FIELD VERIFY ALL CONDITIONS

DESIGN DRAWINGS ARE SCHEMATIC. THIS CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING OR AWARD OF CONTRACT TO INSPECT EXISTING FIELD CONDITIONS. THIS CONTRACT SHALL INCLUDE ALL LABOR AND MATERIALS NECESSARY FOR FIELD MODIFICATIONS DUE TO EXISTING CONDITIONS.

THE CONTRACTOR SHALL CONTACT THE ARCHITECT, ENGINEER OR OWNER PRIOR TO BIDDING FOR INTERPRETATIONS AND CLARIFICATIONS OF THE DESIGN AND INCLUDE IN HIS BID ALL COSTS TO MEET THE DESIGN INTENT. CLARIFICATIONS MADE BY THE ARCHITECT, ENGINEER OR OWNER AFTER BIDDING WILL BE FINAL AND SHALL BE IMPLEMENTED AT CONTRACTORS COST.

BIDDING CONTRACTORS SHALL HAVE A WORKING KNOWLEDGE OF LOCAL CODES AND ORDINANCES AND SHALL INCLUDE IN THEIR BIDS THE COSTS FOR ALL WORK INSTALLED IN STRICT ACCORDANCE WITH GOVERNING CODES, THE PLANS AND SPECIFICATIONS NOT WITHSTANDING. THE CONTRACTOR SHALL ALERT ARCHITECT, ENGINEER OR OWNER OF ANY APPARENT DISCREPANCIES BETWEEN GOVERNING CODES AND DESIGN INTENT.

HVAC GENERAL NOTES

A. COORDINATE ROOF TOP EQUIPMENT PLACEMENT WITH ARCHITECTURAL DRAWINGS. COORDINATE EXACT LOCATION WITH EXISTING STRUCTURE AND LANDLORD'S ROOFING CONTRACTOR.

B. REFER TO FOOD SERVICE DRAWINGS FOR ADDITIONAL SCOPE OF WORK.

C. INSTALL ALL DUCT, PIPE ECT. AS HIGH AS POSSIBLE. COORDINATE INSTALLATION OF WORK WITH OTHER CONTRACTORS.

D. PROVIDE FLEXIBLE CONNECTION BETWEEN DUCT WORK AND ALL EQUIPMENT WITH RATING PARTS.

E. ALL DUCTWORK SHALL BE INSTALLED IN ACCORDANCE WITH SMACNA STANDARDS. ALL JOINTS SEALED PRIOR TO INSULATION. ALL DUCTWORK TO BE CONCEALED UNLESS NOTED OTHERWISE. DUCTWORK SIZES INDICATED ARE ACTUAL DUCT SIZES. ADDITIONAL CLEARANCE SHALL BE CONSIDERED FOR INSULATION.

F. ALL ROOFING WORK SHALL BE PERFORMED BY LANDLORDS ROOFING CONTRACTOR AT THIS CONTRACTORS EXPENSE TO MAINTAIN ROOF WARRANTY. COORDINATE ROOF PENETRATIONS WITH THIS CONTRACTOR. VERIFY CONTRACTOR WITH LANDLORD.

MECHANICAL LEGEND

SYMBOL	DESCRIPTION
PLAN-VIEW LINE TYPES	
———	WORK SHOWN BOLD-CONTINUOUS INDICATES NEW WORK
MECHANICAL STATS & SENSORS	
TS	TEMPERATURE SENSOR
T	LOW VOLTAGE THERMOSTAT
HS	HUMIDITY SENSOR
MECHANICAL DUCTWORK ACCESSORIES	
	DUCT WITH MANUAL VOLUME DAMPER
	ELBOW WITH TURNING VANES
M	MOTOR OPERATED DAMPER - LOW VOLTAGE
S	DUCT MOUNTED SMOKE DETECTOR (HARD WIRE INTERLOCK TO FAN MOTOR BY E.C.) FURNISHED BY E.C., INSTALLED BY M.C.
MECHANICAL AIR DEVICES	
SR	SUPPLY REGISTER
RR	RETURN REGISTER
ER	EXHAUST REGISTER
RG	RETURN GRILLE
MECHANICAL DUCTWORK	
UP	SUPPLY DUCT WITH ELBOW TURNED UP
DN	SUPPLY DUCT WITH ELBOW TURNED DOWN
UP	RETURN DUCT WITH ELBOW TURNED UP
DN	RETURN DUCT WITH ELBOW TURNED DOWN
UP	EXHAUST DUCT WITH ELBOW TURNED UP
DN	EXHAUST DUCT WITH ELBOW TURNED DOWN
24X12 SA	SUPPLY DUCT
24X12 RA	RETURN DUCT
24X12 EA	EXHAUST DUCT
	FLEXIBLE DUCTWORK CONNECTION
	BRANCH TAKEOFF
	REDUCER, CONCENTRIC
	REDUCER, NONCONCENTRIC

KITCHEN PRESSURIZATION CALCULATION

EQUIPMENT	OUTSIDE AIR	EXHAUST AIR	TOTALS
RTU-3	640	0	640
MUA-1 K63B	4560	0	4560
EF-2 (TOASTER)	0	-200	-200
KEF-1,2 (K63A)	0	-4800	-4800
DISHFAN K50A	0	-800	-800
KEF-3 K94A	0	-700	-700
KITCHEN TOTALS	5200	-6500	-1300

TOTAL BUILDING PRESSURE CALCULATION

EQUIPMENT	OUTSIDE AIR	EXHAUST AIR	TOTALS
RTU-1	924	0	924
RTU-2	909	0	909
RTU-3	640	0	640
MUA-1 K63B	4560	0	4560
EF-1 (RR)	0	-300	-300
EF-2 (TOASTER)	0	-200	-200
KEF-1,2 (K63A)	0	-4800	-4800
DISHFAN K50A	0	-800	-800
KEF-3 K94A	0	-700	-700
BUILDING TOTALS	7033	-6800	233

HOOD BALANCING COMPANY CONTACT:
MELINK
ALEX FALCK
(513) 965 - 7301

OCCUPANCY/TEMPERATURE SCHEDULE

SEASON	OCCUPIED		UNOCCUPIED	
	TIME	TEMP.	TIME	TEMP.
SUMMER	6AM-4PM	74	4PM-6AM	80
WINTER	6AM-4PM	72	4PM-6AM	60

CHANGE-OVER SET POINT 2 DEG.

STANDARD HVAC ABBREVIATIONS

AAV	AUTOMATIC AIR VENT	HD	HEAD	RO	REVERSE OSMOSIS
ACCESS	ACCESSORIES	HOA	HAND/OFF/AUTOMATIC	RPM	REVOLUTIONS PER MINUTE
AD	ACCESS DOOR	HP	HORSEPOWER	RS	REFRIGERANT SUCTION
AFF	ABOVE FINISHED FLOOR	HPR	HIGH PRESSURE RETURN (STEAM CONDENSATE)	SA	SUPPLY AIR
AMP	AMPERE			SAT	SUPPLY AIR TEMPERATURE
AP	ACCESS PANEL	HSTAT	HUMIDISTAT	SC	SHADING COEFFICIENT
APD	AIR PRESSURE DROP	HTG	HEATING	SCD	SMOKE CONTROL DAMPER
ARI	AIR CONDITIONING AND REFRIGERATION INSTITUTE	HWR	HEATING HOT WATER RETURN	SD	SMOKE DETECTOR
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS	HWS	HEATING HOT WATER SUPPLY	SENS	SENSIBLE HEAT
BAS	BUILDING AUTOMATION SYSTEM	HZ	HERTZ	SP	STATIC PRESSURE
BD	BACKDRAFT DAMPER	I/O	INPUT/OUTPUT	TAB	TESTING, ADJUSTING, BALANCE
BHP	BRAKE HORSEPOWER	IAQ	INDOOR AIR QUALITY	TDH	TOTAL DYNAMIC HEAD
BTU	BRITISH THERMAL UNIT	IN HG	INCHES OF MERCURY	TDS	TOTAL DISSOLVED SOLIDS
BTUH	BRITISH THERMAL UNIT PER HOUR	IN WC	INCH WATER COLUMN	TSP	TOTAL STATIC PRESSURE
CD	CEILING DIFFUSER	IN WG	INCH WATER GAUGE	TSTAT	THERMOSTAT
CFH	CUBIC FEET PER HOUR	IPLV	INTERGRATED PART LOAD VALUE	UL	UNDERWRITERS LABORATORY
CFM	CUBIC FEET PER MINUTE	INST	INSTALLED	VAV	VARIABLE AIR VOLUME
CHWR	CHILLED WATER RETURN	KW	KILOWATT	VFD	VARIABLE FREQUENCY DRIVE
CHWS	CHILLED WATER SUPPLY	KWH	KILOWATT HOUR	WB	WET-BULB (TEMPERATURE)
CI	CAST IRON	LAT	LEAVING AIR TEMPERATURE	WG	WATER GAGE
CLG	COOLING	LBS/HR	POUNDS PER HOUR	WPD	WATER SIDE PRESSURE DROP
CO	CARBON MONOXIDE	LF	LINEAR FOOT (FEET)	WIRE	WIRED
CO2	CARBON DIOXODE	LPR	LOW PRESSURE RETURN (STEAM CONDENSATE)		
COP	COEFFICIENT OF PERFORMANCE				
CV	CONSTANT VOLUME	LPS	LOW PRESSURE STEAM		
CWR	CONDENSER WATER RETURN	LWT	LEAVING WATER TEMPERATURE		
CWS	CONDENSER WATER SUPPLY	MAX	MAXIMUM		
DB	DECIBELS	MBH	1000 BTUH		
DB	DRY-BULB TEMPERATURE	MCA	MINIMUM BRANCH CIRCUIT AMPACITY		
DC	DISCONNECT	MERV	MINIMUM EFFICIENCY REPORTING VALUE		
DDC	DIRECT DIGITAL CONTROLS	MIN	MINIMUM		
DEG	DEGREE DELTA(CHANGE IN TEMPERATURE)	MOD	MOTOR OPERATED DAMPER		
DIA	DIAMETER	MPR	MEDIUM PRESSURE RETURN (STEAM CONDENSATE)		
DIW	DEIONIZED WATER				
DP	DEW POINT TEMPERATURE	MPS	MEDIUM PRESSURE STEAM		
DX	DIRECT EXPANSION	MRI	MAGNETIC RESONANCE IMAGING		
EA	EXHAUST AIR	MVD	MANUAL VOLUME DAMPER		
EAT	ENTERING AIR TEMPERATURE	NA	NOT APPLICABLE		
EER	ENERGY EFFICIENCY RATIO	NC	NOISE CRITERIA		
EG	EXHAUST GRILLE	NC	NORMALLY CLOSED		
EMERG	EMERGENCY POWER	NO	NORMALLY OPEN		
ESP	EXTERNAL STATIC PRESSURE	NTS	NOT TO SCALE		
EWT	ENTERING WATER TEMPERATURE	OA	OUTSIDE AIR		
EX.	EXISTING	OCP	OVER CURRENT PROTECTION		
F	FAHRENHEIT	PD	PRESSURE DROP		
F&T	FLOAT AND THERMOSTATIC	PPM	PARTS PER MILLION		
FA	FREE AREA	PRS	PRESSURE REGULATING (VALVE) STATION		
FD	FIRE DAMPER	PRV	PRESSURE REGULATING VALVE		
FLA	FULL LOAD AMPERES	PSI	POUNDS PER SQUARE INCH		
FPM	FEET PER MINUTE	PSIA	POUNDS PER SQUARE INCH – ABSOLUTE		
FPS	FEET PER SECOND	PSIG	POUNDS PER SQUARE INCH – GAGE		
FT	FEET	RA	RETURN AIR		
FURN	FURNISHED	RAT	RETURN AIR TEMPERATURE		
GA	GAUGE	RH	RELATIVE HUMIDITY		
GAL	GALLONS	RL	REFRIGERANT LIQUID LINE		
GPM	GALLONS PER MINUTE	RLA	RUN LOAD AMPERE		

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FIRST WATCH
THE DAYTIME CAFE

FERN CREEK

LOUISVILLE, KY

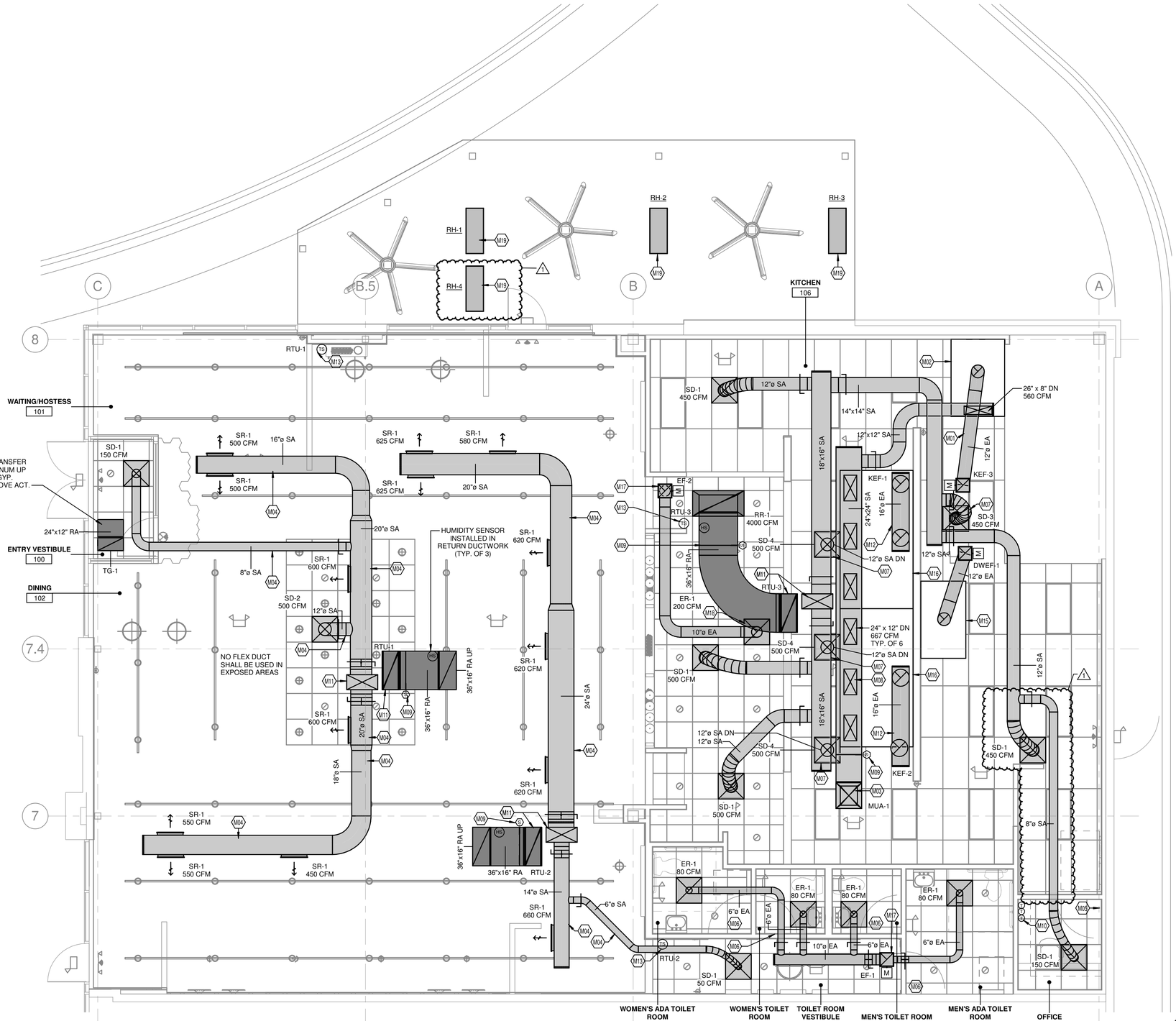
Project No. 220521
KLH Project No. 24514
Issue Date Issue Date

