

GENERAL MECHANICAL SYMBOLS	
	REVISION NUMBER - SHOWN ON PLANS
	POINT WHERE NEW CONNECTS TO EXISTING
	NUMBER OF DETAIL ON SHEET
	NUMBER OF SHEET WHERE DETAIL APPEARS
	KEYNOTE
	CONTINUATION SYMBOL
	ROOM NAME AND NUMBER
	ITEM TO BE DEMOLISHED
	AREA NOT IN CONTRACT
	PIPE SIZE TAG (DIAMETER)
	ABOVE GROUND PIPING
	PIPE SLOPE TAG
	BELOW GROUND PIPING
	PIPE INVERT ELEVATION TAG
	EXISTING PIPE TAG
	PIPING BEING DEMOLISHED

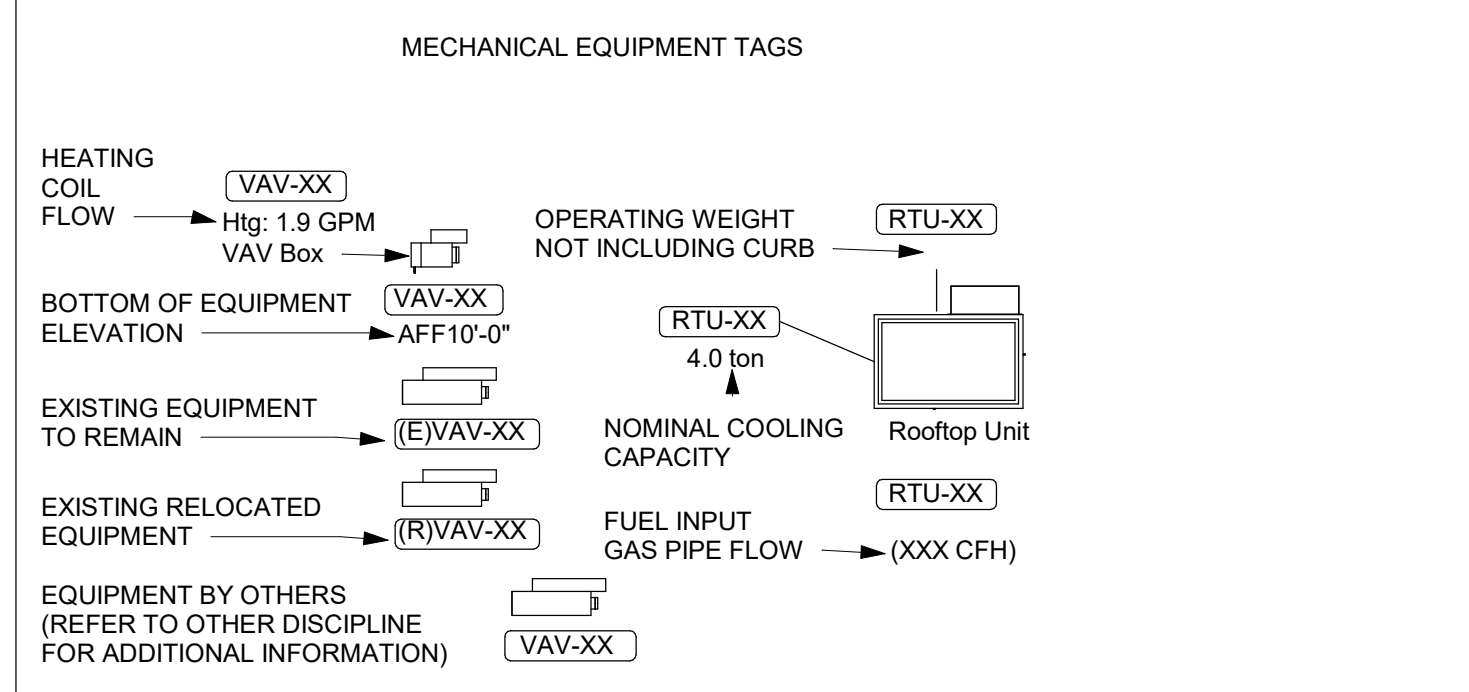
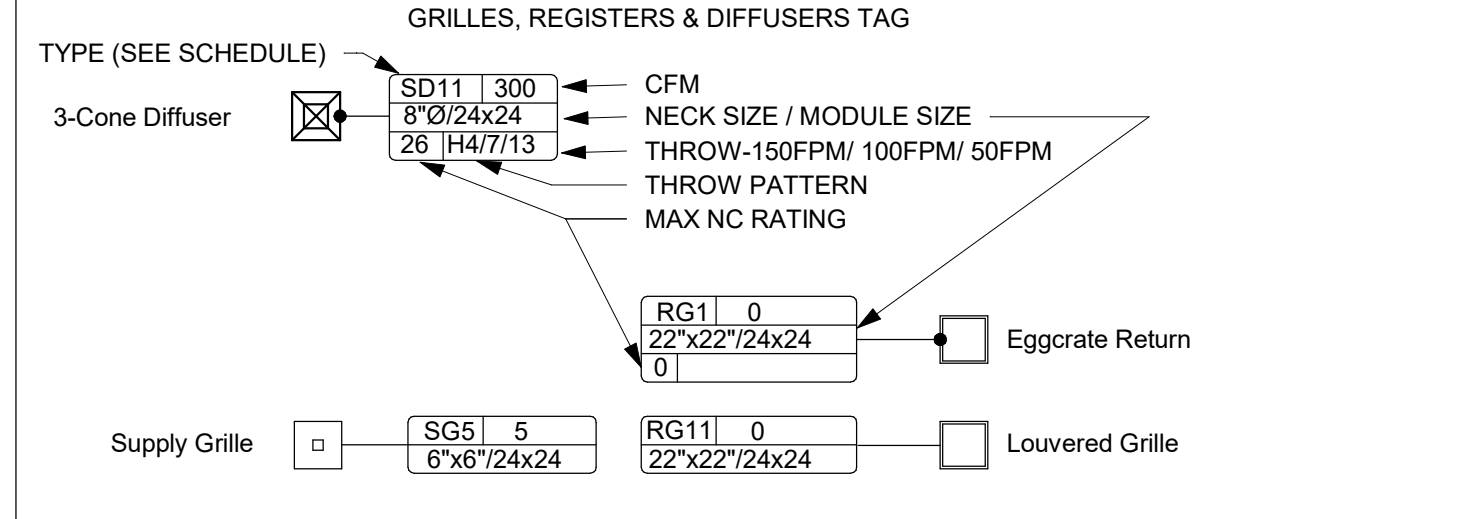
ABBREVIATIONS	
Ø	ROUND
ABV	ABOVE
AC	AIR CONDITIONING
AD	AREA DRAIN
ADD	ADDENDUM
AFF	ABOVE FINISHED FLOOR
AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY
ALT	ALTERNATE
AP	ACCESS PANEL
ARCH	ARCHITECT/ARCHITECTURAL
BFF	BELOW FINISHED FLOOR
BLW	BELOW
BTU	BRITISH THERMAL UNITS
BTUH	BRITISH THERMAL UNITS PER HOUR
CAP	CAPACITY
CB	CATCH BASIN
CFM	CUBIC FEET PER MINUTE
CLG	CEILING
CO	CLEAN OUT
CW	COLD WATER
D	DEGREE
DB	DRY BULB
DIA	DIAMETER
DN	DOWN
DW	DISTILLED WATER
EA	EACH
EAT	ENTERING AIR TEMPERATURE
ELEC	ELECTRICAL
EQUIP	EQUIPMENT
EWC	ELECTRIC WATER COOLER
EWT	ENTERING WATER TEMPERATURE
E/A	EXHAUST AIR
EXIST	EXISTING
F	DEGREES FAHRENHEIT
FCO	FLOOR CLEAN OUT
FD	FLOOR DRAIN
FDC	FIRE DEPARTMENT CONNECTION
FL	FLOOR
FO	FUEL OIL
FOV	FUEL OIL VENT
FOR	FUEL OIL RETURN
FOS	FUEL OIL SUPPLY
FS	FLOOR SINK
FT	FOOT/FEET
FTR	FIN TUBE RADIATION
GAL	GALLON
GF	GAS-FIRED
GC	GENERAL CONTRACTOR
GPM	GALLONS PER MINUTE
GW	GREASE WASTE
HB	HOSE BIB
HP	HORSE POWER
HTG	HEATING
HTR	HEATER
HW	HOT WATER
HYD	HYDRANT
ID	INDIRECT
IN	INCH
INV	INVERT
LB	POUND
LBHR	POUNDS PER HOUR
LAT	LEAVING AIR TEMPERATURE
LP	LOW PRESSURE
LPG	LIQUEFIED PETROLEUM GAS
LVR	LOUVER
LWT	LEAVING WATER TEMPERATURE
M/A	MIXED AIR
MAX	MAXIMUM
MBH	ONE THOUSAND BTU PER HOUR
MCF	ONE THOUSAND CUBIC FEET
MD	MOTORIZED DAMPER
MECH	MECHANICAL
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MTR	MOTOR
MUA	MAKE-UP AIR
NC	NOISE CRITERIA
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NUMBER
NO	NORMALLY OPEN
NTS	NOT TO SCALE
O	OXYGEN
O/A	OUTSIDE AIR
ORD	OVERFLOW ROOF DRAIN
PD	PRESSURE DROP
PV	POST INDICATOR VALVE
PLB	PLUMBING
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH GAUGE
PWR	POWER
R	DUCT RISER
R/A	RETURN AIR
RCP	RADIANT CEILING PANEL
RD	ROOF DRAIN
REC	RECESSED
RED	REDUCER
RH	RELATIVE HUMIDITY
R/A	RELIEF AIR
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
RW	RAIN WATER
SF	SQUARE FOOT
SAN	SANITARY
S/A	SUPPLY AIR
SM	SURFACE MOUNT
SP	STANDPIPE
SP	STATIC PRESSURE
STM	STEAM
T	THERMOSTAT
TD	TEMPERATURE DROP
TDR	TRENCH DRAIN
TEMP	TEMPERATURE
TYP	TYPICAL
UG	UNDERGROUND
VAC	VACUUM
V	VENT
VAV	VARIABLE AIR VOLUME
VENT	VENTILATION
VTR	VENT THROUGH ROOF
W	WASTE
WB	WET BULB
WCO	WALL CLEAN OUT
WH	WALL HYDRANT

EQUIPMENT ABBREVIATIONS	
AC	AIR CONDITIONING UNIT
ACCU	AIR COOLING CONDENSING UNIT
AHU	AIR HANDLING UNIT
AS	AIR SEPARATOR
B	BOILER
CH	CHILLER
CT	COOLING TOWER
CUH	CABINET UNIT HEATER
CHWP	CHILLED WATER PUMP
DBP	DOMESTIC WATER BOOSTER PUMP
DC	DUCT MOUNTED COIL
DCP	DOMESTIC WATER CIRCULATING PUMP
EF	EXHAUST FAN
EDC	ELECTRIC DUCT COIL
ET	EXPANSION TANK
EWB	ELECTRIC WATER HEATER
FCU	FAN COIL UNIT
FP	FIRE PUMP
GI	GREASE INTERCEPTOR
GRV	GRAVITY ROOF VENTILATOR
HWP	HEATING WATER PUMP
HRU	HEAT RECOVERY UNIT
PRV	POWER ROOF VENTILATOR
RE	RETURN/EXHAUST FAN
RTU	ROOFTOP UNIT
SP	SUMP PUMP
UH	UNIT HEATER
WH	WATER HEATER

NOTE
ALL OF GENERAL NOTES ON THIS SHEET ARE TO BE APPLIED TO ALL OTHER DRAWINGS IN THIS SET. THE SYMBOLS AND ABBREVIATIONS SHOWN ON THIS SHEET MAY OR MAY NOT BE USED IN THIS SET OF DRAWINGS.

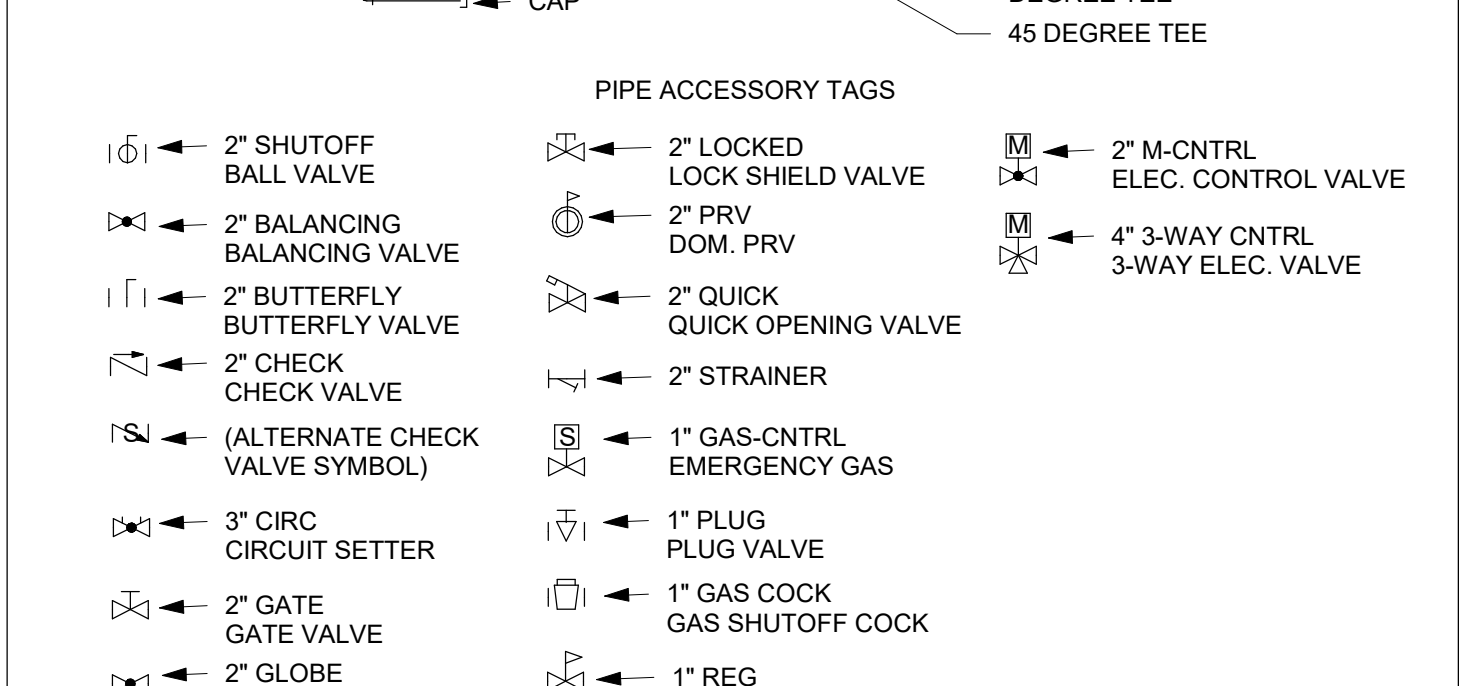
HVAC SYMBOLS	
	SQUARE DUCT SIZE TAG (WIDTH x HEIGHT)
	OVAL DUCT SIZE TAG (WIDTH / HEIGHT)
	ROUND DUCT SIZE TAG (DIAMETER)
	EXISTING DUCT TAG
	DUCT BEING DEMOLISHED
	SUPPLY AIR
	CONDITIONED OUTSIDE AIR
	OUTSIDE AIR
	RETURN AIR
	TRANSFER AIR
	EXHAUST AIR
	RELIEF AIR
	GREASE EXHAUST AIR
	CONDENSATE EXHAUST AIR
	SMOKE EXHAUST AIR
	EXHAUST GAS FLUE
	COMBUSTION AIR

