

GAS PIPING SPECIFICATION:

SECTION 1 - PIPING SYSTEMS

1.0 GENERAL

- A. PROVIDE ISOLATION VALVES AT MAIN BRANCH CONNECTIONS, EQUIPMENT, AND AT BOTTOM OF RISERS WHERE THEY ORIGINATE FROM A CONTINUOUS MAIN AND RISE TO A FLOOR OR FLOORS ABOVE.
- B. SIZE REDUCTIONS SHALL BE MADE BY ECCENTRIC REDUCERS WITH FLAT SIDE ON TOP WHERE SPECIFIED. NO BUSHINGS FOR PIPE REDUCTIONS PERMITTED.
- C. PROVIDE DIELECTRIC UNION AT ALL CONNECTIONS OF DISSIMILAR METALS.
- D. PROPERLY SEAL ALL PIPE PENETRATIONS THROUGH WALLS, ROOFS, FLOORS, OR CEILINGS.
- E. ELBOWS ARE TO BE LONG RADIUS; FIELD FABRICATED FITTINGS ARE NOT ACCEPTABLE.
- F. BRANCH CONNECTIONS TO MAIN MAY BE SADDLE-TYPE, FORGED STEEL WELDED FITTING.
- G. ALL PIPING TAKE-OFFS FOR NATURAL GAS SHALL BE MADE FROM THE SIDE OR TOP OF PIPING. "BULLHEAD" TEE ARE PROHIBITED.
- H. VISUALLY INSPECT ALL PIPING, VALVES AND JOINTS PRIOR TO INSULATING, ENCLOSING, BURYING, OR OTHERWISE CONCEALING.

1.1 PIPE HANGERS AND SUPPORTS

- A. PIPE SHALL BE SUPPORTED BY SPLIT RING ADJUSTABLE TYPE, CLEVIS HANGER, TRAPEZE (MULTIPIPE RACK) OR OTHER APPROVED HANGERS, OR ROOF SUPPORTS.
- B. BRACKETS OR CLAMPS MAY BE USED WHERE PIPE RUNS ALONG WALLS, COLUMNS OR CEILINGS, BUT MUST ALLOW FOR EXPANSION AND CONTRACTION.
- C. RADIAL SUPPORTS SHALL BE RIGID TYPE. IF WALL BRACKETS OR LONGITUDINAL SUPPORTS ARE USED ON STRAIGHT LENGTHS OVER 20 FEET LONG, THEY SHALL BE OF THE FLEXIBLE TYPE TO PROVIDE FOR THERMAL EXPANSION AND CONTRACTION.
- D. HANGERS AND SUPPORTS SHALL BE PLACED WITHIN 1 FOOT FROM EACH CHANGE IN DIRECTION AND WITHIN 3 FEET OF THE END OF EACH RUNOUT OR AS DEFINED BY PIPE STRESS ANALYSIS OR PIPE EXPANSION ANALYSIS AS PART OF A DELEGATED DESIGN.
- E. PIPING AT ALL EQUIPMENT AND CONTROL VALVES SHALL BE SUPPORTED TO PREVENT STRAINS OR DISTORTIONS IN THE CONNECTED EQUIPMENT AND CONTROL VALVES.
- F. MAXIMUM ALLOWABLE HANGER ROD LOADING AND SPACING FOR PIPING SYSTEMS ARE SHOWN BELOW. CHECK LOCAL CODES TO DETERMINE IF A DIFFERENT SPACING IS REQUIRED. CLOSER HANGER SPACING MAY BE REQUIRED DUE TO ADDITIONAL VALVES AND FITTINGS

1.2 NATURAL GAS SYSTEM

- A. NATURAL GAS PIPING SHALL COMPLY WITH THE INTERNATIONAL FUEL GAS CODE AND NFPA-54 AND LOCAL CODE/AMENDMENTS.
- B. VALVES, UNIONS AND CLOSE NIPPLES SHALL NOT BE INSTALLED IN ANY CONCEALED SPACE.

