Contractor shall fill pipe with nitrogen or carbon dioxide prior to brazing joints, as per manufacturer's recommendations.
5. All brazed joints shall conform to AWS's "Brazing Handbook" and shall utilize copper-phosphorous alloy for all copper to copper joints; cadmium-free silver for all copper to bronze or steel joints.
6. All soldered joints shall conform to ASTM B 828 or CDA's "Copper Tube Handbook".
7. Contractor shall install all refrigerant piping with slope as follows:
    a. Liquid Lines: Level
    b. Suction Lines: minimum 1" in 20'-0" towards compressor
    c. Hot-Gas Lines: minimum 1" in 20'-0" away from compressor
8. All pipe below grade shall be installed in protective conduit.
9. Pipe & Fitting Schedule:
    a. All pipe diameters:
        1) Type ACR copper tube conforming to ASTM B 280; couplings/fittings conforming to ASTM B16.

C. Condensate Drain Piping
1. Contractor shall install all pipe at uniform slope away from piece of equipment to point of discharge at no less than 1" in 40'-0".
2. Contractor shall provide a vented "P" trap adjacent to equipment (if not integral). "P" trap shall have a minimum depth of 2" plus the static pressure of the fan.
3. Pipe & Fitting Schedule:
    a. All pipe diameters: Type ACR copper tube conforming to ASTM B 280; couplings/fittings conforming to ASTM B16 or SCH 40 PVC conforming to ASTM D 2466; couplings/fittings conforming to ASTM D 2665 and ASTM D 3311.
4. Contractor shall provide cleanouts as follows:
    a. After combining two (2) or more drain lines.
    b. At each change in direction greater than forty-five (45) degrees.
    c. At 50'-0" intervals, or as indicated on the plans, in all horizontal piping.

HVAC INSULATION

A. General
1. Contractor shall provide all materials, labor, equipment, and accessories for a complete install as outlined by the construction documents.
2. All interior insulation shall comply with ASTM C 411 (Temperature), ASTM C 1136 (Puncture Resistance), ASTM E 96 (Vapor Permeance), ASTM C 1104 (Vapor Sorption), ASTM C 1338 (Fungi Resistance), ASTM C 518 (Thermal Conductivity), NFPA 90A (Flame/Smoke Resistance), and ASHRAE 90.1, latest edition.
3. Only insulation labeled and tested in conformance with ASTM E 84, NFPA 255, and UL 723 shall be used return air plenums.
4. All insulation shall be complete and installed in a clean and neat manner in conformance with the manufacturer's recommendations.
5. All joints shall be sealed tight to maintain vapor barrier.
6. Contractor shall repair or replace all insulation damaged during construction.
7. All insulation exposed to the elements shall be UV and weather resistant.
8. All piping insulation exposed below 8'-0" above finished floor shall be protected with minimum 0.02" vinyl jacket.
9. No insulation is permitted at firestopping penetrations unless specifically part of the firestopping systems.
10. Contractor shall substitute internal lining of ductwork for external insulation so long as it conforms to the local energy code.
11. No asbestos shall be used.

B. Ductwork Insulation
1. Supply, Return, & Outside Air Ductwork Insulation Schedule:
    a. Foil-faced, reinforced jacket, fiberglass insulation having a minimum thermal resistance of the following:
        1) Ducts above ceilings (or other concealed spaces): R-6.0.
        2) Ducts located in mechanical rooms: R-6.0.
        3) Ducts located in attics (or other non-conditioned spaces): R-12.0.
        4) Exterior ductwork: R-12.0. Provide with zero permeability vapor barrier, insulation jacket minimum 7 mils thickness, natural aluminum color. All seams shall overlap to ensure a complete weatherproof seal.
        5) Buried ductwork: R-6.0.
    b. Exposed, Rectangular: Exterior insulation is prohibited. Ductwork shall be provided with duct liner as specified in the construction documents.
    c. Exposed, Spiral: Exterior insulation is prohibited. Ductwork shall be double-wall as specified in the construction documents.
2. Exhaust Air Ductwork Insulation Schedule:
    a. General: foil-faced, reinforced jacket fiberglass insulation having a minimum thermal resistance of R-6.0. Contractor shall provide insulation for a minimum of the first 10'-0" of ductwork from exterior termination.
    b. Type I Hoods: shall be insulated with two (2) layers of minimum 1 1/2", 6.0 pcf density inorganic fire blanket. Fire blanket shall be rated for minimum of 1000 degrees F and shall conform to ASTM C 518, ASTM E 119, ASTM E 136, ASTM E 814, ASTM E 2336, and NFPA 96. All duct cleanouts shall be provided with removable insulation sections.