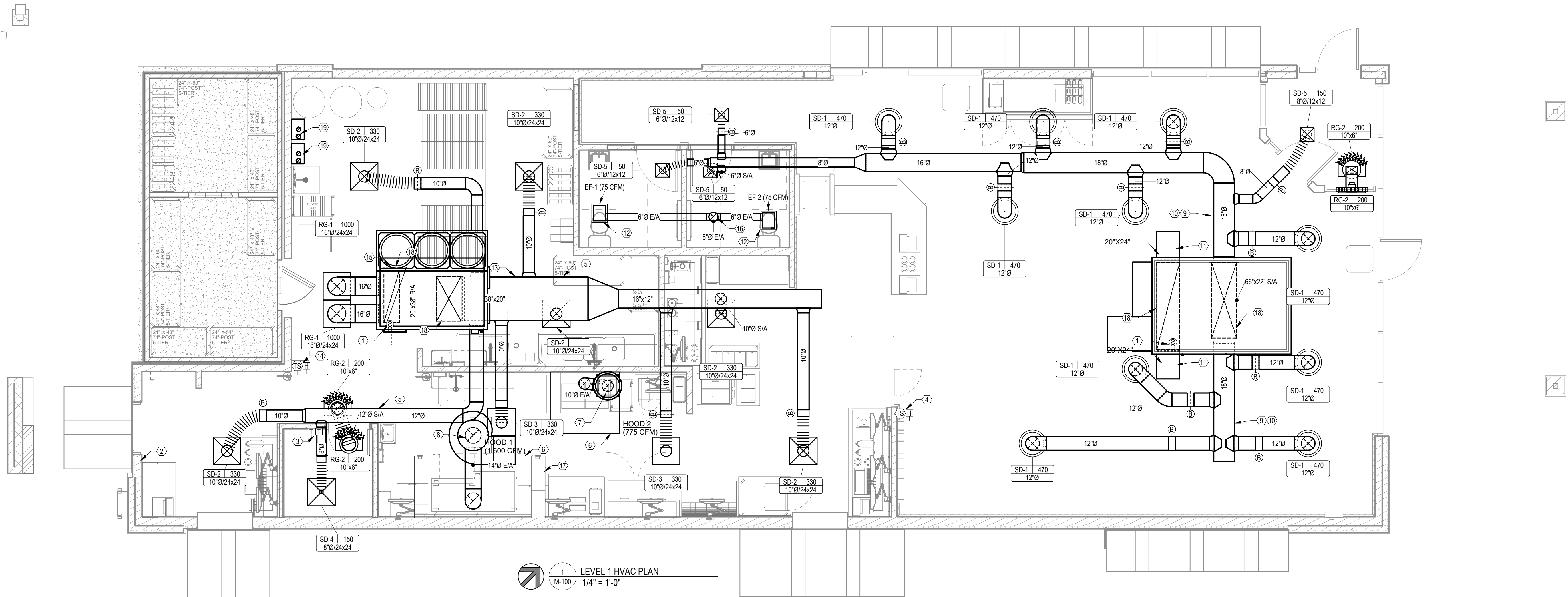
	RECTANGULAR SUPPLY/OUTSIDE AIR DUCT RISE
	ROUND SUPPLY/OUTSIDE AIR DUCT RISE
	RECTANGULAR RETURN/TRANSFER AIR DUCT RISE
	ROUND RETURN/TRANSFER AIR DUCT RISE
	RECTANGULAR EXHAUST/RELIEF AIR DUCT RISE
	ROUND EXHAUST/RELIEF AIR DUCT RISE



DAMPER TAGS	
	Smoke Damper
	Fire Damper
	Comb. Fire/Smoke Damper
	Manual Damper
	Motorized Damper
	Backdraft Damper

PIPING SYMBOLS	
	CHILLED WATER RETURN
	CHILLED WATER SUPPLY
	CONDENSATE DRAINAGE
	CONDENSER WATER RETURN
	CONDENSER WATER SUPPLY
	GEO THERMAL WATER RETURN
	GEO THERMAL WATER SUPPLY
	HEATING WATER RETURN
	HEATING WATER SUPPLY
	NATURAL GAS
	PROPANE GAS
	REFRIGERANT LIQUID
	REFRIGERANT SUCTION
	REFRIGERANT HOT GAS
	STEAM
	CONDENSATE RETURN





OUTDOOR AIR CALCULATIONS

UNIT	Area (sqft)	OCCUPANCY CLASSIFICATION	Occupant Density #/1000 sqft	People outdoor airflow rate in breathing zone, (ft³) cfm/person	Area outdoor airflow rate in breathing zone, (ft³) cfm/sqft	Exhaust airflow rate cfm/sqft	Breathing zone outdoor airflow (ft³) cfm	Zone air distribution effectiveness (Ed)	Zone outdoor airflow (cfm)	
RTU-1	1100	Dining rooms	70	7.5	0.15		776	0.8	621	
	150	Corridors	0	0	0.06		9	0.8	11	
									Total	631

AIR BALANCE SCHEDULE

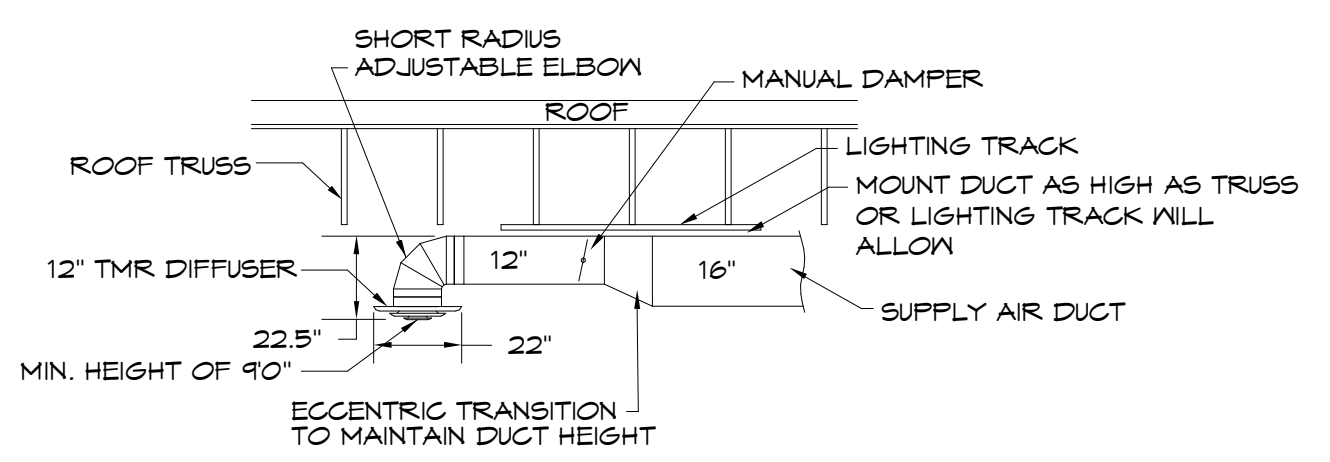
SUPPLY AIR UNIT	OUTSIDE AIRFLOW (CFM)	RETURN AIRFLOW (CFM)	SUPPLY AIRFLOW (CFM)	OA/SA %	EXHAUST AIR UNIT	EXHAUST AIRFLOW (CFM)			
RTU-1	981	4,019	5,000	19.6%	KEF-1	1600			
DOAS-1	2,650	0	2,650	100.0%	KEF-2	775			
					KEF-3	525			
					EF-1, EF-2	150			
TOTAL				3,631	4,019	7,650	47.46%	TOTAL	3,050
								RESULTING BUILDING PRESSURIZATION	581 CFM

THE BUILDING HVAC SYSTEM SHALL BE BALANCED BY NATIONAL TAB HIRED BY THE OWNER. CONTACT Dan Hertenstein - National TAB at: 816-215-1543 - DAN@NATIONALTAB.COM

THE RTU SUPPLY FANS SHALL OPERATE IN SINGLE ZONE VAV MODE WITH 2 STAGES OF FAN CONTROL. LOW SPEED SHALL BE USED DURING PERIODS OF LOW COOLING LOAD AND VENTILATION ONLY OPERATION PER 2019 IECC REQUIREMENTS.

THE ECONOMIZER DAMPERS SHALL HAVE TWO POSITIONS DEPENDENT ON THE FAN SPEED TO MAINTAIN CONSTANT OUTDOOR AIR VOLUME AND BUILDING PRESSURE. REFER TO THE BUILDING AIR BALANCE SCHEDULE ON SHEET M2.

THE UNIT SHALL HAVE ITS FRESH AIR HEATING OPTION ENABLED TO HEAT VENTILATION AIR TO A NEUTRAL VALUE DURING COLD WEATHER OPERATION. REFER TO THE MANUFACTURERS PROGRAMMING DOCUMENTATION FOR SETUP INSTRUCTIONS.



- KEYNOTES**
- LOCATION OF FACTORY DUCT MOUNTED SMOKE DETECTOR IN RETURN OF RTU. PROVIDE REMOTE ENUNCIATOR AUDIOVISUAL. VERIFY LOCATION WITH FIRE MARSHAL PRIOR TO INSTALLATION. REFER TO SPEC SHEET M101 FOR ADDITIONAL INFORMATION.
 - LOCATION OF MANUAL PULL STATION. INSTALL PER THE MANUFACTURERS REQUIREMENTS.
 - LOCATION OF RTU DOAS THERMOSTATS. GO TO LABEL EACH THERMOSTAT.
 - LOCATION OF RTU TEMPERATURE SENSOR AND HUMIDISTAT MOUNTED AT 7'-0".
 - ALL KITCHEN DUCTWORK IS INTENDED TO BE ROUTED THROUGH OR BETWEEN TRUSSES. COORDINATE EXACT ROUTING WITH TRUSSES DURING INSTALLATION.
 - EXHAUST HOOD PROVIDED BY OTHERS. INSTALLED BY THIS CONTRACTOR PER THE MANUFACTURERS INSTRUCTIONS.
 - TRANSITION AND CONNECT 10" DIAMETER GREASE DUCT TO EXHAUST HOOD. ROUTE DUCT UP AND CONNECT TO EXHAUST FAN. OFFSET AS NECESSARY TO MISS ROOF STRUCTURE. AND TO MAINTAIN 10" CLEARANCE FROM ALL OUTDOOR AIR INTAKES AND 5'-0" FROM PARAPET WALLS. ALL GREASE DUCT IS TO BE INSTALLED WITH DUCT WRAP AS DETAILED AND PER THE MANUFACTURERS REQUIREMENTS FOR 0" CLEARANCE TO COMBUSTIBLES. REFER TO ROOF PLAN M-101 FOR CONTINUATION.
 - TRANSITION AND CONNECT 14" DIAMETER GREASE DUCT TO EXHAUST HOOD. ROUTE DUCT UP AND CONNECT TO EXHAUST FAN. OFFSET AS NECESSARY TO MISS ROOF STRUCTURE. AND TO MAINTAIN 10" CLEARANCE FROM ALL OUTDOOR AIR INTAKES AND 5'-0" FROM PARAPET WALLS. ALL GREASE DUCT IS TO BE INSTALLED WITH DUCT WRAP AND ACCESS DOORS AS DETAILED AND PER THE MANUFACTURERS REQUIREMENTS FOR 0" CLEARANCE TO COMBUSTIBLES. REFER TO ROOF PLAN M-101 FOR CONTINUATION.
 - COORDINATE DUCT ROUTING WITH LIGHTING. REFER TO SHEET E200.
 - EXPOSED DUCTWORK SHALL BE OF PAINTLOCK CONSTRUCTION AND PAINTED PER THE DIRECTION OF ARCHITECT.
 - RETURN AIR DUCT LOCATED BETWEEN ROOF TRUSSES. OPEN END OF DUCTWORK TURNED UP TOWARD STRUCTURE WITH A MINIMUM 6" CLEARANCE TO DECK.
 - SUPPORT EXHAUST FAN FROM STRUCTURE AS REQUIRED BY THE MANUFACTURER.
 - COORDINATE WITH STRUCTURAL TO BLOCK OUT JOISTS AS REQUIRED TO RUN DUCT THROUGH THE STRUCTURE.
 - LOCATION OF REMOTE TEMPERATURE AND HUMIDITY SENSOR FOR DOAS UNIT.
 - RETURN DUCT TO BE ROUTED BETWEEN JOISTS, AS HIGH AS STRUCTURE WILL ALLOW.
 - ROUTE 8" EXHAUST DUCT UP THROUGH ROOF TO ROOF CAP. MAINTAIN 10'-0" CLEARANCE TO ALL OUTDOOR AIR INTAKES.
 - HOOD SHALL BE PROVIDED WITH FACTORY PRE-WIRE PACKAGE AND A PRE-ENGINEERED UL-300 FIRE SUPPRESSION SYSTEM. SEE HOOD DRAWINGS FOR DETAILS.
 - TRANSITION AND CONNECT DUCTWORK TO DUCT DROP WITH FLEXIBLE CONNECTION. COORDINATE WITH STRUCTURAL PLAN AND OFFSET DUCTWORK AS NECESSARY TO FIT BETWEEN JOISTS. REFER TO ROOF PLAN M-101 FOR CONTINUATION.
 - PROVIDE 3" PVC FLUE AND COMBUSTION AIR INTAKE PIPE FOR HOT WATER HEATER THROUGH ROOF. PROVIDE MANUFACTURERS TERMINATION KIT. SEAL PENETRATION WEATHERTIGHT. VERIFY 10'-0" CLEARANCE FROM ALL OUTDOOR AIR INTAKES.