Title

MECHANICAL LEGEND AND ABBREVIATIONS

Sheet

M000



1 MECHANICAL FLOOR PLAN
1/4" = 1'-0"

KEYED NOTES

- M01 EXHAUST DUCT DOWN TO CONVECTION OVEN HOOD FLANGED CONNECTION AND CONNECT. REFERENCE FOOD SERVICE (FS) DRAWINGS FOR ADDITIONAL REQUIREMENTS. EXTEND ALUMINUM DUCT UP THRU ROOF TO EXHAUST FAN.
- M02 TYPE II CONVECTION OVEN EXHAUST HOOD. REFERENCE FOOD SERVICE (FS) DRAWINGS FOR ADDITIONAL REQUIREMENTS.
- M03 EXTEND AND CONNECT DUCT UP TO MAKE-UP AIR UNIT. PROVIDE FLEXIBLE CONNECTION AT UNIT.
- M04 PROVIDE DOUBLE WALL DUCTWORK WITH 1" INSULATION FOR ALL EXPOSED DUCTWORK.
- M05 PROVIDE 1.5" AIRSPACE BETWEEN BOTTOM OF DOOR AND FINISHED FLOOR FOR AIRFLOW.
- M06 PROVIDE 1" AIRSPACE BETWEEN BOTTOM OF DOOR AND FINISHED FLOOR FOR AIRFLOW.
- M07 PERFORATED SUPPLY DIFFUSER PROVIDED WITHOUT PATTERN CONTROLLER.
- M08 EXTEND SUPPLY AIR DUCT DOWN TO SUPPLY CONNECTIONS TO HOOD. PROVIDE TRANSITION DUCT AND BALANCING DAMPER AT HOOD.
- M09 MECHANICAL CONTRACTOR SHALL FURNISH A NEW ADDRESSABLE SMOKE DETECTOR. MECHANICAL CONTRACTOR SHALL INSTALL SMOKE DETECTOR IN NEW AIR DUCT MAIN. MECHANICAL CONTRACTOR SHALL INTERLOCK SMOKE DETECTOR TO FAN MOTOR. ELECTRICAL CONTRACTOR SHALL WIRE SMOKE DETECTOR TO REMOTE ANNUNCIATOR. REFER TO ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION INCLUDING ANNUNCIATOR LOCATION.
- M10 PROVIDE THERMOSTAT AND EXTEND CONTROL WIRING FROM RTU AND SPACE SENSOR TO THIS LOCATION.
- M11 EXTEND DUCTWORK UP TO UNIT THROUGH OPENING IN ROOF AND CONNECT TO ROOFTOP UNIT. VERTICAL DUCTWORK SAME SIZE AS EQUIPMENT. PROVIDE FLEXIBLE CONNECTION IN VERTICAL DUCT.
- M12 EXTEND GREASE DUCT UP THROUGH ROOF TO EXHAUST FAN ON ROOF. PROVIDE APPROVED FLANGED AND GASKETED DUCT TRANSITION AT EXHAUST FAN. PROVIDE HI-TEMPERATURE DUCT WRAP ON ENTIRE LENGTH OF GREASE DUCT. PROVIDE DUCT CLEAN-OUT AND ACCESS DOORS AS REQUIRED BY IMC AND AUTHORITY HAVING JURISDICTION. REFERENCE SPECIFICATIONS AND FOOD SERVICE (FS) DRAWINGS FOR ADDITIONAL REQUIREMENTS. CONTRACTOR TO PROVIDE OPENING IN ROOF FOR DUCT, CURB AND FAN.
- M13 PROVIDE SPACE SENSOR AT THIS LOCATION. EXTEND CONTROL WIRING TO THERMOSTATS LOCATED IN OFFICE.
- M15 TYPE II DISHWASHER EXHAUST HOOD. REFERENCE FOOD SERVICE (FS) DRAWINGS FOR ADDITIONAL REQUIREMENTS.
- M16 PROVIDE TYPE I KITCHEN HOOD. REFERENCE CAPTIVEAIRE DRAWINGS FOR ADDITIONAL INFORMATION.
- M17 EXTEND EXHAUST DUCT UP THRU ROOF TO EXHAUST FAN. PROVIDE DUCT TRANSITION AT FAN.
- M18 LOCATE EXHAUST GRILLE OVER TOASTER. LOCATE AS CLOSE AS CEILING TILE WILL PERMIT. EXTEND ALUMINUM DUCT FROM GRILLE TO 10"X10" VERTICAL ALUMINUM DUCT UP TO EXHAUST FAN AND CONNECT. SLOPE FROM GRILLE TO VERTICAL DUCT.
- M19 PROVIDE NEW ELECTRIC RADIANT HEATER SUSPENDED FROM THE STRUCTURE ABOVE. INSTALL PER MANUFACTURER'S PUBLISHED INSTALLATION AND OPERATION MANUAL. PROVIDE MANUAL CONTROL SWITCH. COORDINATE HEATER AND CONTROL FINAL LOCATIONS WITH OWNER.

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FIRST WATCH
THE DAYTIME CAFE

FERN CREEK

LOUISVILLE, KY

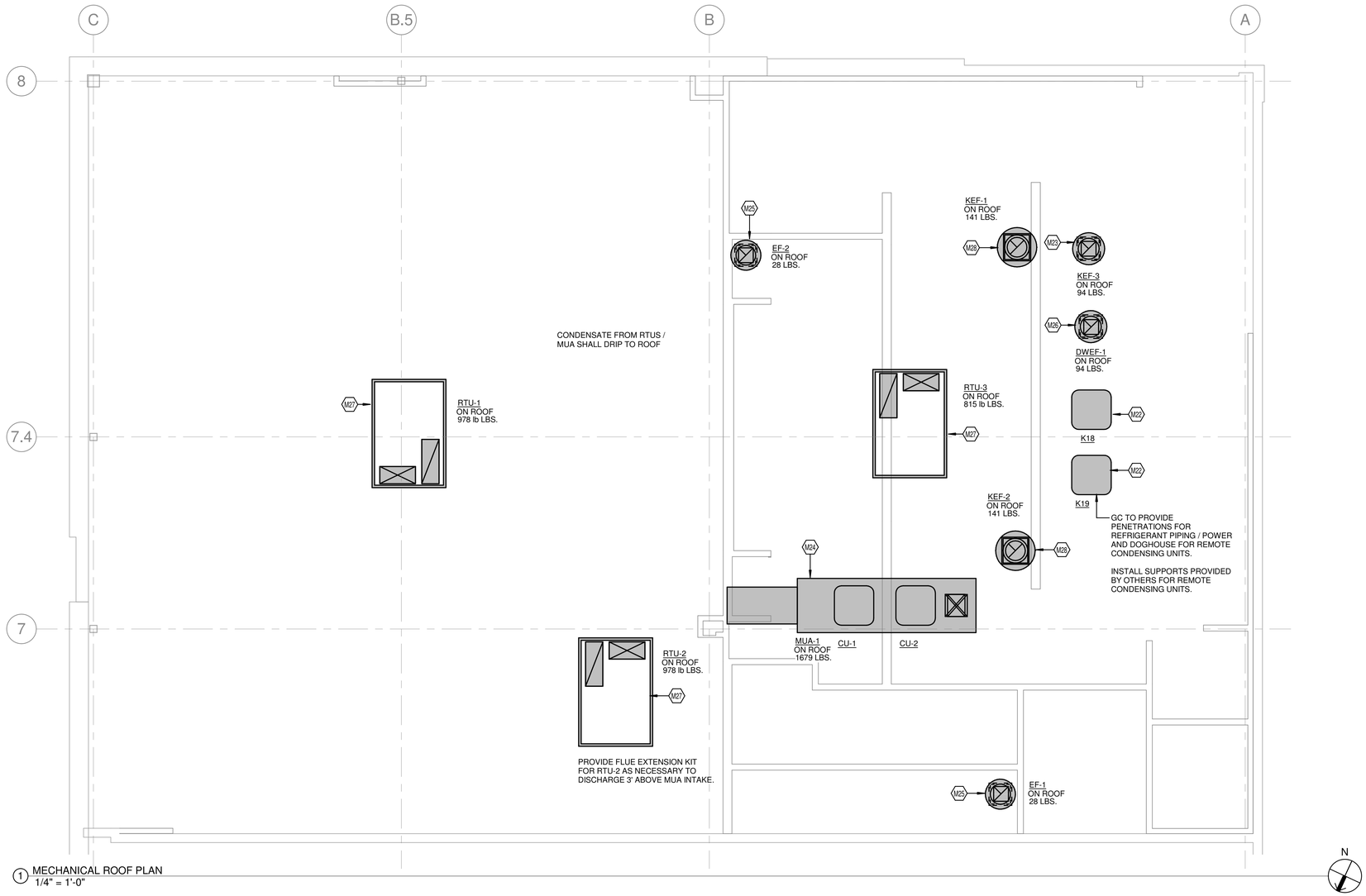
Project No.	220521
KLH Project No.	24514
Issue Date	Issue Date

Title
MECHANICAL FLOOR PLAN

Sheet
M100

KEYED NOTES

M22	REMOTE CONDENSING UNIT PURCHASED BY OTHERS, INSTALLED BY GENERAL CONTRACTOR. REFER TO KITCHEN EQUIPMENT PLANS FOR FURTHER DETAIL. PROVIDE PENETRATIONS FOR REFRIGERANT PIPING / POWER AND DOGHOUSE FOR REMOTE CONDENSING UNITS. INSTALL SUPPORTS PROVIDED BY OTHERS FOR REMOTE CONDENSING UNITS. VERIFY FINAL LOCATION WITH KITCHEN EQUIPMENT VENDOR.
M23	CONVECTION OVEN EXHAUST FAN ON ROOF. REFERENCE FOOD SERVICE DRAWINGS FOR ADDITIONAL REQUIREMENTS.
M24	MAKEUP AIR UNIT ON ROOF. REFERENCE FOOD SERVICE DRAWINGS FOR ADDITIONAL REQUIREMENTS.
M25	PROVIDE EXHAUST FAN ON ROOF. BALANCE TO THE SCHEDULED AIRFLOW. PROVIDE DUCT TRANSITION AT FAN.
M26	DISHWASHER EXHAUST FAN ON ROOF. REFERENCE FOOD SERVICE DRAWINGS FOR ADDITIONAL REQUIREMENTS.
M27	PROVIDE ROOFTOP UNIT AS SCHEDULED. BALANCE TO THE SCHEDULED AIRFLOW. MAINTAIN ALL CODE AND MANUFACTURER REQUIRED CLEARANCES.
M28	GREASE EXHAUST FAN ON ROOF. REFERENCE SPECIFICATIONS AND FOOD SERVICE FOR ADDITIONAL REQUIREMENTS. CONTRACTOR TO PROVIDE OPENING IN ROOF FOR DUCT, CURB AND FAN.



1 MECHANICAL ROOF PLAN
1/4" = 1'-0"

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THE DAYTIME CAFE

FERN CREEK

LOUISVILLE, KY

Project No.	220521
KLH Project No.	24514
Issue Date	Issue Date

Title

MECHANICAL ROOF PLAN

Sheet

M101

HVAC ELECTRICAL COORDINATION SCHEDULE

ABBREVIATIONS		CONTRACTOR TYPE		MOTOR CONTROL TYPE		CONTROL TYPE		SHORT CIRCUIT RATING
DC	LOCAL DISCONNECT	EC	ELECTRICAL CONTRACTOR	CS	COMBINATION STARTER	TC	TIMECLOCK	WHERE SHORT CIRCUIT
MC	MOTOR CONTROL (POWER)	EX	EXISTING	MCC	MOTOR CONTROL STARTER	CPT	CONTROL POWER TRANSFORMER	RATING CODE REQUIRED
SD	DUCT SMOKE DETECTOR	FC	FIRE PROTECTION CONTRACTOR	MS	MAGNETIC STARTER OR CONTACT	BAS	BUILDING AUTOMATION SYSTEM	VALUE INDICATES "YES"
CN	CONTROLS	GC	GENERAL CONTRACTOR	MS	MANUAL STARTER	LOW	LOW VOLTAGE CONTROLS	APPLICABLE EQUIPMENT'S
TS	TOGGLE SWITCH	HC	HVAC CONTRACTOR	VFD	VARIABLE FREQUENCY DRIVE	LINE	LINE VOLTAGE CONTROLS	SHORT CIRCUIT RATING
C/B	H.A.C.R. CIRCUIT BREAKER AT SOURCE PANELBOARD	MFR	MANUFACTURER	MSR	MANUAL STARTER W/ CONTROL RELAY	RLINE	REVERSE ACTING LINE VOLTAGE THERMOSTAT	SHALL EXCEED THE
FUSE	FUSE AT LOCAL DISCONNECT (VERIFY FIELD RATING)	PC	PLUMBING CONTRACTOR	OV	OVERCURRENT PROTECTION	MAN	MANUAL	AVAILABLE FAULT
FLA	OPERATING FULL LOAD AMPS	OR	OWNER OR OTHERS			FA	FIRE ALARM	CURRENT VALUE
MCA	MINIMUM CIRCUIT AMPACITY					CO	CARBON MONOXIDE SENSOR	INDICATED.
CP	CORD AND PLUG CONNECTION					INT	INTEGRAL TO EQUIPMENT	
[BLANK]	HARD WIRED (WHEN INDICATED FOR DC TYPE)					ASD	AREA SMOKE DETECTOR	
						DSD	DUCT SMOKE DETECTOR	

CONNECTION MARK	DESCRIPTION	VOLTAGE	PHASE	EMERGENCY	HP	WATTS	HTG KW	FLA	MCA	OCP	DC TYPE	DC FURN	DC INST	DC WIRE	MC TYPE	MC FURN	MC INST	MC WIRE	CN TYPE	CN FURN	CN INST	CN WIRE	FA SHUTDOWN	AVAILABLE FAULT CURRENT
RH-1-A	ELECTRIC UNIT HEATER	208 V	1				2	9.61				EC	EC	EC	MG	MFR	MFR	MFR	LOW	HC	HC	EC	NA	1265
RH-2-A	ELECTRIC UNIT HEATER	208 V	1				2	9.61				EC	EC	EC	MG	MFR	MFR	MFR	LOW	HC	HC	EC	NA	1438
RH-3-A	ELECTRIC UNIT HEATER	208 V	1				2	9.61				EC	EC	EC	MG	MFR	MFR	MFR	LOW	HC	HC	EC	NA	1693
EF-2-A	TOASTER EXHAUST FAN	120 V	1		0.1			1.5				EC	EC	EC	MG	MFR	MFR	MFR	LINE	EC	EC	EC	NA	1416
KEF-1-A	K63A GREASE EXHAUST FAN	208 V	1		1			6.9				EC	EC	EC	MG	MFR	MFR	MFR	LINE	EC	EC	EC	NA	2128
DWEF-1-A	K50A DISHWASHER EXHAUST FAN	120 V	1		0.33			4.3				EC	EC	EC	MG	MFR	MFR	MFR	LINE	EC	EC	EC	NA	2020
KEF-2-A	K63A GREASE EXHAUST FAN	208 V	1		1			6.9				EC	EC	EC	MG	MFR	MFR	MFR	LINE	EC	EC	EC	NA	3265
EF-1-A	RESTROOM EXHAUST FAN	120 V	1		0.1			1.5				EC	EC	EC	MG	MFR	MFR	MFR	LINE	EC	EC	EC	NA	2261
RTU-1-A	PACKAGED ROOFTOP UNIT, GAS HEAT	208 V	3						67	80		EC	EC	EC	MG	MFR	MFR	MFR	LOW	HC	HC	HC	NA	4439
RTU-2-A	PACKAGED ROOFTOP UNIT, GAS HEAT	208 V	3						67	80		EC	EC	EC	MG	MFR	MFR	MFR	LOW	HC	HC	HC	NA	4653
MUA-1-A	K63A MAKEUP AIR UNIT	208 V	3		5			14.5	18.2	30		EC	EC	EC	MG	MFR	MFR	MFR	LOW	HC	HC	EC	DUCT SMOKE	2979
RTU-3-A	PACKAGED ROOFTOP UNIT, GAS HEAT	208 V	3						67	80		EC	EC	EC	MG	MFR	MFR	MFR	LOW	HC	HC	HC	NA	4908
KEF-3-A	K94A HEAT EXHAUST FAN	120 V	1		0.33			4.3				EC	EC	EC	MG	MFR	MFR	MFR	LINE	EC	EC	EC	NA	1426
CU-1-A	AIR SOURCE OUTDOOR CONDENSING UNIT	208 V	3						14.5	20		EC	EC	EC	MG	MFR	MFR	MFR	LOW	HC	HC	EC	NA	1853
CU-2-A	AIR SOURCE OUTDOOR CONDENSING UNIT	208 V	3						21.4	30		EC	EC	EC	MG	MFR	MFR	MFR	LOW	HC	HC	EC	NA	2777
RH-4-A	ELECTRIC UNIT HEATER	208 V	1				2	9.61				EC	EC	EC	MG	MFR	MFR	MFR	LOW	HC	HC	EC	NA	1296