MAXIMUM ALLOWABLE HANGER ROD LOADING								
ROD DIA. (IN)	3/8	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4
MAX. LOAD	610	1130	1810	2710	3770	4960	6230	8000

MAXIMUM ALLOWABLE HANGER SPACING - NATURAL GAS PIPE		
NOMINAL TUBING SIZE	ROD DIAMETER (IN)	MAXIMUM SPACING (FT)
1/2"	3/8"	6'-0"
3/4" - 1"	3/8"	8'-0"
1-1/4" - 2"	3/8"	10'-0"
2-1/2" - 3"	1/2"	10'-0"
4"	5/8"	10'-0"
6"	3/4"	10'-0"
8"-12"	7/8"	10'-0"

PIPE AND PIPE INSULATION SCHEDULE

SYSTEM ABBREV	SYSTEM	LOCATION	OPERATING TEMP [°F]	OPERATING PRESS. [PSIG]	PIPE				INSULATION			PRESSURE TEST PROCEDURE	NOTES
					SIZE	TYPE/SCHED	MATERIAL	JOINING METHOD	TYPE	JACKET	THICKNESS [IN]		
G	NATURAL GAS	ABOVE GRADE	50-70	1	1/2" THRU 2"	SCH. 40	CARBON STEEL	150# MALLEABLE IRON NPT	-	-	-	P.2	
		ABOVE GRADE	50-70	1	1/2" THRU 2"	SCH 10	CARBON STEEL	COLD PRESS MECHANICAL	-	-	-	P.2	1
		ABOVE GRADE	50-70	1	2-1/2" AND UP	SCH 40	CARBON STEEL	BUTT WELDED	-	-	-	P.2	

PIPE PRESSURE TEST:

- P.1 HYDROSTATICALLY TEST PER ASME B31.1 & B31.3
- P.2 PNEUMATICALLY TEST PER ASME B31.1 & B31.3. TEST PRESSURE TO BE 60 PSI MINIMUM
- P.3 PNEUMATICALLY TEST WITH DRY NITROGEN PER ASME B31.5

NOTES:

1. FITTINGS EQUAL TO VIEGA MEGAPRESS/PROPRESS

GENERAL REMARKS APPLICABLE TO ALL PIPE SYSTEMS:

1. PROVIDE IDENTIFICATION LABELS ON ALL ABOVE FLOOR AND ABOVE GRADE PIPING.
2. WHERE REQUIRED, PAINTING OF PIPE SYSTEMS SHALL BE BY GC/OTHERS.
3. ALL PIPES, INSULATION, AND MATERIALS IN PLENUMS MUST MEET ASTM E84 FLAME/SMOKE RATING OF 25/50.

DUCTWORK AND DUCT INSULATION SCHEDULE

SYSTEM	FUNCTION	LOCATION	SHAPE	DUCT			LINER		EXTERNAL DUCT INSULATION			NOTES
				PRESS. CLASS [IN WG]	OPERATING PRESS. [IN WG]	MATERIAL	TYPE	R-VALUE	TYPE	FINISH	MINIMUM R-VALUE	
MAU-1,2,3	SA	WAREHOUSE	RECT	2"	1"	GALVANIZED G-90	-	-	-	-	-	

NOTES:

1. SNAP-LOCK WILL BE ALLOWED ON LOW PRESSURE DUCT LESS THAN 14"ø
2. DUCTWORK FLEXIBLE INSULATION JOINTS TO OVERLAP MINIMUM 2"
3. EXPOSED DUCTWORK TO BE GASKETED SPIRAL OR TDC, SUITABLE FOR PAINTING. PAINTING BY OTHERS
4. DUCTWORK AND EXHAUST SYSTEMS SERVING TYPE I OR TYPE II KITCHEN HOODS SHALL BE CONSTRUCTED PER NFPA REQUIREMENTS.