Revisions:

NO.	REVISION	DATE
1	ADDENDUM 02 - BUILDING PERMIT - 09/20/22	

DEDICATED OUTDOOR AIR SYSTEM SUMMARY SCHEDULE

TYPE	MARK	QTY	DOAS / RTU MODEL #	MANUFACTURE R	BLOWER	RETURN AIR	MAX OUTSIDE AIR	TOTAL	WEIGHT	ESP	HP	PH	VOLT	MCA	MOCAP	COOLING INFORMATION				REHEAT INFORMATION				GAS HEAT INFORMATION				REMARKS						
																DB	WB	DB	WB	DB	WB	DB	WB	DB	WB	DB	WB		DB	WB	DB	WB	DB	WB
DOAS	1	1	CASRTU3-130-15-20T-DOAS	CAPTIVE AIRE	15P-3	0 CFM	2650 CFM	2650 CFM	2836 lb	0.500	2.00 hp	3	208 V	76.4 A	80.0 A	83.3 F	76.4 F	83.3 F	76.4 F	48.0 F	45.4 F	264	101.5	18.2	70.0 F	54.8 F	66.6	129.6	146.5	NATURAL	279576 Btu	223662 Btu	69.0 F	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15

- NOTES:**
- INVERTER SCROLL COMPRESSOR WITH INTEGRATED OIL SENSOR. DIGITAL OR STAGED NOT AN APPROVED EQUAL.
 - DIRECT DRIVE PLENUM BLOWER. BELT DRIVEN BLOWERS ARE NOT ACCEPTABLE.
 - INTEGRATED MONITORING VIA CELLULAR CONNECTION BY MANUFACTURER.
 - REFRIGERATION PRESSURE MONITORING ON HIGH AND LOW PRESSURE SIDE OF SYSTEM INCLUDED THROUGH DIGITAL INTERFACE.
 - EC MOTOR CONDENSING FANS.
 - ELECTRONIC EXPANSION VALVE. TXV NOT ACCEPTABLE.
 - SUCTION LINE ACCUMULATOR.
 - FACTORY COMMISSIONING WITH 5 YEAR PARTS WARRANTY. 25 YEAR WARRANTY ON STAINLESS STEEL HEAT EXCHANGER.
 - AVERAGE INTAKE, EVAP AND DISCHARGE TEMPERATURE SENSORS. (DISCHARGE SENSOR TO BE FACTORY MOUNTED WITHIN UNIT)
 - 2" EXTERIOR DUAL-WALL CONSTRUCTION W/ R-19 INSULATION - MINIMUM 20GA EXTERIOR W/ 14GA BASE.
 - SUPPLY CFM MONITORING INTEGRAL TO UNIT WITH CFM MEASUREMENT INCLUDED THROUGH DIGITAL INTERFACE.
 - FULLY MODULATING HOT GAS REHEAT.
 - HAIL GUARD FOR CONDENSING COIL.
 - DOWN DISCHARGE / DOWN RETURN.
 - 80% EFFICIENT FURNACE. WITH MODULATING INDUCER TO MAINTAIN CONSTANT COMBUSTION EFFICIENCY ACROSS FIRING RANGE. 6:1 TURNDOWN WITH NG AND 5:1 TURNDOWN WITH LP.

ROOFTOP UNIT SCHEDULE

MARK	MANUFACTURER	MODEL NO.	NOM TONS	EVAP CFM	EXT. STATIC P. IN. WG.	COOLING			HOT GAS REHEAT	HEATING (GAS)			ELECTRICAL				SUPPLY FAN TYPE	MINIMUM OUTDOOR AIR	SEER/EER	TOTAL WEIGHT (LBS)	NOTES		
						TOTAL	SENSIBLE	AMB		INPUT	OUTPUT	HEATING STAGES	VOLT/PH/Hz	BLOWER MOTOR	POWER EXHAUST	MCA						MOCAP	
RTU-1	Trane	YSJ-150-	12.5	5000 CFM	1.000	3	149000 Btu/h	105.0 F	80.0 F / 67.0 F	Yes	250000 Btu/h	202500 Btu/h	3	208 V / 3 / 60 Hz	3.00 hp	Yes	65.0 A	90.0 A	VFD	961 CFM	0 / 12.5	2046 lb	1-8

ALTERNATE ROOFTOP UNIT MANUFACTURER

MARK	MANUFACTURER	MODEL NO.	NOM TONS	EVAP CFM	EXT. STATIC P. IN. WG.	COOLING			HOT GAS REHEAT	HEATING (GAS)			ELECTRICAL				SUPPLY FAN TYPE	MINIMUM OUTDOOR AIR	SEER/EER	TOTAL WEIGHT (LBS)	NOTES			
						TOTAL	SENSIBLE	AMB		INPUT	OUTPUT	HEATING STAGES	VOLT/PH/Hz	BLOWER MOTOR	POWER EXHAUST	MCA						MOCAP		
RTU-1	Lennox	LGH150H4M	12.5	5000 CFM	1.000	2	154800 Btu/h	116100 Btu/h	95.0 F	-459.7 F / -459.7 F	Yes	240000 Btu/h	192000 Btu/h	2	208 V / 3 / 60 Hz	5.00 hp	Yes	71.0 A	90.0 A	VFD	961 CFM	0 / 10.8	1363 lb	1-8

- NOTES:**
- PROVIDE DIGITAL CONTROLS. HIGH PERFORMANCE WITH FDO OUTDOOR AIR ECONOMIZER WITH DRY BULB CONTROL. SINGLE ZONE VAV (MSAV). BAROMETRIC RELIEF DAMPER. TIME DELAY ON COMPRESSOR RE-START. CRANKCASE HEATER. BAROMETRIC RELIEF DAMPER. DRAIN PAN OVERFLOW SWITCH. DISCHARGE AIR TEMPERATURE SENSING. HINGED ACCESS DOORS. SMOKE DETECTOR MOUNTED IN RETURN. AND STANDARD COOLING DOWN TO 0°F FOR EACH UNIT. OUTDOOR AIR DAMPER TO FULLY CLOSE W/ FAN SHUTDOWN FOR ALL UNITS.
 - EXTERNAL STATIC PRESSURE LISTED REPRESENTS STATIC PRESSURE REQUIRED FOR DUCTWORK AND DIFFUSERS OUTSIDE THE HVAC UNIT COMPLETELY INDEPENDENT OF ANY PRESSURE DROP THROUGH THE HVAC EQUIPMENT INCLUDING BUT NOT LIMITED TO FILTERS, COILS AND ECONOMIZERS. THE FAN AND MOTOR SHALL BE SIZED APPROPRIATELY TO MEET THIS DEFINITION OF EXTERNAL STATIC PRESSURE.
 - PROVIDE COMMERCIAL 7-DAY PROGRAMMABLE HEAT/COOL/AUTO TO CHANGEOVER THERMOSTAT WITH ECONOMIZER OUTPUT AND REMOTE. TEMPERATURE AND HUMIDITY SENSOR FOR EACH UNIT (HONEYWELL VISION PRO 8000 OR EQUAL). ECONOMIZER/OUTDOOR AIR DAMPER IS TO CLOSE DURING UNOCCUPIED HOURS.
 - PROVIDE 14" HIGH (AT LOWEST POINT) PRE-FABRICATED INSULATED ROOF CURB.
 - PROVIDE HAIL GUARDS FOR EACH UNIT.
 - PROVIDE FACTORY INSTALLED UNIT MOUNTED CIRCUIT BREAKERS.
 - MECHANICAL CONTRACTOR SHOULD CLEAN OR PROVIDE ALL NEW FILTERS ON DAY OF TURNOVER.
 - PROVIDE HOT GAS REHEAT FOR HUMIDITY CONTROL AND ALL ASSOCIATED ACCESSORY COMPONENTS.

FAN SCHEDULE

ID	LOCATION	MANUFACTURER	MODEL NO.	TYPE	DESIGN AIRFLOW	ESP	FAN			VOLT	PH	REMARKS	
							DRIVE TYPE	POWER	MOTOR RPM				
EF-1	Ceiling	Greenheck	SP-A200-390	Premium (Constant Cfm)	75 CFM	0.250	Direct	0.68 hp	900	Yes	0 V	1	SEE NOTE 1.
EF-2	Ceiling	Greenheck	SP-A200-390	Premium (Constant Cfm)	75 CFM	0.250	Direct	0.68 hp	900	Yes	0 V	1	SEE NOTE 1.

- NOTES:** 1. PROVIDE CEILING GRILLE, INTEGRAL BACKDRAFT DAMPER, AND ROOF CAP.

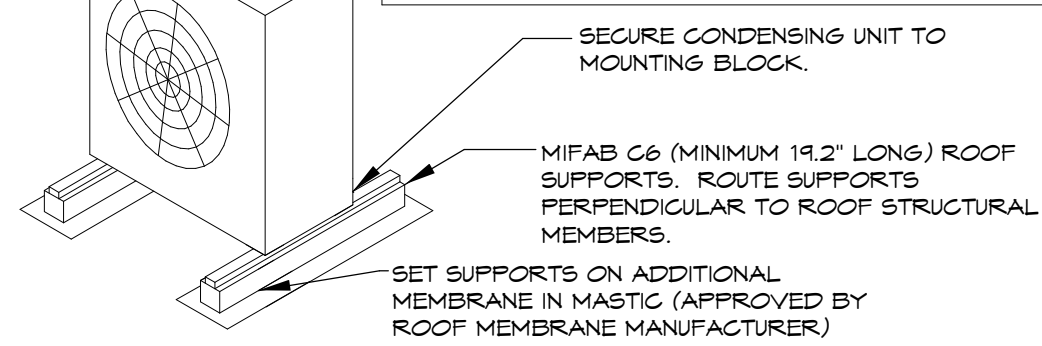
GRILLES, REGISTERS AND DIFFUSERS SCHEDULE

ID	MANUFACTURER	MODEL	MATERIAL	FINISH	NECK			NOTES
					SIZE	WIDTH	HEIGHT	
RG-1	AMER LOUVER CO	STRATUS	Aluminum	White Enamel	16"	0"	0"	SEE NOTE 1.
RG-2	Titus	350RL	Steel	White Enamel	0"	10"	6"	
RG-2	Titus	350RL	Steel	White Enamel	0"	10"	6"	
SD-1	Titus	TMR	Steel	White Enamel	12"	0"	0"	FIELD PREP FOR PAINTING
SD-2	Titus	TMS-AA	Aluminum	WHITE ENAMEL	10"	0"	0"	
SD-3	Titus	PAR	Steel	White ENAMEL	10"	0"	0"	RETURN - NO DEFLECTOR
SD-4	Titus	T3SQ-4	Steel	WHITE ENAMEL	8"	0"	0"	THERMAL VAV DIFFUSER
SD-5	Titus	TMS	Steel	White Enamel	0"	0"	0"	WITH O.B. DAMPER AND TRM KIT

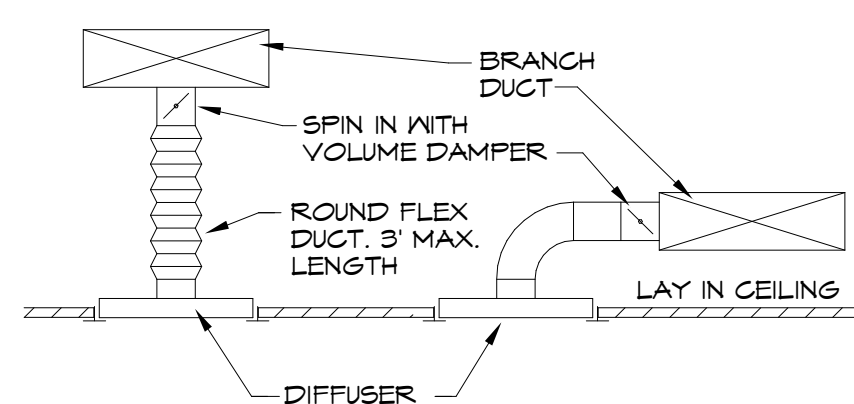
- NOTES:** 1. RETURN GRILLE TO BE PLASTIC FILTER RETURN. FILTER TO BE AMERICAN AIR FILTER (AAF) FRONTLINE GREEN 1". WITH AAF AMERICAN SIZE 20X20X1.

NOTES:

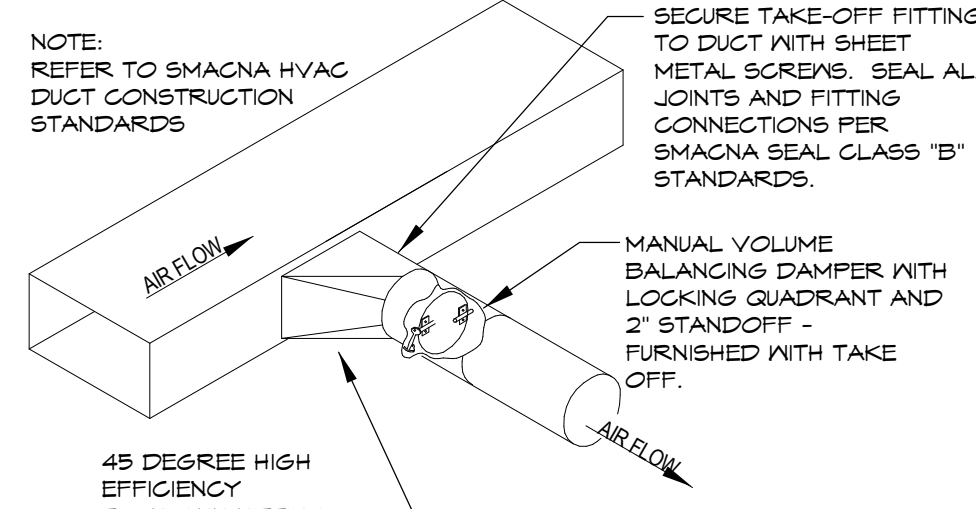
- PROVIDE MANUFACTURERS RECOMMENDED CLEARANCES BETWEEN CU & HP UNITS.
- PROVIDE ADDITIONAL SUPPORTS AS REQUIRED IF UNITS ARE NOT SAME WIDTH.
- PAINT EXPOSED INSULATION WITH MANUFACTURER RECOMMENDED ULTRAVIOLET PROTECTIVE COATINGS.