C. HVAC Piping Insulation
1. Flexible, closed-cell elastomeric or molded fiberglass insulation having a minimum thickness and thermal conductivity of the following:
2. Air conditioning condensate (copper only), pipe diameters 1-1/4" and less:
    a. Minimum 1/2", U-0.21 to U-0.27.
3. Air conditioning condensate (copper only), pipe diameters 1-1/2" to 8":
    a. Minimum 1", U-0.21 to U-0.27.
4. All Refrigerant piping, all pipe diameters:
    a. Minimum 1", U-0.21 to U-0.27.

D. HVAC Equipment Insulation Schedule:
1. Flexible, closed-cell elastomeric or molded fiberglass insulation having a minimum thickness and thermal conductivity of the following:
2. Chilled water equipment (including but not limited to valves, pumps, air separators, evaporators, tanks, etc.): Minimum 1", U-0.21 to U-0.27.
3. Hot water equipment (including but not limited to valves, pumps, converters, tanks, etc.): Minimum 2", U-0.21 to U-0.27.

CONTROL SYSTEMS

A. General
1. Contractor shall provide all materials, labor, equipment, and accessories for a complete install as outlined by the construction documents.
2. Contractor shall provide all low voltage wiring required. All line voltage wiring shall be completed by the Electrical Contractor.
3. Contractor shall route all line and low voltage wiring in conduit as per the NEC, latest edition.
4. Fan cycling is prohibited on any system delivering ventilation air to occupied spaces during occupied hours. Contractor shall provide a control system that allows for continuous operation during occupied hours.
5. All outdoor air dampers are prohibited to be closed during occupied hours.
6. All outdoor air dampers shall be closed during unoccupied or morning warmup hours. Outdoor air dampers shall be controlled via the control system or programmable thermostat.
7. Contractor shall route all line and low voltage wiring in conduit as per the NEC, latest edition. Seal off fittings shall be provided in all areas within 18" of the classified ceiling space in CNG areas.

B. Smoke Detectors
1. Contractor shall provide all duct mounted smoke detectors as indicated in the construction documents.
2. Contractor shall provide a key activated test station, located adjacent to the associated detector and in a fully accessible location.
3. Contractor shall provide a remote audible/visual device with indicator and key activated test station, located in a continuously monitored location. Contractor shall coordinate final location with Owner and authority having jurisdiction.
4. The smoke detector shall shut down the air distribution system and closed the outdoor air damper upon alarm. All systems shall require a manual reset upon restarting equipment after shut-down.

C. Temperature Controls
1. Contractor shall provide a seven (7) day programmable digital thermostat with occupied and unoccupied settings.
2. Contractor shall coordinate time of day scheduling with Owner.

TESTING, ADJUSTING AND BALANCING

A. General
1. Contractor shall verify all equipment has been installed per the manufacturer's recommendation.
2. Contractor shall be responsible for equipment startup in accordance with manufacturer's instructions prior to any Testing, Adjusting, and Balancing (TAB) work.
3. Contractor shall be responsible for complete balance, calibration, and proper operation as indicated in the Sequence of Operations.
4. Contractor shall be responsible for complete TAB of each system.
5. All TAB work shall be completed by an independent AABC or NEBB certified contractor.
6. All Balance Reports shall be within 3% of design and shall completed using standard AABC or NEBB procedures.
7. All TAB reports shall be submitted to the Owner and Architect/Engineer of record in duplicate.
8. Contractor shall balance air systems prior to any hydronic, steam, and refrigeration systems.
9. Contractor shall balance all air systems in conjunction with hood exhaust and/or hood make-up air systems to ensure proper air balance of the space.

B. Air Distribution Systems
1. Contractor shall replace all filters prior to testing and insulation.
2. All equipment shall be fully operation and connected to the duct system. Contractor shall seal all air devices prior to testing.
3. All ductwork shall be tested in accordance with the IECC utilizing one of the following methods:
    a. Rough-in Test Method: System shall operate at 0.1" w.g. pressure with less than a four (4) cfm leakage per 100 square feet of floor area.
    b. Post-Construction Test Method: System shall operate at 0.1" w.g. pressure with less than a four (3) cfm leakage per 100 square feet of floor area.
4. Contractor shall repair leaks and repeat test as required until system passes.
5. Contractor shall repair all holes in ductwork created during the testing.

C. Refrigerant Systems
1. All testing shall be completed in accordance to ANSI B 31.5 and Section 4101:8 of the "Pressure Piping Code".
2. Contractor shall fill system with oil-free dry nitrogen.
3. All piping shall be tested at 150 psig on the low side and 300 psig on the high side for twenty-four (24) hours.
4. Contractor shall repair all leaks and repeat test as required until system passes.

REVISIONS	DATE
	01.13.2026

[redacted]