GENERAL REMARKS APPLICABLE TO ALL DUCT SYSTEMS:

1. ALL DUCTWORK SHALL BE HUNG WITH GALVANIZED STRAP, GRIPPLE OR TRAPEZED.
2. DUCT SIZES INDICATED ON DRAWINGS ARE SHEET METAL SIZE AND INCLUDE LINER SPECIFIED.
3. ALL DUCTWORK, INSULATION, AND MATERIALS IN PLENUMS MUST MEET ASTM E84 FLAME/SMOKE RATING OF 25/50.
4. ALL DUCTWORK SHALL BE SEALED TO CLASS A REQUIREMENTS.
5. DUCT GAUGE SHALL BE PER SMACNA STANDARD FOR PRESSURE CLASS INDICATED, UNLESS NOTED OTHERWISE, AND SHALL BE NO LESS THAN 26 GAUGE

EXHAUST FAN SCHEDULE

PLAN MARK	MANUFACTURER	MODEL	LOCATION	TYPE	OCCUPIED		UNOCCUPIED		ESP [IN WC]	TSP [IN WC]	HP	BHP	DRIVE TYPE	CONTROL / SWITCH BY	SONES	ELECTRICAL		WEIGHT [LBS]	NOTES
					AIRFLOW [CFM]	FAN RPM	AIRFLOW [CFM]	FAN RPM								VOLTS/PH	FLA		
EF-1	COOK	120SQN10D	ELECTRICAL ROOM	INLINE	1000	1043	-	-	0.1	0.1	1/6	0.077	DIRECT	T-STAT	6.6	115/1	5.8	100	1, 2,3,8
EF-2	COOK	24XLP	FIRE PUMP HOUSE	SIDEWALL	4400	795	-	-	0.120	0.120	1/2	0.437	BELT	T-STAT/FIRE PUMP/MOTOR STARTER	15.3	460/3	1.1	400	1,4,7
EF-3	COOK	GN-168	FIRE PUMP HOUSE	INLINE	150	1044	-	-	0.15	0.15	1/20	50 WATTS	DIRECT	T-STAT	2.5	115/1	0.504	25	1,2,3,6
EF-4	COOK	GC-148	FIRE PUMP HOUSE	CEILING	110	916	-	-	0.2	0.2	-	38 WATTS	DIRECT	CONTINUOUS	1.5	115/1	0.417	25	1,3,6

- GENERAL REMARKS:
1. CURB LEVELING AND BLOCKING, BY GENERAL CONTRACTOR
2. PURCHASED BY NDBS

- NOTES:
1. FACTORY INSTALLED AND WIRED NON FUSED DISCONNECT
2. FIELD INSTALL FACTORY PROVIDED MOUNTING BRACKET WITH VIBRATION HANGERS
3. FURNISH WITH SPEED CONTROLLER, INSTALLED AND WIRED BY E.C.
4. FURNISH WITH WEATHERHOOD, INSTALLED BY MC
5. FURNISH WITH INLET GUARD, INSTALLED BY MC
6. FURNISH WITH BACKDRAFT DAMPER
7. FURNISHED WITH MOTOR STARTER - INSTALLED AND WIRED BY EC
8. LINE VOLTAGE THERMOSTAT FURNISHED BY MC, MODEL: DAYTON 1UHH4. WIRED BY EC.