1

HVAC ACCESSORIES

ACCESSORIES:

1. MOTOR DAMPER
2. ECONOMIZER
3. ROOF CURB
4. HAIL GUARDS
5. INTAKE HOOD
6. VIBRATION ISOLATION
7. FLAT FILTER
8. FILTER/MIXING BOX
9. ACCESS DOOR
10. FLEX CONNECTIONS
11. MOUNTING COLLAR
12. HOT GAS BYPASS
13. FACE/BYPASS DAMPER
14. CONDENSATE PUMP
15. MOTOR GUARD
16. GREASE TRAP
17. DUCT FLANGES
18. BASE RAIL
19. HUMIDIFIER
20. CO2 SENSORS
21. ECON POWERED EXHAUST
22. ECON BAROMETRIC RELIEF
23. HOT GAS REHEAT COIL
24. SHAFT GROUNDING BRUSHES

HVAC ROOFTOP UNITS SCHEDULE

Equipment shall be braced and labeled by the equipment manufacturer to withstand the minimum scheduled available fault current value for listed equipment.

EQUIPMENT MARK	DESCRIPTION	STATUS	WEIGHT (lbs)	MANUFACTURER	MODEL	MIN EER	CFM (cfm)	ESP (in WC)	OACFM (cfm)	NOMINAL TONS	OA EAT WB (Deg F)	MAT CLG DB (Deg F)	MAT CLG WB (Deg F)	CLG MBH (mbh)	CLG SENS (mbh)	LAT DB (Deg F)	LAT CLG WB (Deg F)	MAT HTG (Deg F)	HTG MBH (mbh)	GAS HTG IN (mbh)	GAS HTG OUT (mbh)	MIN GAS PRESSURE (in WC)	MAX GAS PRESSURE (in WC)	ELECTRIC CONNECTION SUMMARY	AVAILABLE FAULT CURRENT	ACCESSORIES
RTU-1	PACKAGED ROOFTOP UNIT, GAS HEAT	NEW	978 lb	CARRIER	48FCDM14A2M5	11.0	4400	0.7	924	12.5	55 °F	79	66	153	113	55	55	21 °F	98	180	148	4.5	13.5	(RTU-1) A - 208V/3PH, 67 MCA, 80A OCP	4439	2,3,4,10,21,23
RTU-2	PACKAGED ROOFTOP UNIT, GAS HEAT	NEW	978 lb	CARRIER	48FCDM14A2M5	11.0	4400	0.7	910	12.5	55 °F	79	66	150	110	55	55	20 °F	86	180	148	4.5	13.5	(RTU-2) A - 208V/3PH, 67 MCA, 80A OCP	4653	2,3,4,10,21,23
RTU-3	PACKAGED ROOFTOP UNIT, GAS HEAT	NEW	815 lb	CARRIER	48FCDM12A2M5	11.0	4000	0.7	640	10	55 °F	78	66	114	96	55	55	18 °F	56	180	148	4.5	13.5	(RTU-3) A - 208V/3PH, 67 MCA, 80A OCP	4908	2,3,4,10,21,23

RTUS SHALL BE PROVIDED WITH TWO STAGES OF COOLING AND HEATING, TWO STAGES OF FAN SPEED, AND DUAL ENTHALPY ECONOMIZERS.

HVAC MAKEUP AIR UNIT SCHEDULE

Equipment shall be braced and labeled by the equipment manufacturer to withstand the minimum scheduled available fault current value for listed equipment.

EQUIPMENT MARK	DESCRIPTION	STATUS	WEIGHT (lbs)	MANUFACTURER	MODEL	OACFM (cfm)	GAS HTG IN (mbh)	GAS HTG OUT (mbh)	MIN GAS PRESSURE (in WC)	MAX GAS PRESSURE (in WC)	ELECTRIC CONNECTION SUMMARY	AVAILABLE FAULT CURRENT
MUA-1	K63A MAKEUP AIR UNIT	BY OTHERS	1679	CAPTIVE AIRE	A2-D.500-20D-MPU	4560	343.22	315.76	5	14	(MUA-1) A - 208V/3PH, 5 HP, 14.5A FLA, 18.2 MCA, 30A OCP	2979

HVAC VENTILATION SCHEDULE - FIRST WATCH

NUMBER	NAME	AREA	PEOPLE RED	OA PER PERSON	OA PER SQ FT.	REQ SUP	ACT SUP	REQ OA	ACT OA	ACT RET	ACT EXH	CRIT OA	PRESSURE
100	ENTRY VESTIBULE	52 SF	0	0	0	270	150	29	32	150	0	0	Neutral
101	WAITING/HOSTESS	262 SF	3	5	0.06	910	850	163	178	850	0	4.5	Neutral
102	DINING	798 SF	63	7.5	0.18	1760	3400	653	714	3400	0	22.7	Neutral
103	TOILET ROOM VESTIBULE	86 SF	0	0	0.06	30	50	10	10	50	0	12.9	Neutral
104A	MEN'S TOILET ROOM	27 SF	0	0	0	10	0	0	0	0	80	0	Negative
104B	MEN'S ADA TOILET ROOM	81 SF	0	0	0	30	0	0	0	0	80	0	Negative
105A	WOMEN'S TOILET ROOM	27 SF	0	0	0	10	0	0	0	0	80	0	Negative
105B	WOMEN'S ADA TOILET ROOM	48 SF	0	0	0	20	0	0	0	0	80	0	Negative
106	KITCHEN	1403 SF	0	0	0	3575	3850	10	616	3850	985	0	Negative
107	OFFICE	45 SF	1	5	0.06	125	150	0	24	150	0	6.4	Neutral
108	DINING	1101 SF	70	7.5	0.18	2280	4350	899	899	4350	0	20.7	Neutral
TOTAL		3928 SF											

HVAC LOAD SCHEDULE

THE HEATING AND COOLING LOAD CALCULATIONS ARE BASED ON THE CLTD/CLF (COOLING LOAD TEMPERATURE DIFFERENCE/COOLING LOAD FACTOR) METHOD. ASSUMPTIONS AND EXECUTION OF THESE METHODS ARE PER ASHRAE 183-2007 STANDARD FOR PEAK COOLING AND HEATING LOAD CALCULATIONS IN BUILDINGS EXCEPT LOW-RISE RESIDENTAL BUILDINGS.

COOLING LOAD BREAKDOWN

CROOF	SENSIBLE HEAT GAIN FROM ROOF
CWALL	SENSIBLE HEAT GAIN FROM EXTERIOR WALLS
CPART	SENSIBLE HEAT GAIN FROM PARITIONS
CGLASS	SENSIBLE HEAT GAIN FROM GLAZING
CSOLAR	SENSIBLE HEAT GAIN FROM SOLAR GAIN THROGH GLAZING
CLIGHTS	SENSIBLE HEAT GAIN FROM INTERIOR LIGHTING
CEQUIP	SENSIBLE HEAT GAIN FROM PLUG LOADS, COMPUTERS, ETC.
CPSENS	SENSIBLE HEAT GAIN FROM PEOPLE
CSSENS	TOTAL SENSIBLE HEAT GAIN TO SPACE
CFAN	SENSIBLE HEAT GAIN FROM AIR HANDLER FAN
COAS	SENSIBLE HEAT GAIN FROM OUTDOOR VENTILATION AIR
CTSENS	TOTAL SENSIBLE HEAT GAIN
CPLAT	LATENT HEAT GAIN FROM PEOPLE
COAL	LATENT HEAT GAIN FROM OUTDOOR VENTILATION AIR
CTLAT	TOTAL LATENT HEAT GAIN
CTOT	TOTAL HEAT GAIN (SENSIBLE + LATENT)

HEATING LOAD BREAKDOWN

HROOF	HEAT LOSS FROM ROOF
HWALL	HEAT LOSS FROM EXTERIOR WALLS
HPART	HEAT LOSS FROM PARTITIONS
HGLASS	HEAT LOSS FROM GLAZING
HSLAB	HEAT LOSS FROM SLAB
HSPACE	TOTAL HEAT LOSS FROM SPACE
HOA	HEAT LOSS FROM OUTDOOR VENTILATION AIR
HTOT	TOTAL HEAT LOSS

EQUIPMENT MARK	CROOF	CWALL	CPART	CGLASS	CSOLAR	CLIGHTS	CEQUIP	CPSENS	CSSENS	CFAN	COAS	CTSENS	CPLAT	COAL	CTLAT	CTOT	HROOF	HWALL	HPART	HGLASS	HSPACE	HSLAB	HOA	HTOT
RTU-1	2.82	1.91	0	5.7	29.64	9.49	0.68	31.18	93.77	1.54	17.88	113.19	13.2	26.21	39.41	152.6	4.55	5.33	0	26.44	97.65	1.67	59.66	97.65
RTU-2	3.67	0.9	0	2.74	18.78	12.32	0	33.39	91.34	1.54	17.59	110.47	14	25.78	39.78	150.25	6.88	2.46	0	15.7	85.79	2.06	58.7	85.79
RTU-3	2.39	3.01	0	0	0	8.02	68.19	0.3	81.9	1.4	12.39	95.69	0.2	18.15	18.35	114.04	4.28	8.44	0	0	55.62	1.58	41.32	55.62

HVAC AIR COOLED CONDENSING UNIT SCHEDULE

Equipment shall be braced and labeled by the equipment manufacturer to withstand the minimum scheduled available fault current value for listed equipment.

Equipment Mark	DESCRIPTION	LOCATION	STATUS	MANUFACTURER	SEER	NOMINAL TONS	ELECTRIC CONNECTION SUMMARY	AVAILABLE FAULT CURRENT
CU-1	AIR SOURCE OUTDOOR CONDENSING UNIT	MUA-1	BY OTHERS	CAPTIVE AIRE	14.0	3	(CU-1) A - 208V/3PH, 14.5 MCA, 20A OCP	1853
CU-2	AIR SOURCE OUTDOOR CONDENSING UNIT	MUA-1	BY OTHERS	CAPTIVE AIRE	14.0	5	(CU-2) A - 208V/3PH, 21.4 MCA, 30A OCP	2777

HVAC FANS SCHEDULE

Equipment shall be braced and labeled by the equipment manufacturer to withstand the minimum scheduled available fault current value for listed equipment.

	EQUIPMENT MARK	DESCRIPTION	STATUS	WEIGHT (lbs)	MANUFACTURER	MODEL	CFM (cfm)	ESP (in WC)	ELECTRIC CONNECTION SUMMARY	AVAILABLE FAULT CURRENT
	DWEF-1	K50A DISHWASHER EXHAUST FAN	BY OTHERS	94	CAPTIVE AIRE	DU33HFA	800	0.5	(DWEF-1) A - 120V/1PH, 0.33 HP, 4.3A FLA	2020
CRE DOWNBLAST DIRECT DRIVE	EF-1	RESTROOM EXHAUST FAN	NEW	28	GREENHECK	G-080-VG	300	0.5	(EF-1) A - 120V/1PH, 0.1 HP, 1.5A FLA	2261
CRE DOWNBLAST DIRECT DRIVE	EF-2	TOASTER EXHAUST FAN	NEW	28	GREENHECK	G-080-VG	200	0.5	(EF-2) A - 120V/1PH, 0.1 HP, 1.5A FLA	1416
	KEF-1	K63A GREASE EXHAUST FAN	BY OTHERS	141	CAPTIVE AIRE	DU85HFA	2400	0.75	(KEF-1) A - 208V/1PH, 1 HP, 6.9A FLA	2128
	KEF-2	K63A GREASE EXHAUST FAN	BY OTHERS	141	CAPTIVE AIRE	DU85HFA	2400	0.75	(KEF-2) A - 208V/1PH, 1 HP, 6.9A FLA	3265
	KEF-3	K94A HEAT EXHAUST FAN	BY OTHERS	94	CAPTIVE AIRE	DU33HFA	700	0.5	(KEF-3) A - 120V/1PH, 0.33 HP, 4.3A FLA	1426

HVAC ELECTRIC RADIANT HEATERS SCHEDULE

Equipment shall be braced and labeled by the equipment manufacturer to withstand the minimum scheduled available fault current value for listed equipment.

EQUIPMENT MARK	DESCRIPTION	WEIGHT (lbs)	MANUFACTURER	MODEL	ELECTRIC CONNECTION SUMMARY	AVAILABLE FAULT CURRENT
RH-1	ELECTRIC UNIT HEATER	24	REVERBERRAY	ELX-46S	(RH-1) A - 208V/1PH, 2 KW HTG, 9.61A FLA	1265
RH-2	ELECTRIC UNIT HEATER	24	REVERBERRAY	ELX-46S	(RH-2) A - 208V/1PH, 2 KW HTG, 9.61A FLA	1438
RH-3	ELECTRIC UNIT HEATER	24	REVERBERRAY	ELX-46S	(RH-3) A - 208V/1PH, 2 KW HTG, 9.61A FLA	1693
RH-4	ELECTRIC UNIT HEATER	24	REVERBERRAY	ELX-46S	(RH-4) A - 208V/1PH, 2 KW HTG, 9.61A FLA	1296

1

HVAC DIFFUSERS AND REGISTERS SCHEDULE - FIRST WATCH

TAG	MANUFACTURER	MODEL	FACE	MOUNTING	MATERIAL	FINISH	DAMPER TYPE	BORDER STYLE	REMARKS
ER-1	TITUS	350FL	24"x24"	CEILING	ALUMINUM	STANDARD WHITE	(none)	LAY IN MOUNTING	
RR-1	TITUS	350FL	48"x24"	CEILING	ALUMINUM	STANDARD WHITE	(none)	LAY IN MOUNTING	
SD-1	TITUS	OMNI-AA	24"x24"	CEILING	ALUMINUM	STANDARD WHITE	OPPOSED BLADE	LAY IN MOUNTING	REFER TO DRAWINGS FOR DUCT CONNECTION SIZE
SD-2	TITUS	OMNI-AA	24"x24"	CEILING	ALUMINUM	STANDARD WHITE	OPPOSED BLADE	LAY IN MOUNTING	REFER TO DRAWINGS FOR DUCT CONNECTION SIZE. DIFFUSERS IN CEILING SHALL RECEIVE FINISH TO MATCH CEILING COLOR. REFER TO SHEET A103. COORDINATE WITH FIRST WATCH REPRESENTATIVE.
SD-3	TITUS	OMNI-AA	24"x24"	CEILING	ALUMINUM	STANDARD WHITE	OPPOSED BLADE	LAY IN MOUNTING	REFER TO DRAWINGS FOR DUCT CONNECTION SIZE
SD-4	CAPTIVEAIRE	DI-PSP	24"x24"	CEILING	STEEL	METALESCENT ALUM. BAKED ENAMEL	(none)	LAY IN MOUNTING	REFER TO FOOD SERVICE DRAWINGS FOR ADDITIONAL INFORMATION
SR-1	TITUS	S300FL	24"x6"	DUCT	ALUMINUM	METALESCENT ALUM. BAKED ENAMEL	OPPOSED BLADE	SURFACE MOUNT	
TG-1	TITUS	350FL	24"x12"	CEILING	ALUMINUM	STANDARD WHITE	(none)	LAY IN MOUNTING	

SD-4 INCLUDED IN FOOD SERVICE PACKAGE(PURCHASED BY OTHERS, INSTALLED BY MECHANICAL CONTRACTOR).