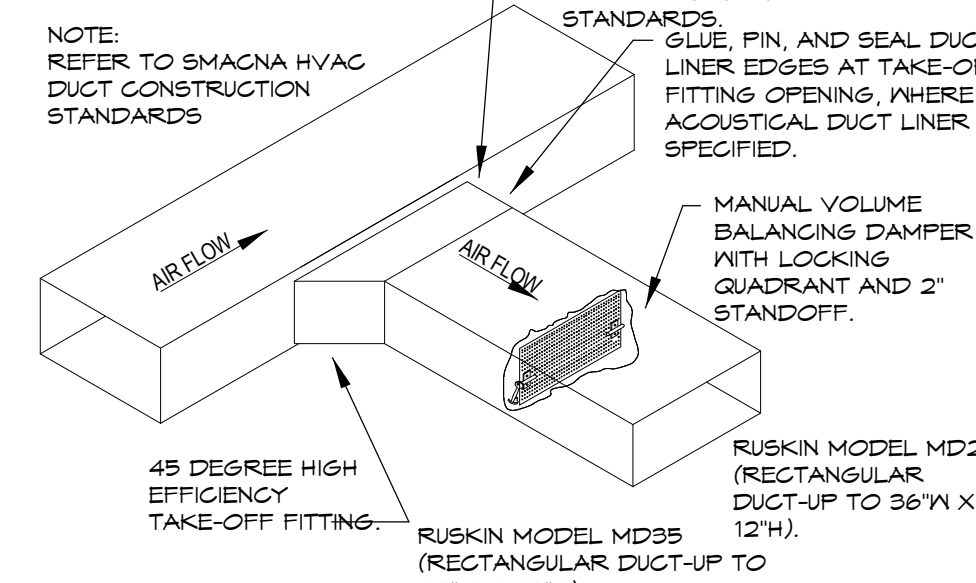
5 M-200 ROOFTOP CONDENSING UNIT DETAIL NO SCALE



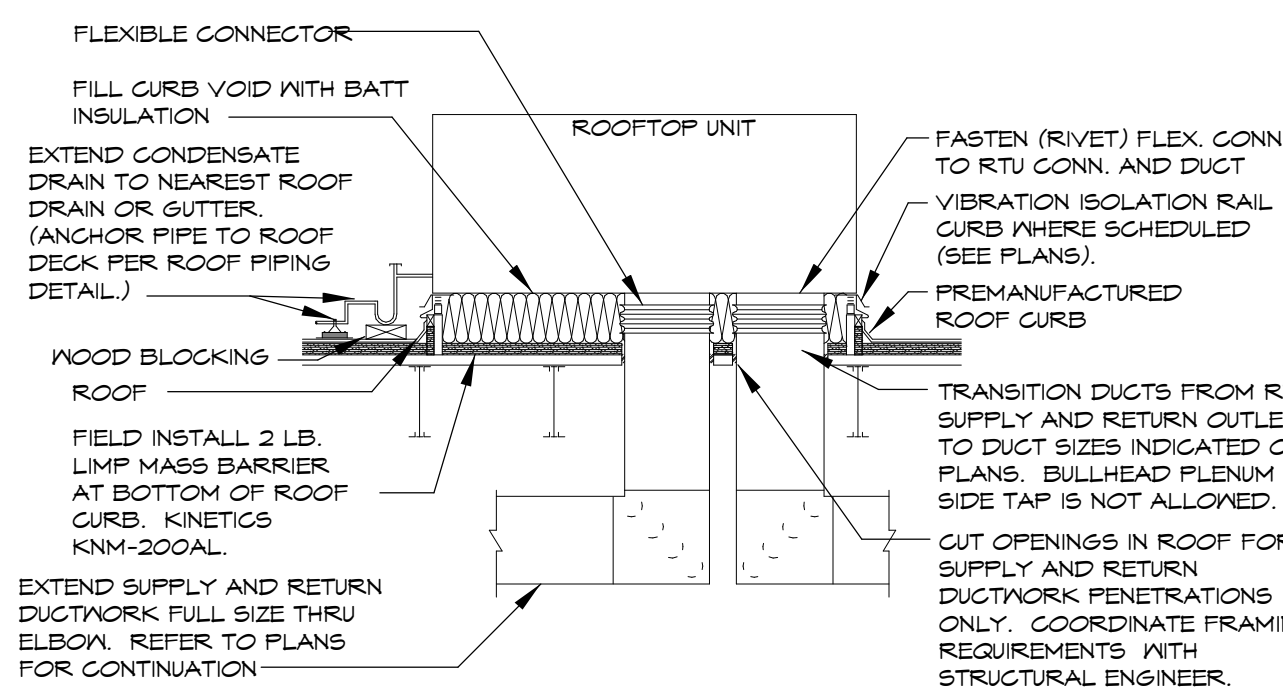
6 M-200 DIFFUSER DETAIL NO SCALE



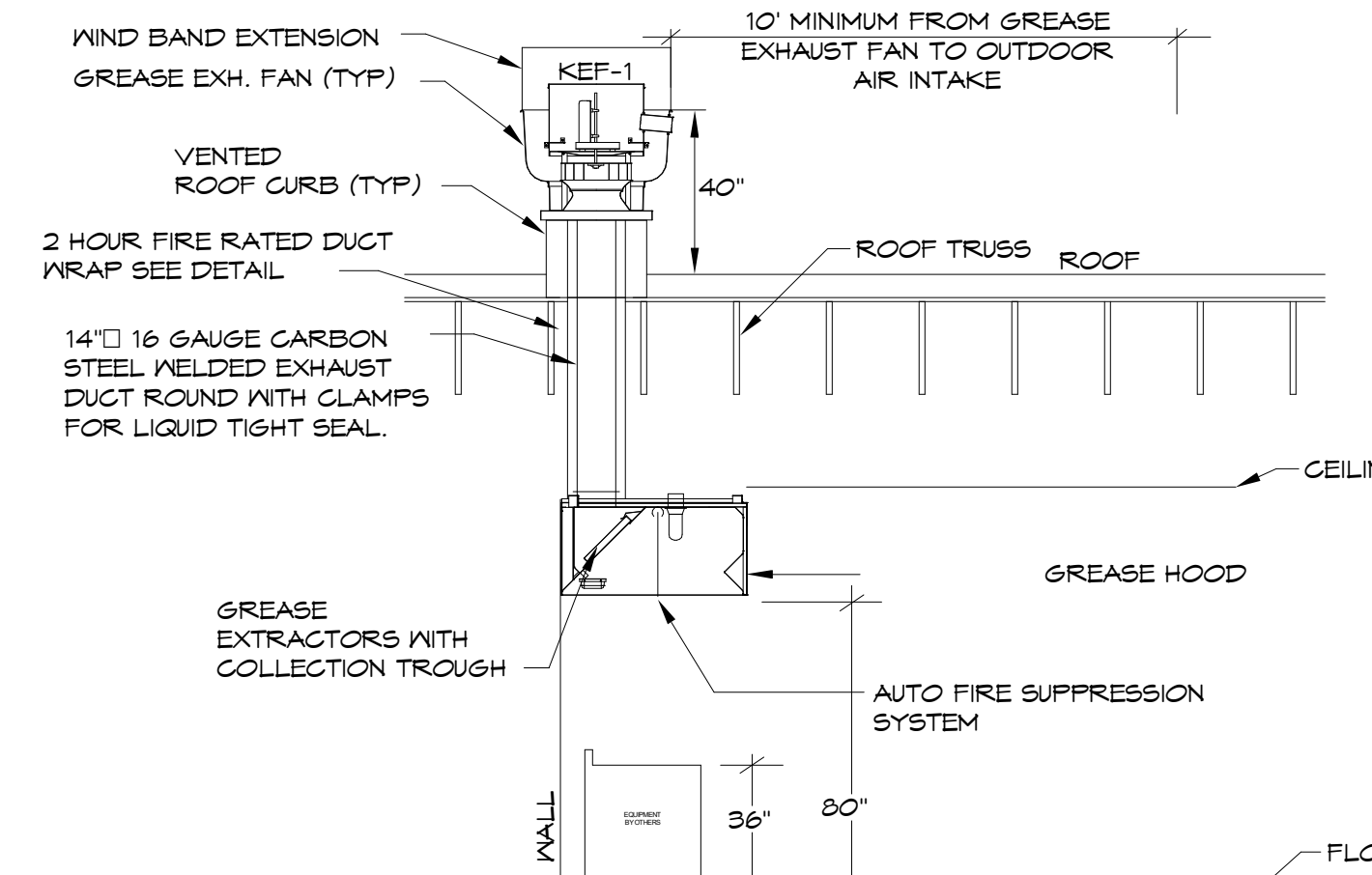
8 M-200 ROUND DUCT TAKE OFF DETAIL NO SCALE



9 M-200 RECTANGULAR DUCT TAKE OFF DETAIL NO SCALE



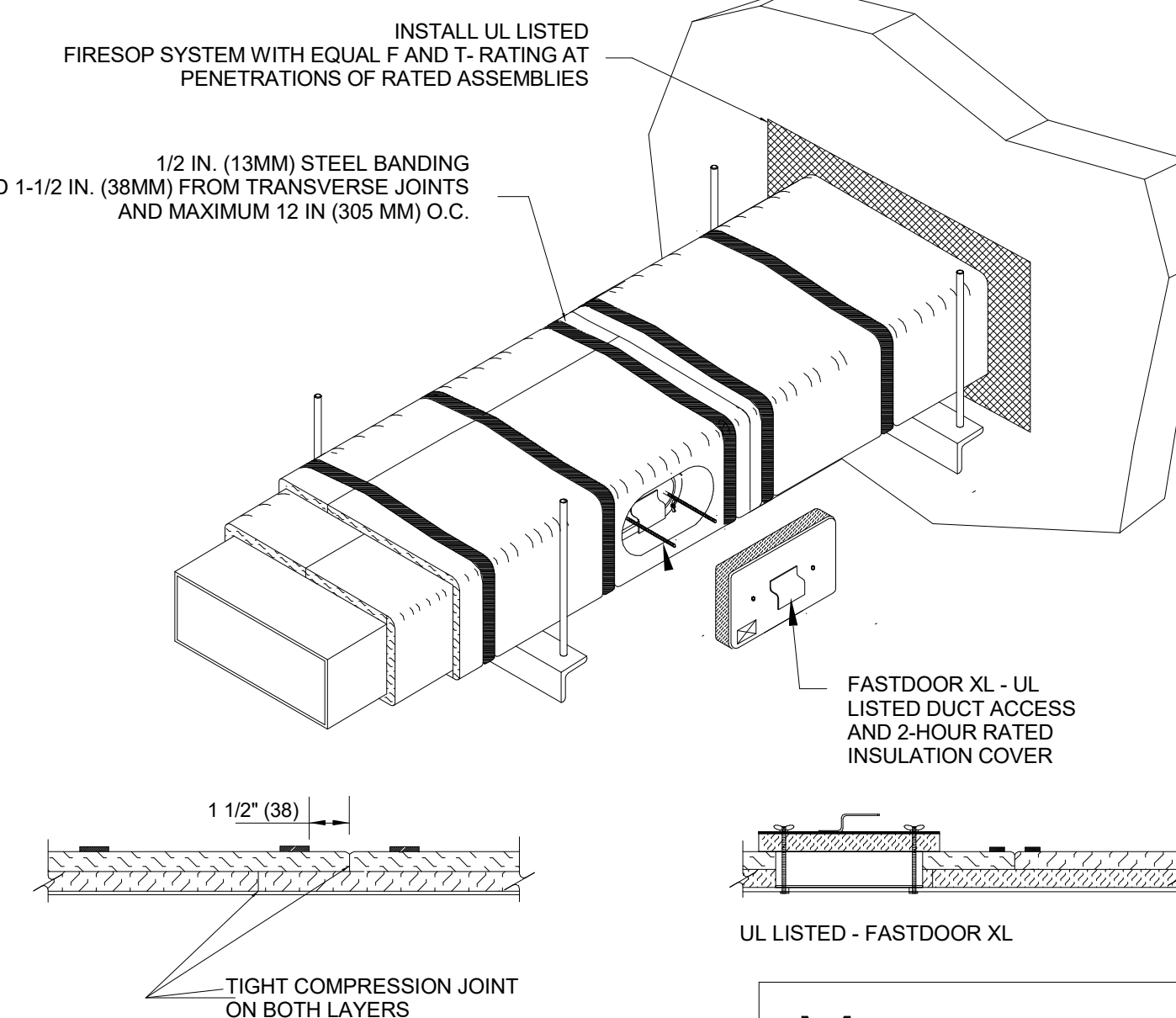
7 M-200 DOWNFLOW ROOFTOP UNIT DETAIL NO SCALE



4 M-200 GREASE HOOD DETAIL NO SCALE

FIRE RATED ENCLOSURE - GREASE DUCTS

- THERMAL CERAMICS FIREMASTER FASTWRAP XL IS TESTED TO ASTM E2336 AND UL LISTED PER HNK1 G18 TO PROVIDE ZERO CLEARANCE TO COMBUSTIBLES AND TO PROVIDE A 1- OR 2-HOUR ENCLOSURE. THROUGH PENETRATIONS FIRESOP SYSTEMS ARE TESTED IN ACCORDANCE WITH ASTM E 814 (UL 1479). ICC-ES APPROVAL PER REPORT ESR 2213 OR ESR 2832.
- COMPLIANT TO THE FOLLOWING CODES:
NFPA 96
INTERNATIONAL MECHANICAL CODES
UNIFORM MECHANICAL CODE
CALIFORNIA MECHANICAL CODE
- INSULATION APPLIED IN TWO LAYERS WITH TIGHT COMPRESSION JOINT ON BOTH LAYERS AT ALL JOINTS.
- MINIMUM 16 GAUGE CARBON STEEL (OR 18 GAUGE STAINLESS STEEL) RECTANGULAR OR ROUND GREASE EXHAUST DUCT
- INSTALL UL LISTED AND LIQUID TIGHT THERMAL CERAMICS FASTDOOR XL ACCESS DOORS AT ALL CHANGES IN DIRECTION AND AT MINIMUM EVERY 20 FT ON HORIZONTAL RUNS.
- SUPPORT HANGER SYSTEMS DO NOT NEED TO BE WRAPPED PROVIDED THE HANGER RODS ARE MINIMUM OF 3/8 IN. DIAMETER AND SUPPORTS ARE MINIMUM 2 X 2 X 1/8 IN. STEEL ANGLE OR SMACNA EQUIVALENT SUPPORT SYSTEM.
- THERMAL CERAMICS DUCT WRAP SHALL BE INSTALLED DIRECTLY ONTO THE DUCT AND APPLIED FROM THE HOOD CONNECTION TO THE CONNECTION TO THE FAN.
- THERMAL CERAMICS DUCT ENCLOSURE SYSTEM SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS AND UL LISTINGS.