DIRECT FIRED MAKE-UP AIR UNIT SCHEDULE

PLAN MARK	MANUFACTURER	MODEL	LOCATION	SUPPLY FAN					OUTDOOR AIRFLOW [CFM]	NATURAL GAS HEATING					ELECTRICAL			WEIGHT [LBS]	NOTES
				AIRFLOW [CFM]	ESP [IN WC]	HP	BHP	QTY		EDB [°F]	LDB [°F]	INPUT [MBH]	OUTPUT [MBH]	MIN PRESS. [IN WC]	VOLTS/PH	MCA	MOCp		
MAU-1	CAPTVEAIRE	A4-D-1500-30D	WAREHOUSE	10,150	0.05	5	3.78	1	10,150	0	104.5	1,250	1,150	7-14	460/3	9.6	15	1,650	1, 2, 3, 4, 5, 6, 7, 8
MAU-2	CAPTVEAIRE	A4-D-1500-30D	WAREHOUSE	10,150	0.05	5	3.78	1	10,150	0	104.5	1,250	1,150	7-14	460/3	9.6	15	1,650	1, 2, 3, 4, 5, 6, 7, 8
MAU-3	CAPTVEAIRE	A4-D-1500-30D	WAREHOUSE	10,150	0.05	5	3.78	1	10,150	0	104.5	1,250	1,150	7-14	460/3	9.6	15	1,650	1, 2, 3, 4, 5, 6, 7, 8

- GENERAL REMARKS:
1. EXTERNAL STATIC PRESSURE INCLUDES LOSSES DUE TO DUCTWORK, AIR DEVICES, DAMPERS AND DUCT MOUNTED COILS
2. MAINTAIN MINIMUM ELECTRICAL CLEARANCE AS REQUIRED BY NEC
3. MAU SHALL NOT BE STARTED OR OPERATED WITHOUT THE REQUIRED FILTERS INSTALLED
4. CURB LEVELING AND BLOCKING, BY GENERAL CONTRACTOR
5. PURCHASED BY NDBS

- NOTES:
1. FURNISHED WITH 24" TALL, FLAT, UNINSULATED ROOF CURB
2. FACTORY INSTALLED AND WIRED NON-FUSED DISCONNECT SWITCH
3. EC TO FURNISH AND INSTALL GFCI SERVICE OUTLET
4. FURNISHED WITH MAU CONTROL PANEL - EC TO INSTALL AND WIRE
5. FURNISHED WITH 3-WAY DIFFUSER
6. VFD FACTORY MOUNTED AND WIRED
7. FACTORY INSTALLED INTAKE WEATHERHOOD WITH ALUMINUM MESH FILTERS
8. FREEZE PROTECTION

ARCHITECTURAL WALL HEATER SCHEDULE

PLAN MARK	MANUFACTURER	MODEL	LOCATION	FAN DATA		ELECTRIC HEAT COIL			ELECTRICAL		NOTES
				AIRFLOW [CFM]	POWER [W]	LAT [°F]	CAPACITY [MBH]	KW	VOLTS/PH	MCA	
AWH-1	QMARK	AWH4407	ELECTRICAL ROOM	100	-	128.0	13.8	4	277/1	14.4	1.2
AWH-2	QMARK	AWH3150F	PUMP HOUSE	100	-	102.0	5.1	1.5	120/1	12.5	1.2

- GENERAL REMARKS:
1. INLET TEMPERATURE = 55 °F, UNLESS NOTED
2. AWH MOUNTED, INSTALLED, AND WIRED BY EC
3. PURCHASED BY SUBCONTRACTOR

- NOTES:
1. FACORY INSTALLED THERMOSTAT AND DISCONNECT
2. FURNISHED WITH SURFACE MOUNTING SLEEVE.

FIRE DAMPER SCHEDULE

PLAN MARK	MANUFACTURER	MODEL	LOCATION	SERVICE (SA/RA/EA)	APPLICATION (STATIC/DYNAMIC)	DAMPER SIZE			RATING [HRS]	STYLE	MOUNTING (HORZ/VERT)	NOTES
						WIDTH [IN]	HEIGHT [IN]	OVERALL HEIGHT [IN]				
FD-1	RUSKIN	IBD20-1	ELECTRICAL ROOM	EA	STATIC	14	14	14	1.5	A	VERT	1
FD-2	RUSKIN	IBD20-1	ELECTRICAL ROOM	EA	STATIC	14	14	14	1.5	A	VERT	1