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Revisions:

Mark	Date	By	Description
Issued			

NO.	DATE	BY	DESCRIPTION
1	10/12/22		LL Comments

FIRST WATCH
THE DAYTIME CAFE

FERN CREEK

LOUISVILLE, KY

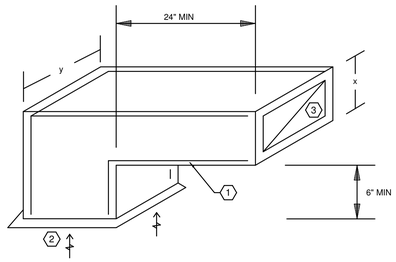
Project No.	220521
KLH Project No.	24514
Issue Date	Issue Date

Title

MECHANICAL SCHEDULES

Sheet

M102



GENERAL NOTES

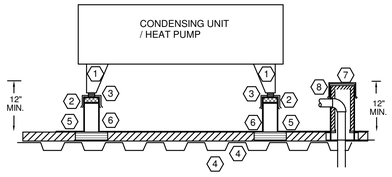
A. OPENING SIZE:
12x12 RR = 12x12 DUCT
12x24 RR = 12x18 DUCT
24x23 RR = 24x18 DUCT

KEYED NOTES:

1. 1/2" ACOUSTIC LINING
2. 12x12 RR OT 24x24 RR (UNLESS OTHERWISE NOTED)
3. OPENING SAME SIZE AS RR NECK

233713.00-13 - PLENUM RETURN GRILLE

SCALE: NONE

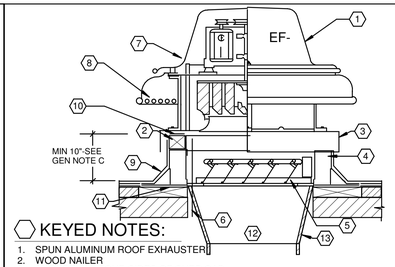


KEYED NOTES:

1. ANCHOR UNIT TO CURB
2. PRESSURE TREATED WOOD NAILER
3. VIBRATION ISOLATORS
4. ROOF DECK
5. PREFABRICATED EQUIPMENT SUPPORT
6. SINGLE MEMBREANE ROOFING, FLASH PER MFG'R RECOMMENDATIONS. FLASH UP AND OVER WOOD NAILER.
7. PREFABRICATED DOG HOUSE
8. SEAL AND FLASH OPENING

GENERAL NOTES:

A. ON PROJECTS WITH BUILT-UP ROOFS, ADD CANT ON EQUIPMENT SUPPORTS AND PREFABRICATE PIPING CHASE
B. PLACE EQUIPMENT ACROSS BAR JOIST OR ADD ADDITIONAL STRUCTURAL STRUCTURAL STEEL AS NECESSARY TO CARRY EQUIPMENT WEIGHT
C. LOCATE A MINIMUM OF 10'-0" FROM EDGE OF ROOF AND ROOF HATCH.



KEYED NOTES:

1. SPUN ALUMINUM ROOF EXHAUSTER
2. WOOD NAILER
3. ANCHOR ALL FOUR SIDES OF CURB CAP INTO NAILER SCREWS AT 12" O.C.
4. PREFABRICATED, INSULATED ALUMINUM CURB
5. MOTOR OPERATED DAMPER WIRED TO INTERFACE WITH EXHAUST FAN START/STOP
6. CONDUIT THROUGH HOLE IN DAMPER SHELF
7. POWER DISCONNECT
8. ALUMINUM BIRD SCREEN
9. CURB TYPE AND FLASHING PER ROOFING MANUFACTURER'S REQUIREMENTS
10. RUBBER GASKET APPLIED TO TOP OF CURB
11. ANCHOR TO ROOF DECK AS REQUIRED
12. CENTER TRANSITION TO DUCTWORK FROM DAMPER OR CURB. PROVIDE 3x DIAMETER STRAIGHT RUN MINIMUM.
13. INSULATED DUCTWORK

GENERAL NOTES:

A. DELETE CANT FOR SINGLE MEMBRANE ROOFS.
B. TOP OF CURB MUST BE LEVEL. FABRICATE PITCH IN CURB OR SHIM AS NECESSARY.
C. TOP OF CURB SHALL BE A MINIMUM OF 10" ABOVE FINISHED ROOF SURFACE. CONTRACTOR HAS THE OPTION TO EITHER FURNISH A CURB WITH SUFFICIENT HEIGHT TO ACCOMMODATE ROOF INSULATION THICKNESS OR TO ADD PRESSURE TREATED WOOD BLOCKING, SECURED TO THE ROOF DECK, BELOW THE CURB
D. LOCATE FAN A MINIMUM OF 10'-0" FROM EDGE OF ROOF, INTAKES, AND ROOF HATCH.
E. INSTALL ROOF MEMBRANE UP UNDER FLASHING, FLASH PER ROOFING MFGR. RQMTS.

233423.00-10 - ROOF EXHAUSTER A

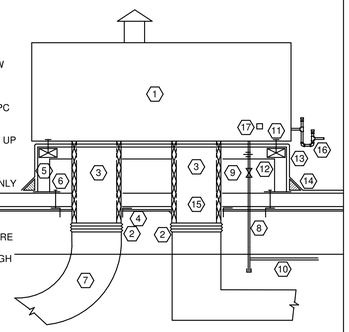
SCALE: NONE

KEYED NOTES:

1. GAS FIRED ROOFTOP UNIT LOCATE A MINIMUM OF 10'-0" FROM EDGE OF ROOF AND ROOF HATCH
2. CANVAS FLEXIBLE CONNECTION
3. 1" ACOUSTICALLY LINED DUCTS
4. 4X4 ANGLE FASTENED TO ROOF DECK AND STRUCURAL SYSTEM. PROVIDE SUPPORTS AS REQUIRED
5. FACTORY FABRICATED, INSULATED ROOF CURB (BY SAME MFG'R AS UNIT)
6. FASTEN TO CURB DECK
7. INSULATED RADIUSED ELBOW
8. UNION BY PUMBING CONTRACTOR (PC)
9. GAS SHUT-OFF VALVE BY PC
10. GAS LINE (BLACK STEEL) BY PC
11. SECURE TO CURB
12. WOOD NAILER
13. ROOFING MEMBRANE, FLASH UP TO BELOW WOOD NAILER
14. CANT STRIP
15. ROOF DECK - CUT OPENINGS FOR DUCT PENETRATIONS ONLY
16. CONDENSATE TRAP - SEE CONDENSATE DRAIN TRAP DETAIL
17. HIGH WATER ALARM IN CONDENSATE DRAIN PAN. WIRE TO BREAK 24 VOLT CONTROL POWER IN THE CASE OF A HIGH WATER EVENT.

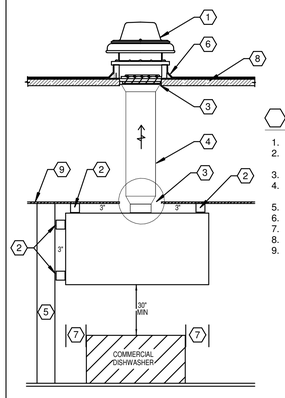
GENERAL NOTES:

A. CONTRACTOR SHALL PROVIDE CURB TO MAINTAIN 14" MINIMUM ABOVE FINISHED ROOFING SYSTEM. PROVIDE ADDITIONAL BLOCKING AS REQUIRED TO ACCOMMODATE ROOF INSULATION THICKNESS.
B. FINAL LOCATION AND STRUCTURAL VERIFICATION BY OTHERS.



237433.00-04 - ROOF CURB & MOUNTING C

SCALE: NONE

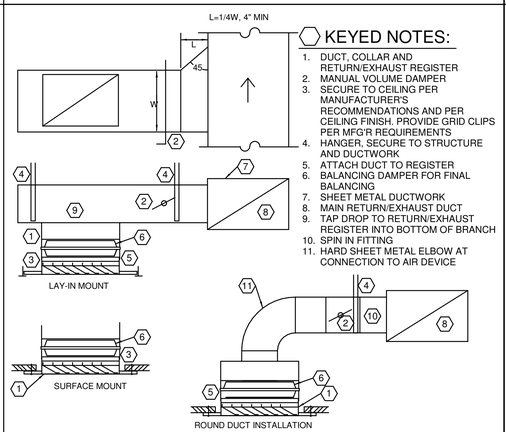


KEYED NOTES:

1. ROOF EXHAUSTER, SEE DETAIL.
2. HOOD TO BE SUPPORTED BY NON-COMBUSTIBLE SUPPORTS.
3. 6" CLEARANCE.
4. INSULATED EXHAUST DUCT MIN. 24 GA. STAINLESS STEEL.
5. INTERIOR WALL.
6. FLASH & COUNTER FLASH AT CURB.
7. 6" MINIMUM OVERHANG.
8. ROOF SYSTEM.
9. CEILING.

233813.00-01 - DISHWASHER HOOD TYPE 2

SCALE: NONE

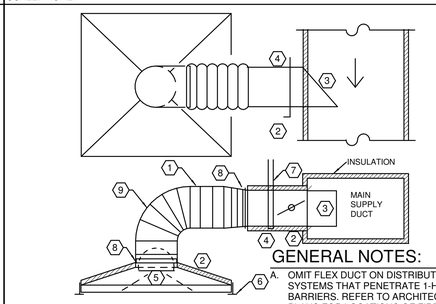


KEYED NOTES:

1. DUCT, COLLAR AND RETURN/EXHAUST REGISTER
2. MANUAL VOLUME DAMPER
3. SECURE TO CEILING PER MANUFACTURER'S RECOMMENDATIONS AND PER CEILING FINISH. PROVIDE GRID CLIPS PER MFG'R REQUIREMENTS
4. HANGER, SECURE TO STRUCTURE AND DUCTWORK
5. ATTACH DUCT TO REGISTER
6. BALANCING DAMPER FOR FINAL BALANCING
7. SHEET METAL DUCTWORK
8. MAIN RETURN/EXHAUST DUCT
9. TAP DROP TO RETURN/EXHAUST REGISTER INTO BOTTOM OF BRANCH
10. SPIN IN FITTING
11. HARD SHEET METAL ELBOW AT CONNECTION TO AIR DEVICE

233713.00-21 - RETURN/EXHAUST REGISTER INSTALLATION

SCALE: NONE



GENERAL NOTES:

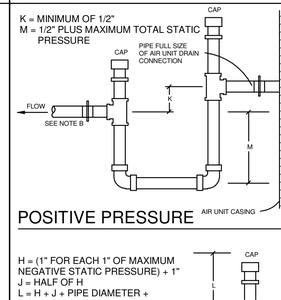
A. OMIT FLEX DUCT ON DISTRIBUTION SYSTEMS THAT PENETRATE 1-HR FIRE BARRIERS. REFER TO ARCHITECTURAL PLANS FOR LOCATIONS OF FIRE BARRIERS.

KEYED NOTES:

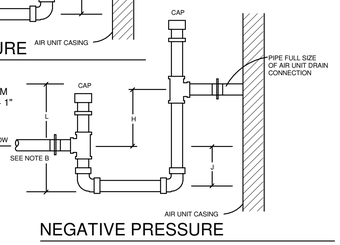
1. MAXIMUM LENGTH OF INSUL. FLEX DUCT EQUALS 5 FEET. FLEX NOT PERMITTED IN INACCESSIBLE CEILINGS
2. INSULATED DUCT, COLLAR AND DIFFUSER BY HVAC CONTRACTOR
3. SCOOP
4. SPIN IN FITTING WITH MANUAL VOLUME DAMPER
5. INTERNAL BUTTERFLY DAMPER FOR DRYWALL APPLICATIONS ONLY. (PROVIDE KEY FOR ADJUSTMENT)
6. SECURE TO CEILING PER MANUFACTURER'S RECOMMENDATIONS AND PER CEILING FINISH. PROVIDE GRID CLIPS PER MFG'R REQUIREMENTS. PROVIDE FRAMING FOR DRYWALL INSTALLATION.
7. HANGER, SECURE TO STRUCTURE AND DUCTWORK
8. PEEL BACK INSULATION AND PROVIDE STRAPPING AND SHEET METAL SCREWS AT FLEX CONNECTION TO DUCT. THEN PROVIDE STRAPPING AROUND INSULATION
9. SUPPORT FLEX TO PREVENT COLLAPSING

233713.00-04 - DIFFUSER INSTALLATION TYPICAL

SCALE: NONE



POSITIVE PRESSURE



NEGATIVE PRESSURE

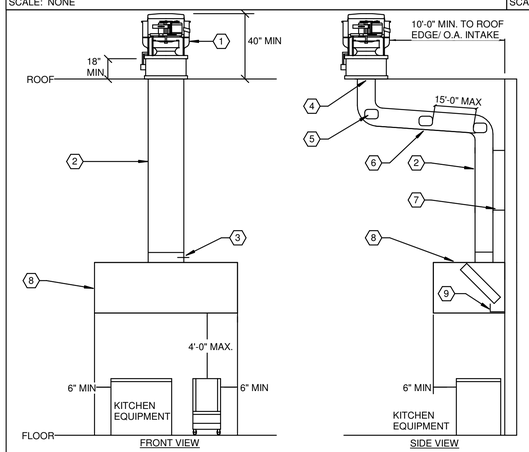
NOTE: OUTDOOR UNITS AND UNITS LOCATED IN UNCONDITIONED SPACES WHICH PROVIDE COOLING IN THE WINTER MUST HAVE HEAT TRACE ON THE CONDENSATE PIPING.

GENERAL NOTES:

A. LOCATE TRAPS SO AS TO BE ACCESSIBLE FOR CLEANING.
B. CONDENSATE PIPING SHALL GRADUALLY SLOPE DOWN FROM DRAIN TRAP.
C. CONFIRM TRAP REQUIREMENTS WITH EQUIPMENT MANUFACTURER.
D. REFER TO SPECIFICATIONS FOR MATERIAL AND INSULATION REQUIREMENTS.
E. PROVIDE UNION UPSTREAM AND DOWNSTREAM OF TRAP.