Morgan Thermal Ceramics
P.O. Box 923
Augusta, Georgia 30903-0923
Phone: (706) 560-4038

ILLINOIS PE COA #184.004972

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BC ENGINEERS INCORPORATED
5720 Reeder Shawnee, KS 66203 (913)202-1772

New Construction
Freddy's Frozen Custard & Steaksburgers
LOT 6 BELLEVILLE CROSSING PLAT ONE
BELLEVILLE, IL 62220

Revisions:
1. ADDENDUM 01 - BELLEVILLE PLAT ONE

Project #: 22310

CONSTRUCTION DOCUMENTS

AUGUST 31, 2022

MECHANICAL SCHEDULES AND DETAILS

M-200

MECHANICAL/PLUMBING SPECIFICATIONS

1. GENERAL PROVISIONS

- A. PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, NECESSARY FOR THE COMPLETE INSTALLATION OF THE PLUMBING AND MECHANICAL SYSTEMS OUTLINED.
B. OBTAIN ALL PERMITS, FEES, LICENCES, INSPECTIONS, AND CERTIFICATES OF COMPLIANCE OR APPROVAL AS REQUIRED BY THE AUTHORITIES.
C. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE LAWS, CODES AND REGULATIONS OF THE GOVERNMENTAL BODIES HAVING JURISDICTION OVER THE SITE.
D. ALL TESTING REQUIRED BY AUTHORITIES SHALL BE CONSIDERED PART OF THIS WORK.
E. DURING CONSTRUCTION, ALL FIXTURES, EQUIPMENT, PIPE, DUCT, ETC. SHALL BE COVERED, PLUGGED, OR CAPPED AS REQUIRED TO KEEP CLEAN AND UNDAMAGED. ALL DAMAGED ITEMS SHALL BE RESTORED TO ORIGINAL CONDITION OR REPLACED. ALL PROTECTIVE COVERING SHALL BE REMOVED BEFORE FINAL ACCEPTANCE.
F. PROVIDE ALL NECESSARY CUTTING AND PATCHING OF WALLS, FLOORS, CEILINGS, AND ROOFS AS NECESSARY. PATCH AROUND ALL OPENINGS SHALL MATCH ADJACENT AREA. COORDINATE ALL ROOFING WORK WITH OWNER OR RESPONSIBLE PARTY, SO THAT THE EXISTING ROOFING WARRANTY WILL BE MAINTAINED.
G. CONTRACTOR SHALL GUARANTEE ALL WORK AND MATERIALS AGAINST DEFECTS FOR A PERIOD OF ONE YEAR FROM FINAL ACCEPTANCE.
2. OPERATION AND MAINTENANCE MANUALS:
A. DURING THE COURSE OF CONSTRUCTION, COLLECT AND COMPILE OPERATING INSTRUCTIONS, WIRING DIAGRAMS, CATALOG LISTS, LUBRICATION AND PREVENTIVE MAINTENANCE INSTRUCTIONS, PARTS LISTS, ETC. FOR ALL EQUIPMENT FURNISHED UNDER THIS CONTRACT.
B. ALL LITERATURE AND INSTRUCTIONS SHIPPED WITH THE EQUIPMENT SHALL BE SAVED FOR INCLUSION IN THE OPERATION AND MAINTENANCE MANUALS.
C. ALL LITERATURE LISTED ABOVE AND ALL PAPERS LISTING WARRANTIES, ETC. SHALL BE BOUND IN A 3-RING BINDER AND LABELED WITH THE PROJECT NAME, ADDRESS, ARCHITECT, ENGINEER, CONTRACTORS, ETC.

7. PIPING:

- A. DOMESTIC COLD, HOT, AND HOT WATER RECIRCULATING (ABOVEGROUND)
1. TYPE 1 HARD DRAWN COPPER TUBING, ASTM B-88
a. WROUGHT COPPER SOLDERED FITTINGS, ASTM B75 ALLOW C12200, ANSI B16.22, MSS SP-104
b. MECHANICAL PRESS COPPER FITTINGS FOR USE IN PLUMBING OR MECHANICAL APPLICATIONS, ASME B16.22, ASME B16.51, OR ASME B16.18. MECHANICAL PRESS COPPER FITTINGS SHALL BE 117 OR ASME B16.51.
2. PEX, HIGH-DENSITY CROSS-LINKED POLYETHYLENE TUBING SHALL BE MANUFACTURED TO THE REQUIREMENTS OF ASTM F876 AND MEET THE STANDARD GRADE HYDROSTATIC PRESSURE RATINGS IN ACCORDANCE WITH ASTM F876 AND ASTM F4013. MUST BE INSTALLED PER THE MANUFACTURERS REQUIREMENTS FOR PLENUM USE
a. PEX-A AND PEX-B MEETING ANSINSP61 AND ANSINSP372 STANDARDS FOR POTABLE WATER SAFETY. PEX-B SHALL BE Labeled AS PEX-B WITH A THICKNESS OF "1/4\"

8. WATER HEATERS

- A. COMMERCIAL, HIGH EFFICIENCY, DIRECT-VENT, GAS-FIRED, STORAGE, DOMESTIC-WATER HEATERS.
1. STANDARD: ANSI Z21.10.3/CASA 4.3
2. DESCRIPTION: MANUFACTURER'S PROPRIETARY DESIGN TO PROVIDE AT LEAST 95 PERCENT COMBUSTION EFFICIENCY AT OPTIMUM OPERATING CONDITIONS STORAGE-TANK CONSTRUCTION: STEEL
a. PRESSURE RATING: 150 PSIG
b. INTERIOR FINISH: COMPLY WITH NSF 61 AND NSF 372 BARRIER MATERIALS FOR POTABLE-WATER TANK LININGS, INCLUDING EXTENDING LINING MATERIAL INTO TAPPINGS.
3. FACTORY-INSTALLED STORAGE-TANK APPURTENANCES:
a. ANODE ROD: REPLACEABLE MAGNESIUM
b. DIP TUBE: REQUIRED UNLESS COLD-WATER INLET IS NEAR BOTTOM OF TANK
c. DRAIN VALVE: CORROSION-RESISTANT METAL WITH HOSE-END CONNECTION
d. INSULATION: COMPLY WITH ASHRAE/IES 90.1 TAPPINGS
f. HEAT-TRIP FITTINGS: INLET TYPE IN COLD-WATER INLET AND OUTLET TYPE IN HOT-WATER OUTLET
g. BURNER: FOR USE WITH DIRECT-VENT, GAS-FIRED, DOMESTIC-WATER HEATERS AND NATURAL-GAS FUEL
h. IGNITION: STANDING PILOT OR ANSI Z21.20/CSA C22.2 NO. 60730-2-5, ELECTRIC, AUTOMATIC, GAS-IGNITION SYSTEM
i. TEMPERATURE CONTROL: ADJUSTABLE THERMOSTAT
j. COMBINATION TEMPERATURE-AND-PRESSURE RELIEF VALVE: ANSI RELIEVING CAPACITY AT LEAST AS GREAT AS HEAT INPUT, AND INCLUDE PRESSURE SETTING LESS THAN WORKING-PRESSURE RATING OF DOMESTIC-WATER HEATER. SELECT RELIEF VALVE WITH SENSING ELEMENT THAT EXTENDS INTO STORAGE TANK
4. DIRECT-VENT SYSTEM THROUGH ROOF OR WALL: COAXIAL OR DOUBLE-CHANNEL VENT ASSEMBLY WITH DOMESTIC-WATER HEATER MANUFACTURERS' OUTSIDE INTAKE/EXHAUST SCREEN
B. DOMESTIC-WATER EXPANSION TANKS:
1. DESCRIPTION: TANK, PRESSURE-RATED TANK CONSTRUCTED WITH WELDED JOINTS AND FACTORY-INSTALLED, BUTYL-RUBBER DIAPHRAGM. INCLUDE AIR PRECHARGE TO MINIMUM SYSTEM OPERATING PRESSURE AT TANK.
2. CONSTRUCTION:
a. TAPPINGS: FACTORY-FABRICATED STEEL, WELDED TO TANK BEFORE TESTING AND SUPPLY WATER FOR DOMESTIC WATER USE.
b. INTERIOR FINISH: COMPLY WITH NSF 61 AND NSF 372 BARRIER MATERIALS FOR POTABLE-WATER TANK LININGS, INCLUDING EXTENDING FINISH INTO AND THROUGH TANK FITTINGS AND OUTLETS
c. AIR-CHARGING VALVE: FACTORY INSTALLED.
3. CAPACITY AND CHARACTERISTICS:
a. WORKING PRESSURE: 150 PSIG
b. INSULATION AND DUCT LINING:

10. DUCTWORK:

- A. ALL DUCTWORK, UNLESS OTHERWISE INDICATED, SHALL BE FABRICATED FROM GALVANIZED SHEET STEEL COMPLYING WITH ASTM A 572. LOCKFORMING QUALITY, WITH 0.90 ZINC COATING IN ACCORDANCE WITH ASTM A 592, AND MILL PHOSPHATIZED FOR EXPOSED LOCATIONS.
B. WHERE DUCTWORK IS INDICATED TO BE EXPOSED TO USE 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.
C. DUCTWORK, METAL GAUGES, REINFORCING, ETC. SHALL BE CONSTRUCTED IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS," LATEST EDITION FOR A 2 INCH WATER GAUGE STATIC PRESSURE.
1. RECTANGULAR DUCT:
a. ELBOWS, UNLESS INDICATED OTHERWISE SHALL BE CONSTRUCTED WITH CENTERLINE RADIUS OF NOT LESS THAN 1.5 DUCT WIDTH OR SQUARE ELBOW WITH DOUBLE WALL STREAMLINE VANES.
b. RETURN AIR ACQUANTILE ELBOWS AND SOUND BOOTS SHALL BE A SQUARE ELBOW WITH NO TURNING VANES.
c. SLOPES FOR TRANSITIONS OR OTHER CHANGES IN DIMENSIONS SHALL BE MINIMUM 1 TO 3.
2. ROUND AND OVAL SPIRAL SEAM DUCT:
a. PROVIDE RADIUS TYPE FITTINGS FABRICATED OF MULTIPLE SECTIONS WITH MAXIMUM 15 DEGREE CHANGE OF DIRECTION PER SECTION, UNLESS SPECIFICALLY DETAILED OTHERWISE. USE 45 DEGREE LATERALS FOR BRANCH TAKEOFF CONNECTIONS, WHERE 90 DEGREE BRANCHES ARE INDICATED PROVIDE CONICAL TYPE TEES.
b. SLOPES FOR TRANSITIONS OR OTHER CHANGES IN DIMENSIONS SHALL BE MINIMUM 1 TO 3.
c. AS AN OPTION, PROVIDE FACTORY-FABRICATED DUCT AND FITTINGS, IN LIEU OF SHOP-FABRICATED DUCT AND FITTINGS.
1. ELBOWS: CONSTRUCTION FOR 90 DEGREES AND 45 DEGREE ELBOW 14" AND SMALLER. PROVIDE MULTIPLE GORE CONSTRUCTION FOR LARGER DIAMETERS WITH STANDING SEAM CIRCUMFERENTIAL JOINT.
2. DIVIDED FLOW FITTINGS: PROVIDE MULTIPLE GORE CONSTRUCTION WITH SADDLE TAP SLOT WELDED AND BONDED TO DUCT FITTING BODY.
d. ROUND LONGITUDINAL SEAM DUCT: USE FOR RIGID METAL DUCT, DUCT ON LEAVING SIDE OF DUCT IN CONCEALED LOCATIONS FOR EXTENSION TO FLEX FOR DIFFUSERS, UNLESS OTHERWISE INDICATED.
D. DUCT SIZES SHOWN ON THE DRAWINGS ARE SHEETMETAL SIZES, ALLOWANCE FOR DUCT INERT HAS BEEN MADE WHERE APPLICABLE.
E. INSTALLATION OF METAL DUCTWORK:
1. GENERAL: ASSEMBLE AND INSTALL DUCTWORK IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES AND FACTORY INSTRUCTIONS FOR AIR-TIGHT SYSTEMS (MAXIMUM 5% LEAKAGE), WITH NO OBJECTIONABLE NOISE, AND CAPABLE OF PERFORMING INDICATED SERVICE. INSTALL EACH RUN WITH MINIMUM NUMBER OF JOINTS. ALIGN DUCTWORK ACCURATELY TO PREVENT EXCESSIVE INTERNAL SURFACE FRICTION. SUPPORT DUCTS RIGIDLY WITH SUITABLE STRAPS, BRACES, HANGERS AND ANCHORS IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS" LATEST EDITION. DUCT HANGERS SHALL BE OF THE TYPE WHICH WILL HOLD DUCTS TRUE-TO-SHAPE AND TO PREVENT SWELLING. SUPPORT VERTICAL DUCTS AT EVERY FLOOR.
2. AUXILIARY STEEL: PROVIDE AUXILIARY STEEL AS REQUIRED TO ADEQUATELY SUPPORT DUCTWORK.
3. ROUTING: LOCATE DUCTWORK RUNS, EXCEPT AS OTHERWISE INDICATED, VERTICALLY AND HORIZONTALLY AND AVOID DIAGONAL RUNS WHEREVER POSSIBLE. LOCATE RUNS AS INDICATED BY DIAGRAMS, DETAILS AND NOTATIONS OR, IF NOT OTHERWISE INDICATED, RUN DUCTWORK IN SHORTEST ROUTE WHICH DOES NOT OBSTRUCT USABLE SPACE OR BLOCK ACCESS FOR SERVICING BUILDING AND ITS EQUIPMENT. HOLD DUCTS CLOSE TO WALLS OR OVERHEAD CONSTRUCTION COLUMNS, AND OTHER STRUCTURAL, AND PERMANENT ENCLOSURE ELEMENTS OF BUILDING. WHEREVER POSSIBLE IN FINISHED AREAS OCCUPIED BY PEOPLE, LOCATE DUCTWORK ABOVE CEILING OR 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.
4. DO NOT ROUTE DUCTWORK THROUGH ELECTRICAL EQUIPMENT SPACES AND ACCESSORIES, UNLESS INDICATED OTHERWISE.
5. PENETRATIONS:
a. WHERE DUCTS PASS THROUGH INTERIOR PARTITIONS OR EXTERIOR WALLS, AND ARE EXPOSED TO VIEW, CONCEAL SPACE BETWEEN OPENING AND DUCT OR DUCT INSULATION WITH SHEET METAL FLANGES OF SAME GAGE AS DUCT. OVERLAP OPENING ON A SIDES BY AT LEAST 1-1/2", FASTEN TO DUCT AND WALL.
b. WHERE DUCTS PASS THROUGH FLOORS, WALLS, OR PARTITIONS, PROVIDE FIRESTOPPING BETWEEN DUCT AND WALL.
6. COORDINATION: COORDINATE DUCT INSTALLATIONS WITH INSTALLATION OF ACCESSORIES, DAMPERS, COL FRAMES, EQUIPMENT, CONTROLS, AND OTHER ASSOCIATED WORK OF THE DUCTWORK SYSTEM.
7. INSTALLATION: INSTALL METAL DUCTWORK IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS," LATEST EDITION.
F. EQUIPMENT CONNECTIONS:
1. CONNECT METAL DUCTWORK TO EQUIPMENT AS INDICATED, PROVIDE FLEXIBLE CONNECTING ELBOWS AND FITTINGS TO ACCOMMODATE EQUIPMENT VIBRATION, VIBRATION ISOLATORS, AND/OR EQUIPMENT CONTAINING ROTATING MECHANRY. PROVIDE ACCESS DOORS AS REQUIRED.
2. SEAL ALL CONNECTIONS BETWEEN JOINTS WITH NON-HARDENING, NON-MIGRATING MASTIC SEALANT, AS RECOMMENDED FOR SEALING SEAMS AND JOINTS IN DUCTWORK. OIL-BASE CAULKING AND GLAZING COMPOUNDS SHALL NOT BE ACCEPTABLE. DUCTS SHALL BE SEALED TO PREVENT LEAKAGE OF AIR OR VAPOR.
1. UNCONDITIONED SPACES CLASS B CLASS A CLASS C CLASS B
2. CONDITIONED SPACES (PENUMBRA) CLASS C CLASS B CLASS C CLASS C

