AIR SEPARATORS

SYMBOL	SYSTEM SERVED	GPM	CONNECTION SIZE INCHES	MAX. P.D. FEET	DESIGN BASIS/ REMARKS
AS-1	MICROTURBINE	20	2	1	B&G ROLAIRTROL R2 WITH STRAINER

NOTES:

07/31/03

POOL WATER HEATER

MARK	TYPE	MBH INPUT	FLUE SIZE	WATER CONN.	AREAS SERVED	EQUIPMENT LOCATION	DEG. F	SEISMIC RESTRAINT	REMARKS
WH-1	HIGH EFFICIENCY	120	4	1 1/2	POOL	MECHANICAL	140	ZONE 3	AO SMITH CYCLONE

NOTES:

07/31/03

EXPANSION TANKS

SYMBOL	SYSTEM SERVED	TYPE	CAPACITY		VALVE SETTING		DESIGN BASIS/ REMARKS
			VOLUME GALS	ACCEPTANCE GALS	PRV PSIG	RELIEF PSIG	
XT-1	HEAT RECOVERY	BLADDER	14	11.5	12	45	B&B HPT 30 V

NOTES:

07/31/03

WATER TO WATER HEAT EXCHANGER

SYMBOL	MINIMUM CAPACITY MBH	TUBE					SHELL					OPER. WEIGHT LBS	DESIGN BASIS/ REMARKS
		GPM	E.W.T. F DEG	L.W.T. F DEG	MAX P.D PSI	FOULING FACTOR	GPM	E.W.T. F DEG.	L.W.T F DEG.	MAX P.D PSI	FOULING FACTOR		
HX-1	1,984	40	83	92.8	0.7	0.0005	20	160	140	2.1	0	78	B&G QW 4 3-2 2

NOTES:

07/30/03

PUMPS

SYMBOL	SYSTEM SERVED	TYPE	GPM	TOTAL HEAD FEET	DESIGN TEMP F DEG.	DESIGN PRESS PSIG	MOTOR			VIBRATION ISOLATION			OPER WEIGHT LBS.	DESIGN BASIS/ REMARKS
							BHP	HP (W)	RPM	BASE TYPE	ISOLATOR TYPE	MIN STATIC DEFLECTION INCHES		
P-1	MICROTURBINE HEAT RECOVERY	IN-LINE	20	45	180	150	0.55	1	1750	-	-	-	85	B&G SERIES 90 SIZE 1-1/2A
P-2	SUPPLEMENTAL POOL HEATER	IN-LINE	10	8	85	150		92W	2840	-	-	-	10	B&G NBF-22

NOTES:

07/31/03

HVAC LEGEND

- EXISTING DUCTWORK
- NEW EQUIPMENT
- EXISTING EQUIPMENT
- DEMOLITION EQUIPMENT
- WALL SWITCH
- EQUIPMENT SYMBOL
- NOTE REFERENCE
- POINT OF CONNECTION (NEW WORK TO EXISTING)
- A — ABANDON
- D — DELIVER TO OWNER
- E — EXISTING TO REMAIN
- C — CUT AND CAP OR PLUG
- K — CUT AND CAP TO BE RECONNECTED
- N — NEW
- R — RELOCATE
- X — EXISTING TO BE REMOVED
- NEW PIPING
- EXISTING PIPING
- DEMOLITION PIPING
- PIPE RISER - UP
- PIPE RISER - DOWN
- BRANCH TOP CONNECTION
- BRANCH BOTTOM CONNECTION
- BRANCH SIDE CONNECTION
- BRANCH CONNECTION
- ELBOW
- BALL VALVE
- GATE VALVE
- GLOBE VALVE
- BUTTERFLY VALVE
- PRV — PRESSURE REDUCING VALVE
- TCV — CONTROL VALVE - TWO WAY
- TCV — CONTROL VALVE - THREE WAY
- SOLENOID VALVE
- AUTOMATIC FLOW CONTROL VALVE
- CHECK VALVE
- BALANCING VALVE
- FLOW MEASURING STATION
- CIRCUIT SETTER
- MAV — MANUAL AIR VENT
- VB — VACUUM BREAKER
- SA — SHOCK ARRESTER
- FS — FLOW SWITCH
- PS — PRESSURE SWITCH
- PRESSURE GAUGE & GAUGE COCK
- GAUGE COCK
- PETE'S PLUG
- THERMOMETER
- RV, SV — RELIEF OR SAFETY VALVE
- SLOPE
- REDUCER
- UNION
- STRAINER
- FLEXIBLE CONNECTION
- HRS — HEAT RECOVERY SUPPLY
- HRR — HEAT RECOVERY RETURN
- NP — NON-POTABLE
- D — DRAIN

SECTION 15083 - PIPE INSULATION
1.1 SUMMARY
A. Pipe insulation, insulating cements, field-applied jackets, and accessories.
1.2 QUALITY ASSURANCE
A. Fire-Test-Response Characteristics: Flame-spread rating of 25, and smoke-developed rating of 50 for insulation installed indoors; according to ASTM E 84.
1.3 FIELD QUALITY CONTROL
A. Inspections: By Owner-engaged agency.
1.4 INSULATION APPLICATION SCHEDULE
A. Interior Domestic Hot, Recirculated Hot Water, and Heat Recovery Water: Cellular glass with factory-applied jacket Flexible elastomeric Polyolefin Closed-cell phenolic foam Calcium silicate; and with field-applied jacket.
END OF SECTION 15083