232113.23-05 - CONDENSATE DRAIN TRAP POSITIVE & NEGATIVE

SCALE: NONE



KEYED NOTES:

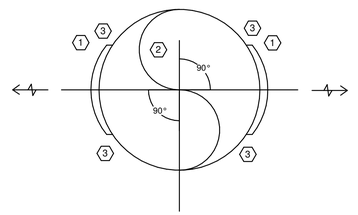
1. KITCHEN EXHAUST FAN U.L. LISTED FOR GREASE (SEE KITCHEN EXHAUSTER DETAIL). FAN MOTOR SHALL BE OUT OF AIRSTREAM. PROVIDE GREASE CUP AND DRAIN.
2. 16 GAUGE INSULATED WELDED BLACK IRON OR 18 GAUGE INSULATED WELDED STAINLESS STEEL. DUCTWORK WRAPPED WITH 2 LAYERS OF ZERO CLEARANCE DUCT WRAP (TYPICAL).
3. HEAT SENSOR IN EACH COLLAR INTERLOCKED TO VENTILATION SYSTEM.
4. FLANGED & GASKETED DUCT TO EXHAUST FAN CONNECTION.
5. CLEANOUT DOOR/LATCH (12"X12" MIN.) MADE OF 16 GAUGE WELDED BLACK IRON OR 18 GAUGE WELDED STAINLESS STEEL (TYPICAL).
6. MINIMUM 2% SLOPE TOWARD HOOD WITH CLEANOUTS A MINIMUM OF EVERY 15 FEET AND CHANGE IN DIRECTION.
7. GREASE DUCT SUPPORT IS TO BE SIZED, SPACED, AND INSTALLED BY CODE.
8. HOOD WITH ANSUL SYSTEM.
9. MAINTAIN 18" CLEARANCE TO COMBUSTIBLES.
10. GREASE DRIP TRAY.

GENERAL NOTES:

A. TYPE I HOOD SHALL BE STAINLESS STEEL, 18 GAUGE, WITH WELDED SEAMS AND UL 710 LISTED.
B. EXHAUST DUCT SHALL BE 16 GA. BLACK IRON OR 18 GA. STAINLESS STEEL, FINISH # 3, WITH CONTINUOUS LIQUID TIGHT WELDED JOINTS AND SEAMS.
C. AIR VELOCITY SHALL BE PER CODE AND AHJ.
D. PROVIDE INSULATION WRAP EQUAL TO 3M "FIRE MASTER DUCT WRAP" WITH UL LISTINGS OF 723, 1978, AND 1479.
E. INSULATION SHALL BE A LIGHTWEIGHT, NON-ASBESTOS, HIGH TEMPERATURE, INORGANIC, CERAMIC FIBER BLANKET TOTALLY ENCAPSULATED IN FOIL/SCRIM HAVING A SERVICE TEMPERATURE RANGE UP TO 2300 DEGREE F.
F. INSULATION SHALL BE A 2-HOUR FIRE RESISTIVE RATED GREASE AIR DUCT ENCLOSURE AS A SHAFT ALTERNATIVE AND A METHOD FOR PROVIDING ZERO INCH CLEARANCE AROUND COMMERCIAL KITCHEN GREASE DUCT EXHAUST SYSTEMS TO COMBUSTIBLE MATERIALS.
G. ALUMINUM GREASE FILTER WITH TROUGH, SHALL BE INSTALLED IN THE HOOD IN COMPLIANCE WITH CODE. FILTERS SHALL BE MOUNTED AT AN ANGLE OF 45 DEGREES MINIMUM.
H. PROVIDE STAINLESS STEEL ENCLOSURE PANEL BETWEEN TOP OF KITCHEN HOOD AND CEILING, PER LOCAL CODE REQUIREMENTS.

233813.00-04 - KITCHEN HOOD DETAIL UP BLAST

SCALE: NONE

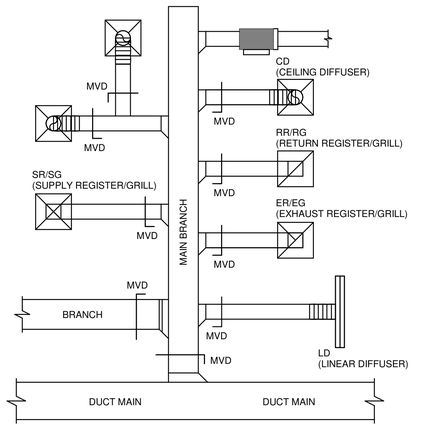


KEYED NOTES:

1. SPIRAL SUPPLY DUCT MOUNTED GRILLE WITH ADJUSTABLE, DOUBLE DEFLECTION LOUVER AND SCOOP DAMPER. (TO BE SIZED AS SCHEDULED)
2. SUPPLY DUCT
3. SEAL JOINTS BETWEEN COLLAR AND MAIN DUCT

233713.00-24 - ANGLED REGISTER INSTALLATION 0 DEGREES

SCALE: NONE



233713.00-20 - DAMPER LOCATIONS

SCALE: NONE

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859-442-8058 FAX

Revisions:

Mark	Date	By	Description
Issued			

NO.	DATE	BY	DESCRIPTION

FIRST WATCH
THE DAYTIME CAFE

FERN CREEK

LOUISVILLE, KY

Project No.	220521
KLH Project No.	24514
Issue Date	Issue Date

Title

MECHANICAL DETAILS

Sheet

M103

SECTION 23 05 01.00 – COMMON REQUIREMENTS FOR HVAC
General
General Provisions of the Contract including General and Supplementary Conditions and General Requirements apply to work of this section.
Scope
The base bid includes furnishing all materials, labor, tools, and equipment and the performance of all work required to install a complete heating and air conditioning system as outlined herein.
Guarantee
The contractor shall provide a guarantee in written form stating that all work under this section shall be free of defective work, materials, or parts for a period of one year from the date of owner's final acceptance and shall repair, revise or replace at no cost to the owner any such defects occurring within the guarantee period. Contractor shall also state in written form that any items or occurrences arising during the guarantee period will be attended to in a timely manner and will in no case exceed four (4) working days from date of notification by owner.
Quality Assurance
Provide a complete installation in conformance with the following standards.
ASHRAE: American Society of Heating, Refrigerating and Air Conditioning Engineers
NFPA: National Fire Protection Association
SMACNA: Sheet Metal and Air Conditioning Contractors National Association.
Statewide Building Code
IMC: International Mechanical Code
Permits, Fees, Inspections, Laws and Regulations
Permits and fees of every nature required in connection with this work shall be obtained and paid for by this contractor who shall also pay for all the installation fees and similar charges. Laws and regulations, which bear upon or affect the various branches of this work shall be complied with by this contractor and are hereby made a part of this contract. All work, which such laws require to be inspected, shall be submitted to the proper public official for inspection and a certificate of final approval must be furnished.
Tests and Adjustments
No ducts, fixtures or equipment shall be concealed or covered until they have been inspected and approved by the Architect and the inspector who shall be notified by the contractor when the work is ready for inspection.
Work shall be completely installed, tested and leak tight before inspection is required. All tests shall be repeated to the satisfaction of those making the inspection.
Architectural coordination items
Cutting and Patching: Cut and drill all openings in walls and floors required for the installation. Secure approval of Engineer before cutting and drilling. Neatly patch all openings cut.
Fire Caulking: Patching through fire rated walls and enclosures shall not diminish the rating of that wall or enclosure. Patch shall be equal to rockwool, firestop, caulk or approved "rated" patch.
Access Panels and Pathways: Furnish all access panels required for proper servicing of equipment. Provide access panels for all concealed valves, vents, controls, cleanout doors, and sprinkler devices required by NFPA. Provide access panels for all fire and/or fire & smoke dampers. Provide frame as required for finish. Furnish panels to General Contractor. Exact locations to be approved by the Architect. Minimum size to be 12" x 12", units to be 16 gauge steel, locking device shall be screwdriver cam locks.
project conditions
Where new HVAC systems are required to be connected to existing HVAC systems, it is the contractor's responsibility to verify the location, size, pressure, condition, and they shall verify that the existing HVAC system is indeed the correct and appropriate HVAC system before any work is done. Provide all necessary camera scoping and dye testing as necessary. If there is any need for concern, if it is determined that the existing HVAC system is not a correct or appropriate HVAC system or not connected to a correct or appropriate HVAC system, if the condition of the existing HVAC system is not viable for re-use, or any other condition that would not allow for proper functioning of the new HVAC system, the contractor shall notify the engineer in writing immediately via RFI and wait for direction before proceeding.
MECHANICAL EQUIPMENT COMMON REQUIREMENTS
INSPECTION
Examine areas and conditions under which mechanical equipment is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.
Uncrate equipment and inspect for damage. Verify that nameplate data corresponds with unit designation.
INSTALLATION
General: Install mechanical equipment as indicated, and in accordance with manufacturer's installation instructions.
Location: Install each unit level/plum and accurately in position indicated in relation to other work; and maintain sufficient clearance for normal service and maintenance, but in no case less than that recommended by manufacturer.
Coordinate with other trades to assure correct recess size for recessed units.
Protect interior mechanical equipment with protective covers during balance of construction.
For ducted equipment, connect ductwork to units with flexible duct connections. Provide transitions to exactly match unit duct connection size. Provide 1" acoustic duct lining on return air side a minimum of 10' from fan.
Provide trap at drain piping connection to unit sized per manufacturer's recommendations.
Access: Provide access space around and over mechanical equipment for service as indicated, but in no case less than that recommended by manufacturer or required by code that is greater.
Access Panels: Furnish all access panels required for proper servicing of equipment. Provide access panels for all concealed valves, vents, controls and cleanout doors, and sprinkler devices required by NFPA. Provide frame as required for finish. Furnish panels to General Contractor. Exact locations to be approved by the Architect. Minimum size to be 12" x 12", units to be 16 gauge steel, locking device shall be screwdriver cam locks.
Rooftop mechanical equipment shall be installed a minimum of 10'-0" from any roof edge regardless of location indicated on plans, unless a screen wall or railing is installed per the local building code. See the architectural plans for coordination.
Roof Curbs: Furnish roof curbs to roofing Installer for installation. Install and secure roof curb to roof structure, in accordance with National Roofing Contractor's Association (NRCA) installation recommendations and shop drawings. Install and secure units on curbs and coordinate roof penetrations and flashing. Install according to roofing manufacturer's recommendation and specifications.
Rooftop supports: Provide rooftop equipment rails for mechanical equipment located on the roof that spans two or more bar joists. Verify roof structure, mounting supports, and membrane installations are completed to the proper point to allow installation of roof mounted units.
ELECTRICAL COORDINATION ITEMS
Electrical Wiring: Install electrical devices furnished by manufacturer but not specified to be factory-mounted. Furnish copy of manufacturer's wiring diagram submittal to Electrical Installer.
Verify that electrical wiring installation is in accordance with manufacturer's submittal and installation requirements of Division 26 sections. Do not proceed with equipment start-up until wiring installation is acceptable to equipment installer.
Install electric heating terminal units including components in accordance with equipment manufacturer's written instructions, and with recognized industry practices; complying with applicable installation requirements of NEC and NECA's "Standard of Installation".
Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Std 486A.
Grounding: Provide equipment grounding connections for electric heating terminals as indicated. Tighten connections to comply with tightening torque values specified in UL Std 486A to assure permanent and effective grounding.
FIELD QUALITY CONTROL
Testing: After installation has been completed, test to demonstrate proper operation of mechanical equipment at performance requirements specified. When possible, field correct malfunctioning units, then retest to demonstrate compliance. Replace units, which cannot be satisfactorily corrected. Test controls and demonstrate compliance with requirements.
Cleaning: After construction is completed, including painting, clean unit exposed surfaces, vacuum clean coils and inside of cabinets. Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.
START-UP
Provide the services of a factory-authorized service representative to start-up rooftop units, in accordance with manufacturer's written start-up instructions. Test controls and demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.
TRAINING OF OWNER'S PERSONNEL
Provide services of manufacturer's technical representative for 1-half day to instruct Owner's personnel in operation and maintenance of units. Schedule training with Owner, provide at least 7-day notice to Contractor and Engineer of training date.

SECTION 23 05 03.00 – SUBMITTALS FOR HVAC
General
Where submittals are required by the Contract Documents, they shall be prepared and supplied in accordance with the Contract Documents. In addition to Division 01, the Contractor is advised to review and comply with the requirements articulated within each Division and within each section of that Division.
Some Divisions may include a division-specific "Submittal Requirements for …." section. Where this section exists, it articulates additional requirements for submittals that apply to the work of that Division.
The following requirements help to identify, track and keep the project organized for all parties involved. They are necessary to ensure a timely turnaround and an appropriate technical review. Submittals that do not conform to the administrative requirements are rejected and returned, without technical review.
Requirements
Supply submittals for each section: Submittals shall be supplied on a section-by-section and type-by-type basis. For example, independent product data submittals shall be furnished for each section that requires product data submittals. Independent shop drawing submittals shall be furnished for each section that requires shop drawings. Refer to the specifications for identification of which submittals are required for the project. Separate PDF file packages shall be supplied for each section, for each submittal type, where electronic submittals are required. Each PDF shall represent a single standalone submittal. Separately bound and identified submittals shall be provided where hardcopies are required.
Include a transmittal: Transmittals shall enumerate each submittal for each section of each type and iteration. Include cover sheet / title page: The cover sheet shall include the information identified in the contract documents. It shall be included as the first page of each electronic and/or hardcopy document-based submittal. An editable and printable PDF form created with editable fields and specification compliant appearance is available from KLH upon request. It is also downloadable from the KLH website at www.klhengrs.com.
Include an index: The index shall enumerate the contents of the submittal.
Include checklists: Where checklists are included with the specifications, complete and include them within the appropriate submittal. Supply complete submittals:
Complete submittals of each type are required. Partial submittals will be rejected. Where a section requires a product data submittal, all product data for that section shall be supplied together, at one time, as one complete submittal. Do not send half the product data as one submittal and the other half as a separate one. When resubmittal is required (e.g. Revise and Resubmit) the revised submittal shall be more complete, more accurate and more contract-compliant than its rejected predecessor. The submittal number (for each section and type) shall increment for each subsequent submittal (00 – Original submission, 01 – First Resubmission, 02 – Second Resubmission, etc…). Resubmittals shall include a copy of the reviewer's comments supplied with the prior submittal rejection and shall be amended with a description of the specific action taken to comply with the reviewer's comments. The absence of this on resubmittal is cause for rejection.
Name electronic files to match the submittal ID and cover sheet: The electronic file name of submittals shall match the submittal ID included on the submittals cover page. For example: The original/first product data submittal for Section 234116 would be labeled as "234116.00-PD-00"; the first resubmittal of same shall be labeled "234116.00-PD-01". The original/first shop drawings submittal file for the same section would be labeled "234116.00-SD-00"; the first resubmittal of same shall be labeled "234116.00-SD-01".
Use of Electronic Drawings from the Owner's Design Team
Plan drawings for the Project were created with AutoCAD and Revit.
If expressly permitted by the Owner and the terms of the Contract, editable electronic versions of standard-scale, AutoCAD-based plan drawings may be made available for the creation of shop and as-built drawings.
Due to the proprietary nature of internal design systems, editable native-software versions of some drawings, including but not limited to system diagrams and details will not be made available in an editable form. In these cases, electronic versions of the drawings may be made available only in PDF, JPG or similar non-editable electronic form, at the sole discretion of the Design Professional.
The Request Drawings form can be accessed, filled out and submitted at the following internet address (scroll down to bottom of home page): http://www.klhengrs.com.

SECTION 23 05 29.00 – HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

Submittal Requirements
Product Data: For each type of product indicated.
Shop Drawings: Fabrication and installation details.

General
Support all piping, ductwork and equipment by hangers or brackets properly from the building structure. Support from decking above is prohibited. Furnish structural steel members where required to support piping and equipment. No portion of piping or valves shall be supported by equipment.
Ductwork - Support by means of hangers as follows:

Duct Width	Hanger Size and Type	Max. Spacing
30 or less	(#16 gage)	8
31 to 60	(#14 gage)	8

A pair of hangers shall be located at every transverse joint and elsewhere according to the table.