14. EXHAUST FANS:

- A. CENTRIFUGAL TYPE FAN WITH CHARACTERISTICS AND CAPACITY AS SCHEDULED. ELECTRICALLY POWERED, SUITABLE FOR USE IN ROOF CURBS, DIRECT OR BELT DRIVEN FANS, AND CAPACITOR-START, INDUCTION-RUN TYPE MOTOR FOR BELT DRIVEN FANS. CENTRIFUGAL CEILING EXHAUSTERS SHALL BE ELECTRICALLY POWERED CENTRIFUGAL TYPE FAN SUITABLE FOR MOUNTING IN THE CEILING WITH A PERFORATED OFF-WHITE METAL GRILLE PERMANENTLY ATTACHED TO THE CEILING. UNIT SHALL BE PROVIDED WITH THE MINIMUM OVERLOAD PROTECTION. PROVIDE DISCONNECT SWITCH OR OTHER MEANS OF DISCONNECT AT MOTOR IN FAN HOUSING.
15. ROOFTOP UNITS:
A. UNIT SHALL BE FACTORY-ASSEMBLED AND TESTED, DESIGNED FOR ROOF INSTALLATION, AND SHALL CONSIST OF SCROLL COMPRESSORS, CONDENSERS, EVAPORATOR COILS, THERMAL EXPANSION VALVE, CONDENSATE DRAIN PAN, CONDENSER AND EVAPORATOR FANS, CONDENSER FANS TO BE SEQUENCED, REFRIGERATION CONTROLS, GAS FIRED HEAT EXCHANGERS OR ELECTRIC HEATING SECTION, CAPACITORS AND DAMPERS. CAPACITIES AND ELECTRICAL CHARACTERISTICS SHALL BE AS SCHEDULED ON THE DRAWINGS.
B. REFRIGERANT CIRCUIT SHALL INCLUDE A FILTER DRYER, SIGHT GLASS, COMPRESSOR SERVICE VALVES, AND LIQUID LINE SERVICE VALVES.
C. SAFETY CONTROLS SHALL INCLUDE:
a. LOW PRESSURE CUTOFF, MANUAL RESET
b. HIGH PRESSURE CUTOFF, MANUAL RESET
c. COMPRESSOR MOTOR OVERLOAD PROTECTION, MANUAL RESET.
d. ANTI-RECYCLING TIMING DEVICE
e. ADJUSTABLE LOW-AMBIENT LOCKOUT.
f. OIL PRESSURE SWITCH.
D. ALUMINUM FINS BONDED TO SEAMLESS COPPER TUBE BY MEANS OF MECHANICAL EXPANSION. AN EQUALIZING TYPE VERTICAL DISTRIBUTOR SHALL ENSURE EACH COIL CIRCUIT RECEIVES THE SAME AMOUNT OF REFRIGERANT.
E. PROVIDE PHOTO-ELECTRIC SMOKE DETECTOR WITH RETURN AIR DAMPER, OUTDOOR AIR DAMPER, AND BAROMETRIC RELIEF DAMPER. PROVIDE POWERED EXHAUST FAN WITH MANUFACTURERS' STANDARD CONTROLS FOR UNITS SCHEDULED ON THE DRAWINGS.
F. GAS HEATERS SHALL BE PROVIDED WITH EXHAUST SPARK IGNITION, MANUFACTURERS' STANDARD GAS TRAIN WITH REGULATOR (IF REQUIRED), AGA APPROVED, VERIFY GAS SERVICE PRESSURE TO INDIVIDUAL ROOFTOP UNITS.
G. DETECTORS SHALL BE PROVIDED WITH SMOKE DETECTOR, TONE-ALERT SMOKE DETECTORS AND SHALL AUTOMATICALLY RESET WHEN THE SMOKE DETECTORS ARE RESET.
17. SMOKE DETECTORS:
A. UNITS MOUNTED IN THE DUCTWORK SHALL BE A DUCT MOUNTED UL LISTED PHOTO-ELECTRIC SMOKE DETECTOR WITH HOUSING. UNITS SHALL BE EQUAL TO SIMILAR TO MODEL 4098-9687. THE SAMPLING TUBE SHALL BE #2098-8804, LENGTH AS REQUIRED FOR DUCT.
B. DUCT DETECTOR REMOTE TEST STATION SHALL BE SIMPLEX #4098-9842 WITH REMOTE ALARM INDICATOR, POWER ON INDICATOR, TONE-ALERT, TONE-ALERT SILENCE SWITCH AND TEST/RESET SWITCH.
1. DEVICES SHALL BE MOUNTED IN APPROVED LOCATION AS INDICATED ON THE FLOOR PLANS OR AS DIRECTED BY LOCAL AUTHORITY HAVING JURISDICTION.
C. PROVIDE AND INSTALL A PHOTO-ELECTRIC SMOKE DETECTOR IN THE RETURN AIR DUCT FOR EACH HVAC UNIT AS INDICATED ON THE FLOOR PLANS. DETECTORS ARE TO BE PROVIDED WITH A SUB-BASE CONTAINING AUXILIARY RELAY CONTACTS. RELAY CONTACTS SHALL BE WIRED INTO UNIT CONTROL WIRING, SO AS TO SHUT UNIT DOWN IN THE CASE OF SMOKE DETECTION. PROVIDE ALL CONTROL WIRING. ELECTRICAL CONTRACTOR SHALL PROVIDE 120 VOLT POWER TO SMOKE DETECTOR.
D. SMOKE DETECTORS SHALL BE INTERLOCKED, IN ALARM CONDITION OF A SINGLE DETECTOR ALL UNITS SHALL SHUT DOWN.
18. CONTROL WIRING:
A. ELECTRICAL WIRING AND WIRING CONNECTIONS REQUIRED FOR THE INSTALLATION OF THE TEMPERATURE CONTROL SYSTEM, SHALL BE PROVIDED BY THIS CONTRACTOR, UNLESS SPECIFICALLY SHOWN ON THE ELECTRICAL DRAWINGS OR SPECIFICATIONS.
B. 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 THE ELECTRICAL SPECIFICATIONS.
C. ALL WIRING IN AREAS USED AS AIR PLenums SHALL BE IN ELECTRIC CONDUIT EXCEPT THAT LOW VOLTAGE WIRING MAY BE TEFLOON COATED, ALUMINUM SHEATHED CABLE OR OTHER WIRE SPECIFICALLY APPROVED FOR INSTALLATION IN AIR PLenums, WHERE ACCEPTED BY LOCAL CODES.
D. ALL WIRING IN AREAS NOT USED FOR AIR MOVEMENT SHALL BE IN ELECTRIC METALLIC TUBING EXCEPT LOW VOLTAGE WIRING MAY BE IN APPROVED SIGNAL CABLE WHERE ACCEPTED BY LOCAL CODES.
C. THERMOSTATIC CONTROLS TO HAVE A 5" DEADBAND AND SETPOINT OVERLAP RESTRICTIONS:
1. TEMPERATURE CONTROLS SETBACK TO BE 55°F (HEAT) AND 85° (COOL), 2-HOUR OCCUPANT OVERRIDE, 10-HOUR BACKUP.
2. THERMOSTATIC CONTROLS TO HAVE A 5" DEADBAND AND SETPOINT OVERLAP RESTRICTIONS.

3. MANUFACTURERS:

- A. MANUFACTURERS, MODEL NUMBERS, ETC. INDICATED OR SCHEDULED ON THE DRAWINGS SHALL BE INTERPRETED AS HAVING ESTABLISHED A STANDARD OF QUALITY AND SHALL NOT BE CONSIDERED AS LIMITING COMPETITION. ARTICLES, FIXTURES, ETC. OF EQUAL QUALITY BY MANUFACTURERS SHALL BE SUBJECT TO APPROVAL BY ARCHITECT AND ENGINEER.
B. ALL LITERATURE AND INSTRUCTIONS SHIPPED WITH THE EQUIPMENT SHALL BE SAVED FOR INCLUSION IN THE OPERATION AND MAINTENANCE MANUALS.

4. MOTORS:

- A. PROVIDE THERMAL OVERLOAD PROTECTION FOR EACH MOTOR PROVIDED BY THIS WORK.

5. TESTING, BALANCING, AND CLEANING:

- A. ALL PIPING SHALL BE TESTED FOR LEAKS BEFORE BEING CONCEALED IN WALL CONSTRUCTION OR COVERED WITH INSULATION.
B. SEWER AND VENT PIPING SHALL BE HYDROSTATICALLY TESTED WITH NO LESS THAN 10 FEET HEAD FOR A PERIOD OF NOT LESS THAN 15 MINUTES, PER THE LOCAL PLUMBING CODE, WITH NO LEAKS.
C. DOMESTIC WATER PIPING SHALL BE HYDROSTATICALLY TESTED AT A PRESSURE OF NOT LESS THAN 1-1/2 TIMES THE OPERATING PRESSURE, BUT NOT LESS THAN 60 PSI, FOR A PERIOD OF NOT LESS THAN 2 HOURS, WITH NO LEAKS.
D. NATURAL GAS PIPING SHALL BE PNEUMATICALLY TESTED AT A PRESSURE OF NOT LESS THAN 1-1/2 TIMES THE OPERATING PRESSURE, BUT NOT LESS THAN 60 PSI, FOR A PERIOD OF NOT LESS THAN 2 HOURS, WITH NO LEAKS.
E. DUCTWORK AND PIPING SHALL BE BALANCED BY QUALIFIED INDEPENDENT BALANCING PERSONNEL WHO HAVE PREVIOUS EXPERIENCE WITH BALANCING PROCEDURES AND ARE CERTIFIED BY THE ASSOCIATED AIR BALANCE COUNCIL (AABC) OR NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB).
1. BALANCING SHALL INCLUDE THE BALANCING OF THE EQUIPMENT AND AIR DISTRIBUTION SYSTEMS TO PROVIDE DESIGN QUANTITIES INDICATED AND VERIFICATION OF PERFORMANCE OF ALL EQUIPMENT AND AUTOMATIC CONTROLS.
2. WITH IN 30 DAYS OF THE COMPLETION OF THE TESTING AND BALANCING WORK, SUBMIT THE TEST AND BALANCING REPORT BEARING THE 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 AND ARE OPERATING. REPORTS SHALL BE BOUND IN A VINYL BINDER AND THE BINDER LABELED OR MAY BE AN ELECTRONIC PDF SUBMITTAL.
F. GREASE DUCT SHALL BE TESTED PRIOR TO USE OR CONCEALMENT OF ANY PORTION OF THE GREASE DUCT SYSTEM. DUCTS SHALL BE CONSIDERED TO BE CONCEALED WHEN INSTALLED IN SHAFTS OR COVERED BY DUCT WRAP INSULATION THAT PREVENTS THE DUCTWORK FROM BEING VISUALLY INSPECTED FROM ALL SIDES. THE PERMIT HOLDER SHALL BE RESPONSIBLE TO PROVIDE THE NECESSARY EQUIPMENT AND PERFORM THE GREASE DUCT LEAKAGE TEST PER NFPA 96 AND ALL LOCAL CODES.
G. BEFORE DOMESTIC WATER PIPING IS PLACED IN SERVICE, ALL DOMESTIC WATER DISTRIBUTION SYSTEMS, INCLUDING THOSE FOR COLD WATER AND HOT WATER SYSTEMS, SHALL BE FLUSHED, STERILIZED AND CHLORINATED IN ACCORDANCE WITH HEALTH DEPARTMENT REGULATIONS. THE SYSTEMS SHALL BE THOROUGHLY FLUSHED OF ALL DIRT AND FOREIGN MATTER, THEN FILLED WITH WATER TREATED WITH 50 PPM OF CHLORINE. DURING THE FILLING PROCESS, VALVES AND FAUCETS SHALL BE OPENED SEVERAL TIMES TO ASSURE TREATMENT OF THE ENTIRE SYSTEM. THE TREATED WATER SHALL BE LEFT IN THE SYSTEM FOR 24 HOURS AFTER WHICH TIME THE SYSTEM SHALL BE FLUSHED; IF THE RESIDUAL CHLORINE IS NOT LESS THAN 10 PPM, THE FLUSHING SHALL BE REPEATED. AFTER STERILIZATION, SAMPLES OF WATER IN THE SYSTEM SHALL BE APPROVED BY THE BOARD OF HEALTH.