SECTION 15181 - HYDRONIC PIPING
1.1 SUMMARY
A. Piping and hydronic specialties for hot-water heating and makeup water for these systems.
1.2 QUALITY ASSURANCE
A. Quality Standard: ASME B31.9.
1.3 PRODUCTS
A. Valves:
1. General-duty valves.
2. Calibrated ball valves.
3. Calibrated balancing valves.
4. Pressure-reducing valves.
5. Safety valves.
6. Automatic flow-control valves.
7. Plastic ball valves.
8. Plastic butterfly valves.
B. Air Vents: Automatic.
C. Expansion Tanks: ASME labeled with bladder or diaphragm air chamber.
D. Air Separators: Tangential type.
E. Bypass chemical feeder.
F. Strainers: Y-pattern, basket, and T-pattern.
1.4 INSTALLATION
A. Heat Recovery Water Applications:
1. NPS 2 and Smaller: Drawn-temper copper tubing with soldered joints or Schedule 40 steel pipe with threaded joints for aboveground.
B. Pool-Water Applications:
1. Schedule 80, CPVC pipe with solvent-welded joints.
END OF SECTION 15181

SECTION 15185 - HYDRONIC PUMPS
1.1 SUMMARY
A. Close-coupled, in-line centrifugal pumps.
1.2 QUALITY ASSURANCE
A. Quality Standard: UL 778.
1.3 PRODUCTS
A. Close-Coupled, In-Line Centrifugal Pumps (Heat Recovery Side):
1. Casing: Radially split, cast iron.
2. Impeller: Cast bronze.
3. Pump Shaft: Steel, with copper-alloy shaft sleeve.
4. Seal: Mechanical.
5. Pump Bearings: Permanently lubricated ball bearings.
END OF SECTION 15185

SECTION 15441 - WATER DISTRIBUTION PUMPS
1.1 SUMMARY
A. Centrifugal pumps for domestic cold- and hot-water systems.
B. Close-Coupled, In-Line, Sealless Centrifugal Pumps: Hermetically sealed, replaceable-cartridge-type with bronze impeller.
C. Controls: Electric thermostat with water-immersion sensor.
END OF SECTION 15441

SECTION 15486 - FUEL-FIRED WATER HEATERS
1.1 SUMMARY
A. Gas water heaters.
1.2 QUALITY ASSURANCE
A. Quality Standard for Performance Efficiency: ASHRAE/IESNA 90.1 and ASHRAE 90.2.
1.3 WARRANTY
A. Materials and Workmanship:
1. Commercial, Gas Water Heaters: Five years.
1.4 PRODUCTS
A. Commercial, High-Efficiency, Gas Water Heaters: ANSI Z21.10.3/CSA 4.3.
1. Description: Manufacturer's proprietary design to provide at least 88 percent combustion efficiency.
2. Storage Tank Construction: ASME-code steel with 150-psig minimum working-pressure rating.
3. Interior Finish: Comply with NSF 61.
4. Lining: Glass complying with NSF 61.
5. Burner or Heat Exchanger: For natural-gas fuel.
6. Temperature Control: Adjustable themostat.
7. Safety Controls: Automatic, high-temperature-limit and low-water cutoff.
8. Energy management system interface.
9. Capacity: 60.
10. Recovery: 171 at 100 deg F temperature rise.
B. Water Heater Accessories:
1. Gas Shutoff Valves: Manually operated.
2. Gas Pressure Regulators: Appliance type.
3. Gas Automatic Valves: Appliance, electrically operated.
4. Combination temperature and pressure relief valves.
5. Pressure relief valves.
6. Water heater stand and drain pan units.
7. Water heater mounting brackets.
8. Piping Manifold Kits: Manufacturer's factory-fabricated.
1.5 SOURCE QUALITY CONTROL
A. Water Heater Storage Tanks, Specified to Be ASME-Code Construction: Tested and inspected according to ASME Boiler and Pressure Vessel Code.
END OF SECTION 15486

SECTION 15487 - HEAT EXCHANGERS
1.1 SUMMARY
A. Heat exchangers.
1.2 QUALITY ASSURANCE
A. Quality Standard for Performance Efficiency: ASHRAE/IESNA 90.1 and ASHRAE 90.2.
1.3 WARRANTY
A. Materials and Workmanship:
1. Instantaneous Heat Exchangers: One year(s).
2. Circulating, Storage Heat Exchangers: Five years.
3. Compression Tanks: One year(s).
1.4 PRODUCTS
A. Heating-Fluid-in-U-Tube-Coil, Instantaneous Heat Exchangers:
1. Description: Tankless, packaged assembly of heat-exchanger coil, controls, and specialties for heating pool water in tubes with heating hot water in shell.
2. Construction: ASME-code, with 150-psig minimum working-pressure rating.
3. Configuration: Horizontal.
4. Heat-Exchanger Coil: Copper, single-wall, U tubes for heating fluid.
5. Flow Rate: See schedule.
1.5 SOURCE QUALITY CONTROL
A. Heat Exchangers, Specified to Be ASME-Code Construction: Tested and inspected according to ASME Boiler and Pressure Vessel Code.
END OF SECTION 15487

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LEGEND AND SCHEDULES

NEW MICROTURBINE GENERATOR
LEWIS AND CLARK COLLEGE
0615 SW PALATINE HILL ROAD
PORTLAND, OR 97219

REVISIONS:
100% CONSTRUCTION DOCUMENTS

DATE: 07-31-03
JOB No.: 3036.00
SCALE: NONE
DRAWN BY: BJL

M1.1