SECTION 23 05 93.00 – TESTING, ADJUSTING AND BALANCING FOR HVAC

Submittal Requirements
Shop Drawings: Certified Reports: Submit testing, adjusting, and balancing reports bearing the seal and signature of the Test and Balance Engineer. The reports shall be certified proof that the systems have been tested, adjusted, and balanced in accordance with the referenced standards; are an accurate representation of how the systems have been installed; are a true representation of how the systems are operating at the completion of the testing, adjusting, and balancing procedures; and are an accurate record of all final quantities measured, to establish normal operating values of the systems. Final Report: Upon verification and approval prepare final reports, type written, and organized and formatted as specified below. Submit 2 complete sets of final report to the owner.

General
Test, adjust, and balance the following mechanical systems:
Supply air systems, all pressure ranges
Return air systems.
Exhaust air systems.
Verify temperature control system operation.
Test systems for proper sound and vibration levels.
Quality Assurance
Codes and Standards:
AABC; "National Standards for Total System Balance".
ASHRAE: ASHRAE Handbook, 2011 Applications, Chapter 38, Testing, Adjusting, and Balancing.
Qualifications
The contractor shall procure the services of an independent Balance and Testing Agency, approved by the Engineer, and a member of Associated Air Balance Council (AABC) or NEBB, which specializes in the balancing and testing of heating, ventilating and air conditioning systems, to balance, adjust and test all air and water systems and equipment as herein specified. All work by this agency shall be done under direct supervision of a qualified heating and ventilating Engineer employed by this agency. All instruments used by this agency shall be accurately calibrated and maintained in good working order.
Sequencing and Scheduling
Test, adjust and balance air conditioning systems during summer season and heating systems during winter season, including at least a period of operation at outside conditions within 5 deg F wet bulb temperature of maximum summer design condition, and within 10 deg F dry bulb temperature of minimum winter design condition. Take final temperature readings during seasonal operation.
Check all filters for cleanliness, provide new as required.
Check dampers (volume and fire) for correct and locked position, and temperature control for completeness of installation before starting fans. Place outlet dampers in full open position. Lubricate all motors and bearings.
Check fan belt tension. Check fan rotation.
Air balance and testing shall not begin until the system has been completed and is in full working order. The Contractor shall put all heating, ventilating and air conditioning systems and equipment into full operation and shall continue the operation of same during each working day of testing and balancing. The contractor shall submit within 30 days after receipt of contract, 8 copies of submittal data for the testing and balancing of the air conditioning, heating, and ventilating systems. The Air Balance and Testing Agency shall provide proof of having successfully completed at least five projects of similar size and scope.
The air balancing contractor shall include the additional cost to change every fan factory installed sheave, pulley and/or belt of in order to obtain the design air flows.
Performing Testing, Adjusting and Balancing
Perform testing and balancing procedures on each system identified, in accordance with the detailed procedures outlined in the referenced standards.
Cut insulation, ductwork, and piping for installation of test probes to the minimum extent necessary to allow adequate performance of procedures.
Patch insulation, ductwork, and housings, using materials identical to those removed.
Seal ducts and piping, and test for and repair leaks.
Seal insulation to re-establish integrity of the vapor barrier.
Mark equipment settings, including damper control positions; valve indicators, fan speed control levers, and similar controls and devices, to show final settings. Mark with paint or other suitable, permanent identification materials.
Retest, adjust, and balance systems subsequent to significant system modifications, and resubmit test results.

SECTION 23 07 13.00 – DUCT INSULATION

Submittal Requirements
Product Data: For each product indicated.
Shop Drawings: Include plans, elevations, sections, details and attachments to other work.

All liners, insulation and adhesives shall have a flame spread index not more than 25 and a smoke developed index of not more than 50. Insulation shall have a minimum installed thermal resistance value of R6 or code minimum, whichever higher.
Rigid Fiberglass Ductwork Insulation: Glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IB, without facing and with vapor barrier all-service jacket manufactured from kraft paper, reinforcing scrim, aluminum foil, and vinyl film.
Flexible Fiberglass Ductwork Insulation: Glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II, without facing and with vapor barrier all-service jacket manufactured from kraft paper, reinforcing scrim, aluminum foil, and vinyl film.
Vapor Barrier Material for Ductwork: Paper-backed aluminum-foil, except as otherwise indicated; strength and permeability rating equivalent to factory-applied vapor barriers on adjoining ductwork insulation, where available; with following additional construction characteristics:
High Puncture Resistance: Low vapor transmission (for ducts in exposed areas: Mech. Rooms, etc.)
Moderate Puncture Resistance: Medium vapor transmission (for ducts in concealed areas).
All ductwork shall be insulated except:
Double wall ductwork
Fabric ductwork
Metal ducts with duct liner of sufficient thickness to comply with energy code.
Factory insulated flexible ductwork
Factory insulated plenums and casings
Flexible connectors
Vibration control devices
Factory insulated access panels and doors
Supply ductwork exposed in conditioned spaces excluding mechanical rooms, server rooms and electric equipment rooms
Toilet exhaust, general exhaust and return ductwork in an insulated joist or attic space.

SECTION 23 09 93.00 – SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

Submittal Requirements
Product Data: Provide written sequences of operation for each controlled system and piece of equipment.

Packaged Rooftop Unit
1. Startup
The unit shall operate on a 7 day/night programmable thermostat.
During startup, the fan shall run with the dampers in the full recirculation position. Provide occupied changeover sequence with optimum start function. When the return air temperature reaches occupied setpoint (adjustable), the minimum outside air damper shall open to the controlled minimum outdoor air position.
2. Supply Fan Control
The supply fan shall be two staged and modulate up and down based on a call for heating or cooling.
3. Space Temperature Control
Provide 7-day programmable thermostat with digital display of space temperature and setpoint (+/- deg. F. adjustable), with override feature and remote space temperature sensor.
4. Minimum Outside Air Control
During occupied mode, the minimum outside air damper shall be open to the scheduled minimum outdoor air flow and modulate proportionally with the supply fan speed to maintain the scheduled minimum outside airflow. When the supply fan speed is set to high, outside air damper shall be partially closed allowing minimum outside air flow as scheduled. As supply fan speed is set to low, damper shall fully open allowing minimum outside air flow as scheduled. Provide motor operated dampers.
5. Economizer Control
Provide dual enthalpy economizer control. Economizer control shall be enabled whenever the outside air enthalpy is lower than the return air enthalpy. Enthalpy shall be calculated from sensors which are tied to the same controller for accuracy. During economizer mode, the outside air damper shall modulate to 100% open. The economizer damper shall modulate open on a call for cooling and modulate closed on a call for heating. The return damper shall modulate inversely with the economizer damper. Economizer shall have powered relief.
6. Cooling Control
Cooling shall be controlled to maintain space temperature setpoint. On a call for cooling, the heating shall be off and supply fan speed shall be low. On a further call for cooling, the economizer shall be enabled. On a further call for cooling, disable the economizer and energize first stage cooling on. On a further call for cooling, the supply fan speed shall be high and energized second stage of cooling.
7. Heating Control
Heating shall be controlled to maintain space temperature setpoint. On a call for heating, the mechanical cooling shall be off. On a further call for heating, the economizer mode shall be disabled. On a further call for heating, the supply fan shall be set to low speed and the gas heating shall be disabled. On a further call for heating, the supply fan shall be set to high speed and the gas heating shall be staged on.
8. Dehumidification
Provide a hot gas reheat coil for dehumidification. Provide space humidity sensor. When the space humidity rises above 60% (adjustable), provide full cooling and modulate the hot gas reheat coil to maintain space temperature setpoint. When the space humidity reaches setpoint, resume with normal heating & cooling operation.
9. Smoke Detector
When the smoke detector is alarmed, the system shall be alarmed and the air handler shall fail safe with manual reset.
10. Unoccupied Mode
During the unoccupied mode of operation, the RTU shall go into night setback mode.
Night Setback/Shutdown
At night setback/shutdown the RTU shall go to fail safe position. Fail safe position is defined by the following: The supply fan is off, the outdoor air intake damper is closed, the heating is off and the mechanical cooling is off. The supply fan shall cycle in conjunction with either the heating or cooling system to maintain a minimum/maximum space temperature depending on the season.

CV Kitchen Makeup Air Unit (Gas-Fired,DX, Supply Fan only)
1. Startup
The makeup air system shall be initiated by an auxiliary contact in the exhaust fan motor starter. See Kitchen Hood Exhaust Fan sequence of operation. At startup, the outdoor air damper shall be fully open. Provide an end switch for proper sequencing of damper operation and energizing of fan motor. The outdoor air damper shall have an end switch which will close a contact only after damper is completely opened. Once the contact is closed the supply fan shall be energized.
2. Supply Fan Control
The supply fan shall run continuously during occupied mode at constant speed. Provide complete interlock with exhaust fan control. When exhaust fan is off, supply fan shall be off.
3. Supply Air Temperature Setpoint
A discharge thermostat (field adjustable) in the makeup air unit supply ductwork shall regulate discharge air temperature by staging multiple gas burners on.
4. Cooling Control
On a call for cooling the heating shall be off. On a further call for cooling the mechanical cooling shall be staged on.
5. Heating Control
Natural gas heating valve shall modulate open to maintain supply air temperature setpoint.
6. Filter Pressure Drop
Provide static pressure differential switch across each filter which will alarm the system on high static pressure limits.
7. Smoke Detector
When the smoke detector is alarmed, the system shall be alarmed and the air handler shall fail safe with manual reset.
8. Ansul System Alarm
Provide hardwire interlocks for Ansul system activation to shutdown makeup air unit.
9. Shut Down
At shutdown the air handler shall go to fail safe position. Fail safe position is defined by the following: The supply fan is off, the outside air damper is closed and the heating is staged off.

Exhaust Fans (Timeclock)
Exhaust fans shall be tied to timeclock, which shall be furnished, installed and wired by electrical contractor. When activated, exhaust fan motor damper shall open and fan shall start.
(Indicated by EC on HECS schedule)

Kitchen Hood Exhaust Fan (Type I)
Provide heat detector in hood collar interlocked to fan operation
The Kitchen Hood exhaust system shall be initiated by the heat detector. Provide indicator light on face of hood. At startup, energize exhaust fan motor. Interlock to makeup air system (whether dedicated makeup air or makeup air from HVAC system), so that makeup air is provided whenever exhaust fan is running.
The exhaust fan shall run continuously at constant speed. Provide a current transducer to prove fan operation. At shutdown, the exhaust fan shall stop. When exhaust fan is off, supply fan shall be off.
Provide all controls and wiring for complete interlock and operation of Kitchen Hood, exhaust fan, makeup air unit supply fan and all associated motor dampers.

Kitchen Hood Exhaust Fan (Type II)
Provide heat detector in hood collar interlocked to fan operation.
The Kitchen Hood exhaust system shall be initiated by the heat detector. Provide indicator light on face of hood. At startup, energize exhaust fan motor. Interlock to makeup air system (whether dedicated makeup air or makeup air from HVAC system), so that makeup air is provided whenever exhaust fan is running.
The exhaust fan shall run continuously at constant speed. Provide a current transducer to prove fan operation. At shutdown, the exhaust fan shall stop. When exhaust fan is off, supply fan shall be off.
Provide all controls and wiring for complete interlock and operation of Kitchen Hood, exhaust fan, makeup air unit supply fan and all associated motor dampers.

Controls
Electrical contractor will provide power wiring. HVAC contractor shall provide all the low voltage wiring of HVAC units and controls, thermostats and controllers.
Thermostat shall be by the manufacturer of the HVAC unit (heat/cool/auto/off) with night setback. Provide plastic protective cover for all thermostats.

Low Voltage Thermostats
Low voltage thermostats shall be furnished, installed and wired by the HVAC contractor. The electrical contractor shall provide 4" square x 1- 1/2" deep wall outlet boxes (with single-gang rings) for all thermostats/sensors. The electrical contractor shall provide one 3/4" empty conduit from each thermostat/sensor location, turned out above accessible ceilings (in joist space or against overhead slab/deck). The HVAC/Temperature Control Contractor shall provide all other necessary conduit, raceway and wiring related work. Conduit shall be identified in ceiling cavity and shall be provided with sweep bends, bushings and dragline.
The HVAC/Temperature Control Contractor shall coordinate with the General Contractor to ensure thermal envelope is maintained at these locations.

General Control Wiring Requirements and Installation Methods
Except where specifically indicated otherwise above, the HVAC/Temperature Control Contractor shall provide all electrical work as required for all temperature control related wiring (i.e. conduit, raceway, outlet boxes, junction boxes, wiring, etc.) in accordance with Electrical Specifications requirements. All conduit shall be 3/4" minimum.
Coordinate all thermostat/sensor locations in field (case by case) with Architect, Owner and Electrical Contractor to ensure that they are placed in locations that will not interfere with furniture, equipment, artwork, wall-hung specialties, room finishes, etc. All thermostat/sensor wall locations indicated on HVAC drawings are schematic only and must be verified case-by-case prior to rough-in.
All electrical work as described in this specification shall be per the latest edition of the National Electrical Code (NEC) and per applicable state and local codes.
Where "free-air" installation methods (either exposed above the ceilings, in bridle rings or in cable trays) are permitted under Electrical Specifications above ceilings, provide plenum-rated cables wherever plenum ceilings (if any) exist and install as defined under Electrical Specifications. Install low voltage circuits, located in concrete slabs and masonry walls, in inaccessible locations, or exposed in occupied areas, in electrical conduit regardless of what wiring methods are permitted under Electrical Specifications.
Where cable trays or bridle rings are provided by the electrical contractor for low voltage cables, these raceways may be utilized for control wiring by this contractor (provide special color coded jackets, label cable jackets per Electrical Specifications and group control wiring cables together). Provide conduit drops from cable tray/bridle ring paths to wall outlet boxes and equipment unless directed otherwise under Electrical Specifications.
Regardless of permitted methods in Electrical Specifications, all cables/wiring installed concealed by gypsum board, masonry or other inaccessible materials in walls or above ceilings shall be installed in conduit, 3/4" minimum.
All conduit, bridle rings, raceway, outlet boxes, etc. necessary for complete operational installation of control wiring shall be provided (furnished and installed) by the temperature control contractor in strict compliance with Electrical Specifications documents. Coordinate all work with all other applicable trades including the electrical contractor.
Provide all required conduit work to and between equipment in a manner compliant with that described above (i.e. between VAV boxes, to boilers, starters, condensing units, etc. as applicable).
Install control wiring without splices between terminal points, color-coded. Install in neat workmanlike manner, securely fastened. Install in accordance with National Electrical Code and per Electrical Specifications.
Install circuits over 25 volt with color-coded No. 12 wire in electrical metallic tubing, per Electrical Specifications.
Install circuits under 25 volt with color-coded No. 18 wire with 0.031" high temperature (105 degs. F) plastic insulation on each conductor and plastic sheath over all.
Install electronic circuits with color-coded No. 22 wire with 0.023" polyethylene insulation on each conductor with plastic-jacketed copper shield over all.

Smoke Detector
All duct smoke detectors will be furnished by electrical contractor, installed by the HVAC contractor, and wired by the electrical contractor per local codes. HVAC contractor will interlock fan with smoke detector.

Motor Operated Dampers
All fresh air intakes and exhaust louvers shall have motor operated dampers. Dampers shall be low leak with blade and edge seals. All motor operated dampers shall be provided and wired by the mechanical contractor unless otherwise noted. Provide all necessary transformers, contactors, controls and wiring for interlocking equipment to motor operated dampers.

SECTION 23 31 13.00 – METAL DUCTS

Submittal Requirements
Product Data: For liners, adhesives, sealants and gaskets.
Shop Drawings: Sheet metal thickness, reinforcing details, duct layouts indicating sizes, configuration, liner material, elevation and static pressure class.