6. PLUMBING:

- A. PROVIDE AN APPROVED WATER HAMMER ARRESTOR FOR EACH PLUMBING FIXTURE SUPPLY AS REQUIRED BY FIXTURE MANUFACTURER.
B. ALL EXPOSED WASTE PIPE SHALL BE CHROME PLATED BRASS PIPE, NO FERROUS PIPE.
C. PROVIDE CLEANOUTS AT EACH CHANGE OF DIRECTION AND AT 100 FOOT INTERVALS IN STRAIGHT RUNS.
D. PROVIDE ACCESS PANELS FOR ALL CONCEALED VALVES AND TRAPS.
E. CLEANOUTS:
1. VINYL TILE FLOOR: JR SMITH #4140, OR EQUAL.
2. QUARRY TILE FLOOR: JR SMITH #4200, OR EQUAL.
3. CARPETED FLOOR: JR SMITH #4020-Y, OR EQUAL.
4. UNFINISHED FLOOR: JR SMITH #4020, OR EQUAL.
5. WALL: JR SMITH #4472, OR EQUAL, 2" ABOVE THE FLOOR.
6. WAREHOUSE FLOORS/FORK TRUCK AREAS: JR SMITH #4100, OR EQUAL, WITH HEAVY DUTY CAST IRON BODY AND ROUND ADJUSTABLE SCOTATED EXTRA HEAVY DUTY NICKEL BRONZE TOP.
7. GRADE: JR SMITH #4268, OR EQUAL, WITH HEAVY DUTY CAST IRON BODY AND COVER.
F. PROVIDE DIELECTRIC UNIONS WITH APPROPRIATE END CONNECTIONS TO MATCH THE PIPE SYSTEM IN WHICH INSTALLED (SCREWED, SOLDERED, OR FLANGED). PROVIDE DIELECTRIC UNIONS ON ALL PIPING CONNECTIONS TO HOT WATER HEATERS AND EXPANSION TANKS.
G. WATER HEATERS:
1. EVERY WATER HEATER SHALL HAVE AN APPROVED MEANS INSTALLED ON THE COLD WATER SUPPLY LINE ABOVE THE EQUIPMENT TO PREVENT SIPHONING OF A STORAGE WATER HEATER OR TANK.
2. BOTTOM FED WATER HEATERS AND TANKS CONNECT TO WATER HEATERS SHALL HAVE A VACUUM RELIEF VALVE INSTALLED, ANSI Z21.22.
3. STORAGE HEATERS OPERATING ABOVE ATMOSPHERIC PRESSURE SHALL HAVE AN APPROVED PRESSURE RELIEF VALVE AND/OR TEMPERATURE RELIEF VALVE.
H. ALL SEWER PIPING LOCATED INSIDE THE BUILDING SHALL BE INSTALLED WITH THE FOLLOWING SLOPES:
1. INSTALL 2-1/2" AND SMALLER PIPE AT 1/4" PER FOOT FALL.
2. INSTALL 3" AND LARGER PIPE AT 1/8" PER FOOT FALL.
3. INSTALL ALL GREASE WASTE PIPING AT 1/4" PER FOOT FALL.
I. ALL SEWER PIPING LOCATED EXTERIOR TO THE BUILDING SHALL BE INSTALLED WITH THE FOLLOWING SLOPES:
1. INSTALL 4" AND SMALLER PIPE AT A MINIMUM OF 2% SLOPE.
2. INSTALL 6" AND LARGER PIPE AT A MINIMUM OF 1% SLOPE.

LEAD CONTENT:

- 1. PIPE AND PIPE FITTINGS, INCLUDING TEES AND FAUCETS, UTILIZED IN THE WATER SUPPLY SYSTEM SHALL NOT HAVE MORE THAN 8% LEAD CONTENT.
2. PIPE, PIPE FITTINGS, JOINTS, VALVES, FAUCETS, AND FIXTURE FITTINGS UTILIZED TO SUPPLY WATER FOR DOMESTIC WATER USE SHALL COMPLY WITH NSF 372 AND SHALL HAVE A WEIGHTED AVERAGE LEAD CONTENT OF 0.25% OR LESS.
C. STORM SEWER, SANITARY SEWER, GREASE WASTE, AND VENTS (UNDERGROUND, INTERIOR TO THE BUILDING):
1. ABS SCHEDULE 40 CELLULAR CORE (FOAM CORE) PIPE AND DWV FITTING SYSTEM: PIPE AND FITTINGS SHALL BE MANUFACTURED FROM ABS COMPOUND WITH A CELL CLASS OF 42222 FOR PIPE AND 32222 FOR FITTINGS AS PER ASTM D 3968 AND CONFORM WITH NATIONAL SANITATION FOUNDATION (NSF) STANDARD 14. PIPE SHALL BE IRON PIPE SIZE (IPS) CONFORMING TO ASTM F 628 FITTINGS SHALL CONFORM TO ASTM D 2861. SOLVENT CEMENTS SHALL CONFORM TO ASTM D 2564.
2. PVC SCHEDULE 40 CELLULAR CORE (FOAM CORE) PIPE AND DWV FITTING SYSTEM: PIPE AND FITTINGS SHALL BE MANUFACTURED FROM PVC COMPOUND WITH A CELL CLASS OF 11432 PER ASTM D 4396 FOR PIPE AND 12454 PER ASTM D 1784 FOR FITTINGS AND CONFORM WITH NATIONAL SANITATION FOUNDATION (NSF) STANDARD 14. PIPE SHALL BE IRON PIPE SIZE (IPS) CONFORMING TO ASTM D 1785 AND ASTM D 2865. INJECTION MOLDED FITTINGS SHALL CONFORM TO ASTM D 2865. FABRICATED FITTINGS SHALL CONFORM TO ASTM F 1866. SOLVENT CEMENTS SHALL CONFORM TO ASTM D 2564.
3. HUBLESS CAST IRON SOIL PIPE AND FITTINGS: HUBLESS CAST IRON PIPE AND FITTINGS SHALL BE MANUFACTURED FROM GRAY CAST IRON AND SHALL CONFORM TO ASTM A 888 AND CISPI STANDARD 301. HUBLESS COUPLINGS SHALL CONFORM TO CISPI STANDARD 310 AND BE CERTIFIED BY NSF 9 INTERNATIONAL.
4. HUB AND SPIGOT CAST IRON SOIL PIPE AND FITTINGS: HUB AND SPIGOT CAST IRON PIPE AND FITTINGS SHALL BE MANUFACTURED FROM GRAY CAST IRON AND SHALL CONFORM TO ASTM A 74.

9. INSULATION AND DUCT LINING:

- A. ALL INSULATIONS AND ACCESSORIES SHALL HAVE A FIRE HAZARD CLASSIFICATION OF A FLAME SPREAD RATING OF NOT OVER 25, A FUEL CONTRIBUTION RATING OF NOT OVER 50, AND A SMOKE DEVELOPED RATING OF NOT OVER 50, IN ACCORDANCE WITH NFPA.
B. PIPE INSULATION - ABOVE GRADE:
1. THE PIPING INSULATION USED SHALL HAVE A THERMAL CONDUCTIVITY OF 0.27 BU PER INH/FT² OR LESS.
2. FIBERGLASS INSULATION WITH FACTORY APPLIED VAPOR BARRIER, ASJ JACKET, FACTORY APPLIED PRESSURE SEALING LONGITUDE LAP JOINT, NO STAPLES, ZESTON PREMOLDED PVC FITTING COVERS. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDATIONS.
3. FLEXIBLE CLOSED CELL ELASTOMERIC THERMAL INSULATION, UNSLIT OR PRESLIT WITH PRESSURE SENSITIVE ADHESIVE SYSTEM FOR CLOSURE AND VAPOR SEALING, EQUAL TO ARMSTRONG AF-ARMALUX OR ARMAFLEX 2000.
4. FOR NON CIRCULATING SYSTEMS, THE FIRST 8 FEET OF INLET AND OUTLET PIPING BETWEEN THE TANK AND THE HEAT TRAP (INCLUDING THE HEAT TRAP) MUST BE INSULATED.
5. FOR CIRCULATING SYSTEMS, ALL HOT WATER PIPING IN THE CIRCULATION LOOP MUST BE INSULATED AS SPECIFIED BELOW.
6. INSULATION SCHEDULE:
a. DOMESTIC COLD WATER 1/2"
b. DOMESTIC HOT WATER 1" FOR PIPING UP TO 1-1/4"Ø, & 1-1/2" FOR PIPING 1-1/2"Ø AND LARGER
c. HOT WATER RECIRCULATING 1/2"
d. CONDENSATE DRAINS INSIDE BUILDING 1/2"
e. REFRIGERANT SUCTION 3/4" FOR PIPING UP TO 1-1/4"Ø, & 1" FOR PIPING 1-1/2"Ø AND LARGER
f. HORIZONTAL STORM PIPE 1/2"
g. HORIZONTAL STORM OVERFLOW PIPE 1/2"
h. ROOF DRAINS 1/2"
INSULATION SHALL BE PROVIDED AT ROOF DRAIN BODY AND A MINIMUM OF 10' OF HORIZONTAL PIPING OR A MINIMUM OF 5' IF COMBINATION OF HORIZONTAL AND VERTICAL STORM PIPING DOWNSTREAM OF ROOF DRAIN BODY.
C. EQUIPMENT INSULATION:
1. FLEXIBLE FIBERGLASS: GLASS FIBER INSULATION, ASTM C 553, TYPE 1, CLASS B-4, SEMI-RIGID BOARD, WITH FACTORY LAMINATED KRAFT ALUMINUM FOIL (ALL SERVICE JACKET), VAPOR BARRIER, OVERSICORNING PIPE AND TANK INSULATION.
D. DUCTWORK: ACOUSTICAL INSULATION.
1. DUCT LINING: 2 LB/CF, THICKNESS AS SCHEDULED, AIR STREAM SIDE COATED, INSTALL OVER SMACNA STANDARDS.
a. DUCT LINING SCHEDULE:
1. RECTANGULAR SUPPLY DUCT 1/2", THROUGHOUT THE FIRST 10 FEET OF DUCT.
2. RETURN AIR DUCT 1/2", THROUGHOUT THE FIRST 10 FEET OF DUCT.