- GENERAL REMARKS:
1. FUSIBLE LINK = 165°F
2. PROVIDE SLEEVE AND COORDINATE SIZE AND LENGTH WITH APPLICATION AND MOUNTING LOCATION
3. PROVIDE RETAINING CLIPS AND SEAL OPENING PER UL 555 AND LOCAL REQUIREMENTS
4. COORDINATE FINAL OPENING SIZE WHEN MULTIPLE DAMPERS ARE REQUIRED
5. PURCHASED BY SUBCONTRACTOR

- STYLE:
- A- BLADES IN AIRSTREAM
- B- BLADES OUT OF AIRSTREAM
- C- BLADES OUT OF AIRSTREAM
- G- BLADES OUT OF WALL
- NOTES:
1. FACTORY PROVIDED GRILL MOUNTING TABS

ELECTRIC INFRARED RADIANT HEATER SCHEDULE

PLAN MARK	MANUFACTURER	MODEL	LOCATION	HEATING				CLEARANCE TO COMBUSTIBLES				REFLECTIVE ANGLE	ELECTRICAL		WEIGHT [LB]	NOTES
				ELEMENTS	WATTS	BTUH	TYPE	TOP [IN]	BELOW [IN]	SIDES [IN]	ENDS [IN]		VOLTS/PH	FLA		
IRH-1	QMARK	F2QL16480	FIRE PUMP HOUSE	2	1600	5,459	QUARTZ LAMP	6	84	24	24	90 DEGREE SYMMETRICAL	480/3		40	1

- GENERAL REMARKS:
1. EC TO INSTALL LINE VOLTAGE THERMOSTAT PROVIDED WITH INFRARED HEATER
2. PURCHASED BY SUBCONTRACTOR

- NOTES:
1. PROVIDED WITH HANGING BRACKET - MC TO INSTALL

LOUVER SCHEDULE

PLAN MARK	MANUFACTURER	MODEL	LOCATION	USE (INTAKE / EXHAUST)	AIRFLOW [CFM]	FACE VELOCITY [FPM]	WATER PENETRATION VELOCITY [FPM]	FREE AREA [%]	PD [IN WC]	WIDTH [IN]	HEIGHT [IN]	DEPTH [IN]	ACTUATOR		INTERLOCKED WITH	SECTIONS			NOTES
													VOLT/PH	FAIL POS		QTY	WIDTH [IN]	HEIGHT [IN]	
L-1	RUSKIN	ELM6DW-1	FIRE PUMP HOUSE	INTAKE	4400	803	1,157	52%	0.10	42	36	6	120/1	OPEN	EF-02, THERMOSTAT, DIESEL FIRE PUMP	1	42	36	1,2,3
L-2	RUSKIN	ELF37SDX-1	FIRE PUMP HOUSE	INTAKE	110	326	873	34%	0.02	12	12	6	N/A	N/A	N/A	1	12	12	1,2,3

- GENERAL REMARKS:
1. LOUVERS WILL SHIP 1/4" UNDERSIZED
2. PURCHASED BY NDBS

- NOTES:
1. PROVIDED WITH KYNAR FINISH, COLOR SELECTION BY GC
2. CHANNEL FRAME TYPE
3. FURNISHED WITH BIRDSCREEN, INSTALLED BY MC

ELECTRIC UNIT HEATER SCHEDULE

PLAN MARK	MANUFACTURER	MODEL	LOCATION	FAN DATA		ELECTRIC HEAT COIL				ELECTRICAL		WEIGHT [LBS]	NOTES
				CFM	HP	LAT [°F]	CAPACITY [MBH]	KW	STEPS	VOLTS/PH	FLA		
EUH-1	QMARK	MUH-07-4	FIRE PUMP HOUSE	650	1/3	92.00	25.6	7.5	2	480/3	9	38	1,2

- GENERAL REMARKS:
1. INLET TEMPERATURE = 55 [°F] UNLESS NOTED
2. PURCHASED BY SUBCONTRACTOR

- NOTES:
1. EC TO INSTALL AND WIRE UNIT MOUNTED THERMOSTAT
2. MC TO INSTALL FACTORY PROVIDED WALL HANGING BRACKET

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KEY PLAN