Ductwork Materials
Exposed Ductwork Materials: Where ductwork is indicated to be exposed to view in occupied spaces, provide materials which are free from visual imperfections including pitting, seam marks, roller marks, stains and discolorations, and other imperfections, including those which would impair painting. Mechanical contractor shall confirm ductwork paint scope and color with architect.
Exposed ductwork which is to be painted shall have paint grip applied and be oil free.
Sheet Metal: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel, lock forming quality; with G 90 zinc coating and mill phosphatized for exposed locations. Minimum gauge shall be 24.
Miscellaneous Ductwork Materials
Volume Dampers: Provide volume dampers in all branch ducts or as required for balancing to required air flows.
Fittings: Provide radius type fittings fabricated of multiple sections with maximum 15 deg. change of direction per section. Unless specifically detailed otherwise, use 45 deg. laterals and 45 deg. elbows for branch takeoff connections. Where 90 deg. branches are indicated, provide conical type tees.
Duct Sealant: Non-hardening, non-migrating mastic or liquid elastic sealant, type applicable for fabrication/installation detail, as compounded and recommended by manufacturer specifically for sealing joints and seams in ductwork.
Duct Cement: Non-hardening migrating mastic or liquid neoprene based cement, type applicable for fabrication/installation detail, as compounded and recommended by manufacturer specifically for cementing fitting components, or longitudinal seams in ductwork.
Ductwork Support Materials: Except as otherwise indicated, provide hot-dipped galvanized steel fasteners, anchors, rods, straps, trim and angles for support of ductwork.
Flexible Ducts
Either spiral-wound spring steel with flameproof vinyl sheathing, or corrugated aluminum. Unless specifically mentioned, the maximum length of flex duct on the supply equals 5 feet. Flex is not allowed for return, relief or exhaust applications. The flexible ducts indicated for use in the H.V.A.C. system shall conform to the requirements of UL 181 for Class 0 or Class 1 flexible air ducts and shall be so identified.
Where installed in unconditioned spaces other than return air plenums, provide 1" thick 1-1/2 lb. continuous flexible fiberglass sheath with vinyl vapor barrier jacket.
Installation is not permitted above drywall ceilings and inaccessible ceilings.
Fabrication
Shop fabricate ductwork in 4, 8, 10 or 12-ft lengths, unless otherwise indicated or required to complete runs. All ductwork shall be Pittsburgh Construction with a minimum of thickness of 24 gauge. In addition, ductwork used in systems over 3" W.G. shall have cold sealant applied. Shop fabricate ductwork of gauges and reinforcement

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Revisions:

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NO.	DATE	BY	DESCRIPTION

FIRST WATCH
THE DAYTIME CAFE

FERN CREEK
LOUISVILLE, KY

Project No. 220521
KLH Project No. 24514
Issue Date Issue Date

Title
MECHANICAL SPECIFICATIONS

Sheet
M601

complying with SMACNA "HVAC Duct Construction Standards".
Lined Duct
Fabricate ductwork with duct liner in each section of duct where indicated. Laminate liner to internal surfaces of duct in accordance with instructions by manufacturers of lining and adhesive, and fasten with mechanical fasteners. Duct liner to be 3-lb density for acoustic requirements 1" thick or as noted. Size of ductwork shown on the drawings is free net area, outside dimension of ducts will need to be increased if lined duct is used.
Size of ductwork shown on the drawings is free net area, outside dimension of ducts will need to be increased if lined duct is used.
Duct Liner: Fibrous glass of thickness indicated. 3-lb density. All liners, insulation and adhesives shall have a flame spread index not more than 25 and a smoke developed index of not more than 50.
Duct Liner Adhesive: As recommended by insulation manufacturer and complying with NFPA 90A or NFPA 90B.
Duct Liner Fasteners: Comply with SMACNA HVAC Duct Construction Standards.
Double Wall Ducts
Exposed round and rectangular ductwork and fittings shall be manufactured or shop-fabricated double wall a minimum G-90 galvanized steel ductwork with 1" fiberglass insulation between the solid outer shell and perforated inner liner. All ducts and fittings shall be construction for SMACNA's latest standards. All gaskets shall be UL listed to conform to ASTM E84-91a and NFPA 90A.
Manufacturers: Subject to compliance with requirements, provide ductwork of one of the following: United-McGills K-27, Lindab Safe, Semco or approved equal.
Installation of Metal Ductwork
General: Assemble and install ductwork in accordance with recognized industry practices which will achieve air-tight (5% leakage for systems rated 3" and under; 1% for systems rated over 3") and noiseless (no objectionable noise) systems, capable of performing each indicated service. Install each run with minimum number of joints. Align ductwork accurately at connections, within 1/8" misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers and anchors of type which will hold ducts true-to-shape and to prevent buckling. Support vertical ducts at every floor.
Sealing: Seal all longitudinal seams, S's and drives and all joints with mastic or cement. Install according to SMACNA standards.
Balancing Dampers: The sheet metal contractor shall be fully responsible for installing balancing dampers in the ductwork, (whether shown on the drawing or not) in order to arrive at the intended air flow. The balancing sub-contractor shall provide direction and assistance in determining locations where dampers are required. Additional dampers, if required shall be installed at no additional cost to the owner.
Wall Penetrations: Seal and pack around all ducts and piping sleeves which pass through walls that extend to bottom side of structure and rated walls.
Field Fabrication: Complete fabrication of work at project as necessary to match shop-fabricated work and accommodate installation requirements.
Routing: Locate ductwork runs, except as otherwise indicated, vertically and horizontally and avoid diagonal runs wherever possible. Run ductwork in shortest route which does not obstruct useable space or block access for servicing building and its equipment. Hold ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building. Limit clearance to 1/2" where furring is shown for enclosure or concealment of ducts, but allow for insulation thickness, if any. Where possible, locate insulated ductwork for 1" clearance outside of insulation. Wherever possible in finished and occupied spaces, conceal ductwork from view, by locating in mechanical shafts, hollow wall construction or above suspended ceilings. Do not encase horizontal runs in solid partitions, except as specifically shown.
Coordinate layout with suspended ceiling and lighting layouts and similar finished work.
Electrical Equipment Spaces: Do not route ductwork through transformer vaults and their electrical equipment spaces and enclosures.
Penetrations: Where ducts pass through interior partitions and exterior walls, and are exposed to view, conceal space between construction opening and duct or duct insulation with sheet metal flanges of same gage as duct. Overlap opening on 4 sides by at least 1-1/2". Fasten to duct and substrate.
All dampers shall be low leakage with edge and blade seals. Damper manufacturers are subject to specification compliance. Provide products by one of the following:
Greenheck Fan Corporation
Nailor Industries
Ruskin Company
Young Regulator Company
Coordination: Coordinate duct installations with installation of accessories, dampers, coil frames, equipment, controls and other associated work of ductwork system.
Installation of Duct Liner
General: Install duct liner in accordance with SMACNA HVAC Duct Construction Standards. Size of ductwork shown on the drawings is free net area, outside dimension of ducts will need to be increased if lined duct is used.
Store internally lined ductwork up off of the floor. Protect internally lined ductwork from water and dust.
The following ductwork shall be lined in addition to that shown per plans:
Return from open ceiling plenum return to HVAC unit.
Supply and return ductwork 10 feet downstream of HVAC unit.
Transfer air ducts.
Butter the leading edge of all internal duct lining with the manufacturer's recommended adhesive.
Inspect and repair all damaged lining prior to installation of ductwork.
Installation of Flexible Ducts
Maximum Length: For any duct run using flexible ductwork, do not exceed 5' - 0" extended length.
Installation shall have smooth full radius turns down to diffuser.
Installation not permitted above inaccessible ceilings.

23 34 23.00 – HVAC POWER VENTILATORS

Submittal Requirements
Product Data: For each type of product indicated.
Centrifugal Roof Ventilators
Provide centrifugal roof type, curb mounted, power ventilators of type, size, and capacity as scheduled, and as specified herein.
Type: Centrifugal fan, direct or belt driven as scheduled.
Provide aluminum, galvanized steel, or fiberglass weatherproof housings as scheduled. Provide square base to suit roof curb. Provide permanent split-capacitor type motor for direct driven fans; capacitor-start, induction-run type motor for belt driven fans.
Provide the Following Types of Housing Design:
Hooded dome type.
Electrical: Provide factory-wired non-fusible type disconnect switch at motor in fan housing. Provide thermal overload protection in fan motor. Provide conduit chase within unit for electrical connection.
Provide NEMA 1 disconnect factory mounted. For single phase fractional HP fans use a toggle type disconnect switch. On three phase integral HP fans use a NEMA 1 safety switch.
Bird Screens: Provide removable bird screens, 1/2" mesh, 16-ga aluminum or brass wire.
Roof Curb: Provide factory fabricated roof curb by the same manufacturer as the equipment. Roof curb to be insulated.
Manufacturer: Subject to compliance with requirements, provide centrifugal roof ventilators of one of the following:
Acme
CaptiveAire
Cook (Loren) Co.
Greenheck.
Twin City Fan & Blower
Prefabricated Roof Curbs
General: Provide manufacturer's standard shop-fabricated units, modified if necessary to comply with requirements.
Fabricate structural framing for units of structural quality sheet steel, formed to manufacturer's standard profiles for coordination with roofing, insulation and deck construction. Include 45 deg. cant strips and deck flanges with offsets to accommodate roof insulation. Weld corners and seams to form watertight units.
Clean and paint units with manufacturer's standard rust-inhibitive metal primer paint.
Reinforce continuous runs of over 3'-0" length, by inserting welded stiffeners of heavy gage with flanges as required to provide sufficient rigidity and strength to withstand maximum lateral forces in addition to superimposed vertical loads.
Sloping Roof Decks: For deck slopes of 1/4" per foot and more, fabricate support units to form level top edge.
Gage and Height: Fabricate units of metal gage and to height above roof surface as indicated.
Where gage or height are not indicated, fabricate units of 14-ga metal, and nominal height of 14".
Provide pressure treated wood nailer, not less than 1-5/8" thick and of width indicated, but not less than width of support wall assembly. Anchor nailer securely to top of metal frame unit.
Provide lumber pressure treated with water-borne preservatives for "above ground" use.
Insulate units inside structural support wall with rigid glass fiber insulation board of approximately 3-lb. density and 1-1/2" minimum thickness, except as otherwise indicated.
Manufacturer: Subject to compliance with requirements, provide prefabricated roof curbs of one of the following:
Custom Curb, Inc.
Equipment Manufacturer.
MicroMetl
Pate Co.
Shipman.
Thycurb.
INSTALLATION
Coordinate ventilator work with work of roofing, walls, and ceilings, as necessary for proper interfacing.
Provide access door in duct below ventilator to service damper.
Solder bottom joints and up 2" on side joints of duct under roof ventilator to retain any moisture entering ventilator.

23 37 13.00 – DIFFUSERS, REGISTERS AND LOUVERS

Submittal Requirements
Product Data: For each type of product indicated.

DIFFUSERS, GRILLES AND REGISTERS
Manufacturer: Subject to compliance with requirements, provide diffusers of one of the following:
Anemostat Products Div., Dynamics Corp. of America.
Metal-Aire
Titus Products Div., Philips Industries, Inc.
Tuttle and Bailey.
Price
Louvers and dampers
Provide louvers and dampers of size as noted.
Manufacturer: Subject to compliance with requirements, provide diffusers of one of the following:
Aerolite
Prefco
Greenheck
Ruskin

23 38 13.00 – COMMERCIAL KITCHEN HOODS AND DUCTWORK

Submittal Requirements
Product Data: For each type of product indicated.
Type 1 Commercial Kitchen Hood
Refer to food service drawings for equipment furnished by food service vendor.
Type 1 Kitchen Exhaust Ductwork
General: Fabricate kitchen exhaust ducts and supports, used for smoke and vapor removal from cooking equipment, of 16-ga minimum galvanized steel or black iron where concealed, and of 18-ga minimum stainless steel where exposed. For duct construction, comply with SMACNA "HVAC Duct Construction Standards", and NFPA 96 "Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment".
Provide flexible fire resistive duct enclosure/wrap per ASTM E2336. Insulation shall be a lightweight non-asbestos, high temperature, inorganic, ceramic fiber blanket totally encapsulated in foil/scrim having a service temperature range up to 2000 degrees F. Insulation is a 2 hour fire resistive rated grease air duct enclosure as a shaft alternative and a method for providing zero inch clearances around commercial kitchen grease duct exhaust systems to combustible materials. Provide 2 layers of insulation per code. Insulate with two (2) layers of 1-1/2" thickness foil encapsulated fire resistive duct wrap, total thickness is 3". Install with 1" high performance filament and 3" aluminum foil tape to seal blanket edges. Provide 304 Carbon Steel banding for 2 hour ratings, steel angle opening frame, 16 gage access cover, ¼" diameter thread rods 5 " long and fire stop materials. Install according to manufacturer's installation instructions.
For access doors that are part of the tested enclosure system in kitchen grease exhaust duct, FireMaster F2-HT-XL3 Access doors are and acceptable.
Provide a manual reset fire stat mounted in the exhaust duct above the hood for automatic shutdown of hood exhaust fan. Wiring by electrical contractor.
Type 2 Dishwasher Exhaust Ducts
General: Fabricate dishwasher exhaust ducts and supports, used for vapor removal, of 22-ga minimum stainless steel. For duct construction, comply with SMACNA "HVAC Duct Construction Standards". Ducts shall be welded, and pitched back to dishwasher.
Kitchen Exhaust Fan
Refer to food service drawings for equipment furnished by food service vendor.
Type 2 Commercial Dishwasher Hood
Refer to food service drawings for equipment furnished by food service vendor.
Dishwasher Exhaust Fan
Refer to food service drawings for equipment furnished by food service vendor.
Makeup Air Unit
Refer to food service drawings for equipment furnished by food service vendor.
Fire Protection System
Refer to food service drawings for equipment furnished by food service vendor.
Inspection
Installation of Type 1 Kitchen Exhaust Ducts
General: Fabricate joints and seams with continuous welds for watertight construction. Provide for thermal expansion of ductwork through 2000 deg. F temperature range. Install without dips or traps which may collect residues, except where traps have continuous or automatic residue removal. Provide access openings at duct connection to hood and at each change in direction, located on sides of duct 1-1/2" minimum from bottom, and fitted with grease-tight covers of same material as duct.
Installation of Type 2 Dishwasher Exhaust Ducts
General: Fabricate joints and seams with continuous welds for watertight construction. Install without dips or traps, which may collect residues, pitch towards dishwasher.
Field Quality Control
Testing: After installation of Hood exhaust system has been completed, test each system to demonstrate proper operation of units at performance requirements specified. When possible, field correct malfunctioning units, then retest to demonstrate compliance. Replace units which cannot be satisfactorily corrected.
Provide testing, permits and approvals as required by state and local authorities.
Adjusting and Cleaning
Clean factory-finished surfaces.
Repair any marred or scratched surfaces.
Inspection
Installation
Coordinate work with work of roofing, walls, and ceilings, as necessary for proper interfacing.
Duct connections to be provided by the HVAC contractor.
The termination of kitchen exhaust outlets shall not be less than 10 feet horizontally from parts of the same or contiguous buildings, adjacent property lines and air intakes.
Outlet shall not be less than 10 feet vertically above adjoining grade level.
Ensure that rotation is in direction indicated and intended for proper performance.
Do not proceed with centrifugal fan start-up until wiring installation is acceptable to fan Installer.

23 74 33.00 – PACKAGED OUTDOOR ROOFTOP UNITS

Submittal Requirements
Product Data: For each type of product indicated.

Warranty
Warranty on Compressor and Heat Exchanger: Provide written warranty, signed by manufacturer, agreeing to replace/repair, within warranty period, compressors and heat exchangers with inadequate and defective materials and workmanship, including leakage, breakage, improper assembly, or failure to perform as required; provided manufacturer's instructions for handling, installing, protecting, and maintaining units have been adhered to during warranty period. Replacement is limited to component replacement only, and does not include labor for removal and reinstallation.
Warranty Period: 5 years from date of owner acceptance.