11. GREASE HOOD AND EXHAUST DUCT:

- A. HOOD SHALL BE CONSTRUCTED OF 18 GAUGE STEEL OR 20 GAUGE STAINLESS STEEL IN ACCORDANCE WITH NFPA 96 AND LOCAL CODES.
1. GREASE TRAP SHALL BE INSTALLED IN THE EXHAUST HOOD AND IN THE PATH OF EGRESS.
2. PROVIDE A COMPLETE AUTOMATIC WET CHEMICAL FIRE EXTINGUISHING SYSTEM FOR THE HOOD AND DUCT AS REQUIRED BY NFPA AND LOCAL CODES. ALL COOKING EQUIPMENT UNDER THE HOOD SHALL BE INTERLOCKED WITH THE SYSTEM, TO SHUTDOWN IN AN ALARM CONDITION.
a. THE GREASE HOOD FIRE SUPPRESSION SYSTEM SHALL BE EQUAL TO AMEREX KP SERIES PRE-ENGINEERED, WET-CHEMICAL STORED-PRESSURE TYPE WITH A FIXED NOZZLE AGENT DISTRIBUTION SYSTEM. THE SYSTEM SHALL BE LISTED AND TESTED TO UL STANDARD 300.
b. THE SYSTEM SHALL UTILIZE AN AGENT EQUAL TO AMEREX KP LIQUID FIRE SUPPRESSANT; A POTASSIUM ACETATE BASE SOLUTION THAT SUPPRESSES COOKING GREASE FIRES, SHALL HAVE A PH OF 9 OR LESS, AND SHALL NOT HARM STAINLESS STEEL SURFACES.
c. THE SYSTEM SHALL BE PROVIDED WITH A MANUAL "DUAL ACTION" TYPE PULL STATION. PULL STATION SHALL BE LOCATED NOT LESS THAN 10 FEET AND A MAXIMUM OF 20 FEET FROM THE GREASE HOOD AND IN THE PATH OF EGRESS. THE MANUAL ACTUATION SHALL REQUIRE A MAXIMUM FORCE OF 40 POUNDS AND A MAXIMUM MOVEMENT OF 14 INCHES TO ACTUATE THE FIRE SUPPRESSION SYSTEM.
d. PROVIDE A GAS SHUT OFF VALVE FOR MOUNTING IN THE GAS PIPE THAT WILL SHUT OFF GAS FLOW TO EQUIPMENT UNDER THE HOOD IN AN ALARM CONDITION. PROVIDE AN ELECTRICAL SWITCH WHICH SHALL BE CAPABLE OF DE-ENERGIZING ALL ELECTRICAL DEVICES AND EQUIPMENT UNDER THE HOOD IN AN ALARM CONDITION.
B. GREASE DUCT SHALL BE CONSTRUCTED OF 16 GAUGE CARBON STEEL OR 18 GAUGE STAINLESS STEEL IN ACCORDANCE WITH NFPA 96 AND LOCAL CODES.
a. INSTALL CIRCUITS OVER 25 VOLT WITH COLOR CODED NUMBER 12 WIRE WITH OFF GAS FLOW TO EQUIPMENT UNDER THE HOOD IN AN ALARM CONDITION. PROVIDE AN ELECTRICAL SWITCH WHICH SHALL BE CAPABLE OF DE-ENERGIZING ALL ELECTRICAL DEVICES AND EQUIPMENT UNDER THE HOOD IN AN ALARM CONDITION.
b. GREASE DUCT SHALL BE CONSTRUCTED OF 16 GAUGE CARBON STEEL OR 18 GAUGE STAINLESS STEEL IN ACCORDANCE WITH NFPA 96 AND LOCAL CODES.
c. PROVIDE MANUALLY ACTUATED ACCESSORY ITEMS INCLUDING BIRD PROOF TOP, STORM COLLAR, ROOF TRIMBLE, ETC. AS REQUIRED FOR A COMPLETE INSTALLATION. ROOF TRIMBLES THROUGH THE BUILDING ROOF SHALL BE SUITABLE FOR USE WITH THE ROOF PROVIDED.
12. FLEXIBLE DUCT:
A. ATCO #086 (R-6), OR EQUAL.
B. FACTORY APPLIED INSULATION AND VAPOR BARRIER, 1-1/2" THICK.
C. MAXIMUM LENGTH OF 5'-0".
13. FLUES AND ACCESSORIES:
A. FLUE FOR GAS FIRED CONDENSING WATER HEATER OR FURNACE SHALL BE AS RECOMMENDED BY THE GAS APPLIANCE MANUFACTURER. FLUES SHALL BE SCHEDULE 40, PVC OR CPVC PIPE PER THE MANUFACTURERS INSTALLATION REQUIREMENTS.
B. PROVIDE MANUALLY ACTUATED ACCESSORY ITEMS INCLUDING BIRD PROOF TOP, STORM COLLAR, ROOF TRIMBLE, ETC. AS REQUIRED FOR A COMPLETE INSTALLATION. ROOF TRIMBLES THROUGH THE BUILDING ROOF SHALL BE SUITABLE FOR USE WITH THE ROOF PROVIDED.

NATURAL GAS:

- 1. BLACK STEEL PIPE, SCHEDULE 40, ASTM A53.
a. PIPE 3" AND SMALLER: 150 LB MALLEABLE IRON, THREADED FITTINGS.
b. PIPE 4" AND SMALLER: WEGA MEGAPRESS FOR WATER AND GAS, CSA L04, TSS/ASME B31 FOR USE WITH ASTM A53 SCHEDULE 40 BLACK IRON PIPE.
c. PIPE 2-1/2" AND LARGER, WELDED.
2. PLUG VALVE: ROWELL NORDSTRON FIGURE NO. 142 OR 143.
e. BALL VALVE: JOMAR T-100NE, APPROVALS- UL842, FM, CSA, NSF 61-8, MSS SP-110
2. GAS PIPING LABELING:
a. ALL ELEVATED PRESSURE GAS PIPING SHALL BE LABELED EVERY 40 FEET WITH SIGNS INDICATING "ELEVATED PRESSURE".
3. GAS PIPING PAINTING:
a. ALL BLACK STEEL GAS PIPING LOCATED EXTERIOR TO THE BUILDING SHALL BE PRIMED AND PAINTED TO EITHER MATCH ADJACENT EXTERIOR WHERE LOCATED ON OR NEAR EXTERIOR WALL AND PAINTED SAFETY YELLOW WHERE LOCATED ON THE ROOF.
b. ALL PIPE HANGERS AND SUPPORTS SHALL BE STANDARD PRODUCTS OF GRINWELL WEE AND MASON, OR ECTEN, HANGER SPACING SHALL BE IN ACCORDANCE WITH MSS-SP-69.
J. SLEEVES:
1. PROVIDE, SET, AND PROPERLY LOCATE PIPE SLEEVES AS REQUIRED FOR THIS WORK. ALL SLEEVES SHALL BE OF SUFFICIENT SIZE TO PERMIT PIPE MOVEMENT DUE TO EXPANSION AND CONTRACTION AND TO ACCOMMODATE PIPE INSULATION.
2. INTERIOR PARTITIONS, 16 GAGE GALVANIZED STEEL, PACKED BETWEEN PIPE AND SLEEVE WITH PIPE SAFING AND CAULK AT EACH END WITH FIRE RESISTANT SEALANT.
3. ROOF: PROTECT OR EQUAL, MANUFACTURED PVC SCHEDULE 40 PIPE SLEEVE WITH WATERPROOF SEAL WITH ROOFING CONTRACTOR AND FLASH AS REQUIRED TO MAINTAIN ROOF WARRANTY.
4. PROTECTION AGAINST CONTACT: METALLIC PIPING, EXCEPT FOR CAST IRON, DUCTILE IRON AND GALVANIZED STEEL, SHALL NOT BE PLACED IN DIRECT CONTACT WITH CORROSIVE SOIL. SHEATHING USED TO PREVENT DIRECT CONTACT SHALL HAVE A THICKNESS OF GREATER THAN .008. AND THE SHEATHING SHALL BE MADE OF PLASTIC, ANY PIPE THAT PASSES THROUGH A FOUNDATION WALL OR FOOTING SHALL BE PROVIDED WITH A RELIEVING ARCH, OR A PIPE SLEEVE SHALL BE BUILT INTO THE FOUNDATION WALL. THE SLEEVE SHALL BE TWO SIZES GREATER THAN THE PIPE PASSING THOUGH THE WALL OR FOOTING.
5. PLUMBING VENTS: FLASH ROOF VENT INTO ROOFING SYSTEM AS REQUIRED BY THE ROOFING CONTRACTOR TO MAINTAIN EXISTING ROOF WARRANTY. ALL PLUMBING TERMINALS SHALL TERMINATE A MINIMUM OF 12" ABOVE ROOF OR EQUAL TO HEIGHT OF PARAPET, WHICHEVER IS GREATER.
K. PROVIDE CHROME PLATED SIGHTCOUPLERS ON ALL PIPE ENTERING FINISHED AREAS.

16. EXHAUST FANS:

- A. CENTRIFUGAL TYPE FAN WITH CHARACTERISTICS AND CAPACITY AS SCHEDULED. ELECTRICALLY POWERED, SUITABLE FOR USE IN ROOF CURBS, DIRECT OR BELT DRIVEN FANS, AND CAPACITOR-START, INDUCTION-RUN TYPE MOTOR FOR BELT DRIVEN FANS. CENTRIFUGAL CEILING EXHAUSTERS SHALL BE ELECTRICALLY POWERED CENTRIFUGAL TYPE FAN SUITABLE FOR MOUNTING IN THE CEILING WITH A PERFORATED OFF-WHITE METAL GRILLE PERMANENTLY ATTACHED TO THE CEILING. UNIT SHALL BE PROVIDED WITH THE MINIMUM OVERLOAD PROTECTION. PROVIDE DISCONNECT SWITCH OR OTHER MEANS OF DISCONNECT AT MOTOR IN FAN HOUSING.
15. ROOFTOP UNITS:
A. UNIT SHALL BE FACTORY-ASSEMBLED AND TESTED, DESIGNED FOR ROOF INSTALLATION, AND SHALL CONSIST OF SCROLL COMPRESSORS, CONDENSERS, EVAPORATOR COILS, THERMAL EXPANSION VALVE, CONDENSATE DRAIN PAN, CONDENSER AND EVAPORATOR FANS, CONDENSER FANS TO BE SEQUENCED, REFRIGERATION CONTROLS, GAS FIRED HEAT EXCHANGERS OR ELECTRIC HEATING SECTION, CAPACITORS AND DAMPERS. CAPACITIES AND ELECTRICAL CHARACTERISTICS SHALL BE AS SCHEDULED ON THE DRAWINGS.
B. REFRIGERANT CIRCUIT SHALL INCLUDE A FILTER DRYER, SIGHT GLASS, COMPRESSOR SERVICE VALVES, AND LIQUID LINE SERVICE VALVES.
C. SAFETY CONTROLS SHALL INCLUDE:
a. LOW PRESSURE CUTOFF, MANUAL RESET
b. HIGH PRESSURE CUTOFF, MANUAL RESET
c. COMPRESSOR MOTOR OVERLOAD PROTECTION, MANUAL RESET.
d. ANTI-RECYCLING TIMING DEVICE
e. ADJUSTABLE LOW-AMBIENT LOCKOUT.
f. OIL PRESSURE SWITCH.
D. ALUMINUM FINS BONDED TO SEAMLESS COPPER TUBE BY MEANS OF MECHANICAL EXPANSION. AN EQUALIZING TYPE VERTICAL DISTRIBUTOR SHALL ENSURE EACH COIL CIRCUIT RECEIVES THE SAME AMOUNT OF REFRIGERANT.
E. PROVIDE PHOTO-ELECTRIC SMOKE DETECTOR WITH RETURN AIR DAMPER, OUTDOOR AIR DAMPER, AND BAROMETRIC RELIEF DAMPER. PROVIDE POWERED EXHAUST FAN WITH MANUFACTURERS' STANDARD CONTROLS FOR UNITS SCHEDULED ON THE DRAWINGS.
F. GAS HEATERS SHALL BE PROVIDED WITH EXHAUST SPARK IGNITION, MANUFACTURERS' STANDARD GAS TRAIN WITH REGULATOR (IF REQUIRED), AGA APPROVED, VERIFY GAS SERVICE PRESSURE TO INDIVIDUAL ROOFTOP UNITS.
G. DETECTORS SHALL BE PROVIDED WITH SMOKE DETECTOR, TONE-ALERT SMOKE DETECTORS AND SHALL AUTOMATICALLY RESET WHEN THE SMOKE DETECTORS ARE RESET.
17. SMOKE DETECTORS:
A. UNITS MOUNTED IN THE DUCTWORK SHALL BE A DUCT MOUNTED UL LISTED PHOTO-ELECTRIC SMOKE DETECTOR WITH HOUSING. UNITS SHALL BE EQUAL TO SIMILAR TO MODEL 4098-9687. THE SAMPLING TUBE SHALL BE #2098-8804, LENGTH AS REQUIRED FOR DUCT.
B. DUCT DETECTOR REMOTE TEST STATION SHALL BE SIMPLEX #4098-9842 WITH REMOTE ALARM INDICATOR, POWER ON INDICATOR, TONE-ALERT, TONE-ALERT SILENCE SWITCH AND TEST/RESET SWITCH.
1. DEVICES SHALL BE MOUNTED IN APPROVED LOCATION AS INDICATED ON THE FLOOR PLANS OR AS DIRECTED BY LOCAL AUTHORITY HAVING JURISDICTION.
C. PROVIDE AND INSTALL A PHOTO-ELECTRIC SMOKE DETECTOR IN THE RETURN AIR DUCT FOR EACH HVAC UNIT AS INDICATED ON THE FLOOR PLANS. DETECTORS ARE TO BE PROVIDED WITH A SUB-BASE CONTAINING AUXILIARY RELAY CONTACTS. RELAY CONTACTS SHALL BE WIRED INTO UNIT CONTROL WIRING, SO AS TO SHUT UNIT DOWN IN THE CASE OF SMOKE DETECTION. PROVIDE ALL CONTROL WIRING. ELECTRICAL CONTRACTOR SHALL PROVIDE 120 VOLT POWER TO SMOKE DETECTOR.
D. SMOKE DETECTORS SHALL BE INTERLOCKED, IN ALARM CONDITION OF A SINGLE DETECTOR ALL UNITS SHALL SHUT DOWN.
18. CONTROL WIRING:
A. ELECTRICAL WIRING AND WIRING CONNECTIONS REQUIRED FOR THE INSTALLATION OF THE TEMPERATURE CONTROL SYSTEM, SHALL BE PROVIDED BY THIS CONTRACTOR, UNLESS SPECIFICALLY SHOWN ON THE ELECTRICAL DRAWINGS OR SPECIFICATIONS.
B. 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 THE ELECTRICAL SPECIFICATIONS.
C. ALL WIRING IN AREAS USED AS AIR PLenums SHALL BE IN ELECTRIC CONDUIT EXCEPT THAT LOW VOLTAGE WIRING MAY BE TEFLOON COATED, ALUMINUM SHEATHED CABLE OR OTHER WIRE SPECIFICALLY APPROVED FOR INSTALLATION IN AIR PLenums, WHERE ACCEPTED BY LOCAL CODES.
D. ALL WIRING IN AREAS NOT USED FOR AIR MOVEMENT SHALL BE IN ELECTRIC METALLIC TUBING EXCEPT LOW VOLTAGE WIRING MAY BE IN APPROVED SIGNAL CABLE WHERE ACCEPTED BY LOCAL CODES.
C. THERMOSTATIC CONTROLS TO HAVE A 5" DEADBAND AND SETPOINT OVERLAP RESTRICTIONS:
1. TEMPERATURE CONTROLS SETBACK TO BE 55°F (HEAT) AND 85° (COOL), 2-HOUR OCCUPANT OVERRIDE, 10-HOUR BACKUP.
2. THERMOSTATIC CONTROLS TO HAVE A 5" DEADBAND AND SETPOINT OVERLAP RESTRICTIONS.



BC PROJECT #2310

New Construction
Freddy's Frozen Custard & Steamburgers
LOT 6 BELLEVILLE, ILL 62220
BELLEVILLE, ILL 62220

Revisions table with columns for revision number, description, and date. Includes revision 1: ADDITION OF BELLEVILLE PROJECT.

ILLINOIS PE COA #184.004972

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MECHANICAL AND PLUMBING SPECIFICATIONS
MP-000