STAGED VOLUME
General: Rooftop unit shall be factory-assembled and tested, designed for roof or slab installation and, consisting of compressors, condensers, evaporator coils, condenser and evaporator fans, refrigeration and temperature controls, filters, and dampers. Capacities and electrical characteristics are scheduled. Casing manufacturer's standard casing construction, having corrosion protection coating, and exterior finish. Casings shall have removable panels or access doors for inspection and access to internal parts, a minimum of 1" thick thermal insulation, knockouts for electrical and piping connections, and an exterior condensate drain connection, and lifting lugs.
Roof Curbs: Manufacturer's standard construction, insulated and having corrosive protective coating, complete with factory-installed wood nailer and drain nipple. Construction shall be in accordance with NRCA Standards.
Evaporator Fans: Forward-curved, centrifugal, belt-driven fans with adjustable sheaves; and permanently lubricated motor bearings.
Condenser fans: Propeller-type, direct-driven fans with permanently lubricated bearings.
Coils: Aluminum plate fin and seamless copper tube type. Fins shall have collars drawn, belled and firmly bonded to the tubes by means of mechanical expansion of the tubes. No soldering or tinning shall be used in the bonding process. Coils shall have a galvanized steel casing. Coils shall be mounted in the coil casing with same end connections accessible for service. Coils shall be removable from the unit through the roof or through the piping enclosure. Coil section shall be completely insulated.
Refrigerant cooling coils: have an equalizing type vertical distributor to ensure each coil circuit receives the same amount of refrigerant. Coils shall be proof (450 psig) and leak (300 psig) tested with air pressure under water, then cleaned, dehydrated, and sealed with a holding charge of nitrogen.
Condensate Pan: Provide IAQ steel, double sloping drain pain. Provide high condensate in primary condensate pan to de-energize unit upon detection of high condensate levels.
Compressors: Serviceable, semi-hermetic, or hermetic compressors with integral vibration isolators, and crankcase heaters, which de-energize during compressor operation. Units shall also have:
Lead compressor shall be 2-stage.

Safety Controls:
low pressure cutout, manual reset;
high pressure cutout, manual reset;
compressor motor overload protection, manual reset;
anti-recycling timing device;
adjustable low-ambient lockout;
oil pressure switch.
Controls:
redundant gas valves;
intermittent pilot ignition;
electronic spark ignition system;
high limit cutout;
forced draft proving switch;
flame roll-out switch.
Enthalpy Economizer Control:
Provide dual enthalpy economizer control. Provide return and outside air dampers, outside air filter, fully modulating electric control system with dry control, and adjustable mixed-air thermostat. System shall be capable of driving 100% closed for unoccupied mode, minimum outside air position and modulation to 100 percent open outside air capability. Provide automatic changeover through adjustable control device.
Heating Types:
Heat exchangers: Provide manufacturer's construction of aluminized steel gas-fired heat exchangers and burners, designed for minimum of 2-stage operation. Provide single gas connection.
Temperature Control:
Temperature control: factory-installed, demand-oriented solid-state control system above 5 tons shall have minimum of 2 cooling steps and 2 heating steps. Controls shall include solid-state thermostats with dead-band, and sub-base with system and fan switches. Other control features include:
Relief:
Power Exhaust Fan – Shall be factory installed for units larger than 5 tons. Shall include relief damper section with mist eliminator. Dampers open to relieve positive pressure within the building. Available only with economizer.
Filters:
Provide air filters to fit in filter box, with a Maximum filter face velocity of 500 fpm, of the following type:
Disposable Type: Provide 30% efficient disposable type air filters 2" thick, consisting of viscous coated fibers with filtering media encased in fiberboard cell sides having perforated metal grids on each side to provide media support.
Options:
Hail guards protecting the condenser fins.
Controls:
Self Contained: Programmable Electronic Night Setback Thermostat - Shall provide heating setback and cooling setup with 7-day, programming capability. Optional remote sensor available.
Manufacturers: Subject to compliance with requirements, provide rooftop units of one of the following:
Aaon
Carrier Air Conditioning, Div of Carrier Corp.
Lennox Industries Inc.
Trane; a division of Ingersoll Rand.
Daikin

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FIRST WATCH
THE DAYTIME CAFE

FERN CREEK

LOUISVILLE, KY

Project No. 220521
KLH Project No. 24514
Issue Date Issue Date

Title
MECHANICAL SPECIFICATIONS

Sheet
M602

COMcheck Software Version 4.1.5.1
Mechanical Compliance Certificate

Project Information

Energy Code:	90.1 (2010) Standard
Project Title:	
Location:	Louisville, Kentucky
Climate Zone:	4a
Project Type:	Alteration

Construction Site:	Owner/Agent:	Designer/Contractor:
		KLH Engineers 1538 Alexandria Pike Fort Thomas, KY 41075

Mechanical Systems List

Quantity	System Type & Description
2	RTU-1,2 Heating: 1 each - Central Furnace, Gas, Capacity = 180 kBtu/h Proposed Efficiency = 82.00% Et, Required Efficiency: 80.00 % Et (or 78% AFUE) Cooling: 1 each - Single Package DX Unit, Capacity = 145 kBtu/h, Air-Cooled Condenser, Air Economizer Proposed Efficiency = 11.00 EER, Required Efficiency: 10.80 EER Fan System: FAN SYSTEM 1 -- Compliance (Motor nameplate HP method) : Passes Fans: FAN 1 Supply, Single-Zone VAV, 4400 CFM, 3.0 motor nameplate hp SYSTEM VERIFICATION REQUIRED.
5	RH-1:5 Heating: 1 each - Radiant Heater, Electric, Capacity = 2 kBtu/h No minimum efficiency requirement applies Fan System: None SYSTEM VERIFICATION REQUIRED.
1	RTU-3 Heating: 1 each - Central Furnace, Gas, Capacity = 180 kBtu/h Proposed Efficiency = 82.00% Et, Required Efficiency: 80.00 % Et (or 78% AFUE) Cooling: 1 each - Single Package DX Unit, Capacity = 125 kBtu/h, Air-Cooled Condenser, Air Economizer Proposed Efficiency = 11.00 EER, Required Efficiency: 11.00 EER Fan System: FAN SYSTEM 2 -- Compliance (Motor nameplate HP method) : Passes Fans: FAN 2 Supply, Single-Zone VAV, 4000 CFM, 2.5 motor nameplate hp SYSTEM VERIFICATION REQUIRED.
2	WH1,2 Gas Instantaneous Water Heater, Capacity: 0 gallons, Input Rating: 199 kBtu/h w/ Circulation Pump No minimum efficiency requirement applies SWH COMPLIANCE REQUIRED.

Mechanical Compliance Statement

Compliance Statement: The proposed mechanical alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 90.1 (2010) Standard requirements in COM*check* Version 4.1.5.1 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Name - Title ____________ Signature ____________ Date ____________

COMcheck Software Version 4.1.5.1
Inspection Checklist

Energy Code: 90.1 (2010) Standard

Requirements: 100.0% were addressed directly in the COM*check* software

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

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
4.2.2,6.4.4.2.1,6.7.2 [PR2][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical systems and equipment and document where exceptions to the standard are claimed. Load calculations per acceptable engineering standards and handbooks.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
4.2.2,7.7.1,10.4.2 [PR3][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the service water heating systems and equipment and document where exceptions to the standard are claimed. Hot water system sized per manufacturer's sizing guide.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
4.2.2,8.4.1.1,8.4.1.2,8.7 [PR6][2]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the electrical systems and equipment and document where exceptions are claimed. Feeder connectors sized in accordance with approved plans and branch circuits sized for maximum drop of 3%.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.7.2.4 [PR5][1]	Detailed instructions for HVAC systems commissioning included on the plans or specifications for projects >=50,000 ft2.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

Additional Comments/Assumptions:

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

Section # & Req.ID	Footing / Foundation Inspection	Complies?	Comments/Assumptions
6.4.3.8 [FO9][3]	Freeze protection and snow/ice melting system sensors for future connection to controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

Additional Comments/Assumptions:

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

Section # & Req.ID	Plumbing Rough-In Inspection	Complies?	Comments/Assumptions
7.4.4.2 [PL3][1]	Automatic time switches installed to automatically switch off the recirculating hot-water system or heat trace.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

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

Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.4.1.4,6.4.1.5 [ME1][2]	HVAC equipment efficiency verified. Non-NAECA HVAC equipment labeled as meeting 90.1.	Efficiency:_____	Efficiency:_____	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Mechanical Systems list for values.*
6.4.3.4.1 [ME3][3]	Stair and elevator shaft vents have motorized dampers that automatically close.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
6.4.3.4.2, 6.4.3.4.3 [ME4][3]	Outdoor air and exhaust systems have motorized dampers that automatically shut when not in use and meet maximum leakage rates. Check gravity dampers where allowed.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.4.3.4.5 [ME39][3]	Enclosed parking garage ventilation has automatic contaminant detection and capacity to stage or modulate fans to 50% or less of design capacity.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
6.4.3.4.4 [ME5][3]	Ventilation fans >0.75 hp have automatic controls to shut off fan when not required.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.4.3.9 [ME6][1]	Demand control ventilation provided for spaces >500 ft2 and >40 people/1000 ft2 occupant density and served by systems with air side economizer, auto modulating outside air damper control, or design airflow >3,000 cfm.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Spaces where the supply airflow rate minus any makeup or outgoing transfer air requirement is less than 1200 cfm.
6.4.3.10 [ME40][2]	Single zone HVAC systems with fan motors >=5 hp have variable airflow controls. Air conditioning equipment with a cooling capacity >=110,000 Btu/h has variable airflow controls.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply. *See the Mechanical Systems list for values.*
6.4.3.10 [ME40][2]	Single zone HVAC systems with fan motors >=5 hp have variable airflow controls. Air conditioning equipment with a cooling capacity >=110,000 Btu/h has variable airflow controls.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply. *See the Mechanical Systems list for values.*
6.4.3.10 [ME40][2]	Single zone HVAC systems with fan motors >=5 hp have variable airflow controls. Air conditioning equipment with a cooling capacity >=110,000 Btu/h has variable airflow controls.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply. *See the Mechanical Systems list for values.*
6.4.4.1.1 [ME7][3]	Insulation exposed to weather protected from damage. Insulation outside of the conditioned space and associated with cooling systems is vapor retardant.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

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

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NO.	DATE	BY	DESCRIPTION

FIRST WATCH
THE DAYTIME CAFE

FERN CREEK

LOUISVILLE, KY

Project No.	220521
KLH Project No.	24514
Issue Date	Issue Date

Title

MECHANICAL ENERGY COMPLIANCE

Sheet

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Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.4.4.1.2 [ME8][2]	HVAC ducts and plenums insulated. Where ducts or plenums are installed in or under a slab, verification may need to occur during Foundation Inspection.	R-____	R-____	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.4.4.1.3 [ME9][2]	HVAC piping insulation thickness. Where piping is installed in or under a slab, verification may need to occur during Foundation Inspection.	____ in.	____ in.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.4.4.1.4 [ME41][3]	Thermally ineffective panel surfaces of sensible heating panels have insulation >= R-3.5.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
6.4.4.2.1 [ME10][3]	Ducts and plenums sealed based on static pressure and location.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.4.4.2.2 [ME11][3]	Ductwork operating >3 in. water column requires air leakage testing.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
6.4.4.2.2 [ME11][3]	Ductwork operating >3 in. water column requires air leakage testing.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
6.4.4.2.2 [ME11][3]	Ductwork operating >3 in. water column requires air leakage testing.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
6.5.1,6.5.1.1,6.5.1.3 [ME12][1]	Air economizers provided where required, meet the requirements for design capacity, control signal, ventilation controls, high-limit shut-off, integrated economizer control, and provide a means to relieve excess outside air during operation.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
6.5.1,6.5.1.1,6.5.1.3 [ME12][1]	Air economizers provided where required, meet the requirements for design capacity, control signal, ventilation controls, high-limit shut-off, integrated economizer control, and provide a means to relieve excess outside air during operation.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
6.5.2.3 [ME19][3]	Dehumidification controls provided to prevent reheating, recooling, mixing of hot and cold airstreams or concurrent heating and cooling of the same airstream.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.5.3.3 [ME42][3]	Multiple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply. *See the Mechanical Systems list for values.*

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

Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.5.3.3 [ME42][3]	Multiple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply. *See the Mechanical Systems list for values.*
6.5.3.3 [ME42][3]	Multiple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply. *See the Mechanical Systems list for values.*
6.5.4.1 [ME25][3]	HVAC pumping systems >10 hp designed for variable fluid flow.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Systems with three or fewer control valves.
6.5.6.1 [ME56][1]	Exhaust air energy recovery on systems meeting Table 6.5.6.1.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
6.5.7.1.1 [ME32][2]	Kitchen hoods >5,000 cfm have make up air >=50% of exhaust air volume.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
6.5.7.1.2 [ME46][3]	Conditioned supply air to space with a kitchen hood shall not exceed the greater of a) supply flow required to meet space heating or cooling, or b) hood exhaust flow minus the available air transfer from available spaces.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.5.7.1.2 [ME46][3]	Conditioned supply air to space with a kitchen hood shall not exceed the greater of a) supply flow required to meet space heating or cooling, or b) hood exhaust flow minus the available air transfer from available spaces.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.5.7.1.5 [ME49][3]	Approved field test used to evaluate design air flow rates and demonstrate proper capture and containment of kitchen exhaust systems.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.5.7.2 [ME33][1]	Fume hoods exhaust systems >=15,000 cfm have VAV hood exhaust and supply systems, direct make-up air or heat recovery.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
6.5.8.1 [ME34][2]	Unenclosed spaces that are heated use only radiant heat.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.5.9 [ME35][1]	Hot gas bypass limited to: <=240 kBtu/h – 50% >240 kBtu/h – 25%			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

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

Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.5.9 [ME35][1]	Hot gas bypass limited to: <=240 kBtu/h – 50% >240 kBtu/h – 25%			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
7.4.2 [ME36][2]	Service water heating equipment meets efficiency requirements.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

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

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
8.4.2 [EL10][2]	At least 50% of all 125 volt 15- and 20-Amp receptacles are controlled by an automatic control device.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
10.4.1 [EL9][2]	Electric motors meet requirements where applicable.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

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

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
6.4.3.1.2 [FI3][3]	Thermostatic controls have a 5 °F deadband.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.4.3.2 [FI20][3]	Temperature controls have setpoint overlap restrictions.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.4.3.3.1 [FI21][3]	HVAC systems equipped with at least one automatic shutdown control.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.4.3.3.2 [FI22][3]	Setback controls allow automatic restart and temporary operation as required for maintenance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.4.3.7 [FI6][3]	When humidification and dehumidification are provided to a zone, simultaneous operation is prohibited.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.7.2.1 [FI7][1]	Furnished HVAC as-built drawings submitted within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.7.2.2 [FI8][3]	Furnished O&M manuals for HVAC systems within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.7.2.3 [FI9][1]	An air and/or hydronic system balancing report is provided for HVAC systems serving zones >5,000 ft2 of conditioned area.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
6.7.2.4 [FI10][3]	HVAC control systems have been tested to ensure proper operation, calibration and adjustment of controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
7.4.4.3 [FI11][3]	Public lavatory faucet water temperature <=110°F.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
7.4.4.4 [FI12][3]	Controls are installed that limit the operation of a recirculation pump installed to maintain temperature of a storage tank.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
10.4.3 [FI24][2]	Elevators are designed with the proper lighting, ventilation power, and standby mode.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

Additional Comments/Assumptions:

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

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

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LOUISVILLE, KY

Project No. 220521
KLH Project No. 24514
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MECHANICAL ENERGY COMPLIANCE

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