PIPING SYMBOLS

- PRIMARY PROCESS FLOW PATH
- SECONDARY FLOW PATH
- HEAT TRACE
- INSULATED PIPELINE
- SKID LIMIT

INSTRUMENT LINE SYMBOLS

- PNEUMATIC SIGNAL
- ELECTRIC SIGNAL
- UNDEFINED SIGNAL
- INTERNAL SYSTEM LINK SOFTWARE OR DATA
- CAPILLARY TUBE

VALVE ACTUATOR SYMBOLS

(NO SYMBOL) = MANUAL FOR ON-OFF SERVICE

- HANDWHEEL (MANUAL OVERRIDE)
- ELECTRIC
- SOLENOID — (WITHOUT) (WITH) = MANUAL OVERRIDE
- DIAPHRAGM – AIR TO AIR — (WITHOUT) (WITH) = POSITIONER
- DIAPHRAGM & SPRING — SPRING TO OPEN, SPRING TO CLOSE (WITHOUT) (WITH) = POSITIONER
- DOUBLE-ACTING CYLINDER — (WITHOUT) (WITH) = POSITIONER
- CYLINDER & SPRING — SPRING TO OPEN, SPRING TO CLOSE

SYMBOLS FOR VALVE ACTION IN THE EVENT OF ACTUATOR POWER FAILURE.

FO — SYMBOL LOCATED BY VALVE– USED ONLY WHERE NECESSARY TO INCREASE UNDERSTANDING OF THE SYSTEM.

- FO = FAIL OPEN
- FC = FAIL CLOSED
- FL = FAIL LOCKED
- FI = FAIL INDETERMINATE (LAST POSITION)
- F = USED WITH 3 WAY & 4 WAY VALVE– ARROWS SHOW PATHS OPEN TO FLOW ON POWER FAILURE.

SYMBOLS FOR SELF-ACTUATED REGULATORS

- SELF CONTAINED
- EXTERNAL TAP
- PRESSURE REDUCING REGULATOR
- BACK PRESSURE REGULATOR
- DIFFERENTIAL PRESSURE REDUCING REGULATOR– SHOWN WITH INTERNAL AND EXTERNAL PRESSURE TAPS.
- PRESSURE RELIEF
- VACUUM RELIEF
- RUPTURE DISC OR SAFETY HEAD
- ANGLE
- STRAIGHT
- PRESSURE RELIEF
- ANGLE
- STRAIGHT WITH WELL
- VACUUM RELIEF
- AUTOMATIC AIR RELIEF
- REDUCER_SIZE PRESSURE VACUUM RELIEF
- TEMPERATURE REGULATOR FILLED SYSTEM
- LEVEL REGULATOR. FLOAT OPERATED MECHANICAL LINKAGE
- CONTINUOUS DRAINER BALL FLOAT TYPE
- TANK — WITH EQUALIZING CONNECTION
- TRAPS

HEAT EXCHANGER SYMBOLS

- SHELL & TUBE HEAT EXCHANGER
- ELECTRICAL HEATING ELEMENT
- AIR COOLED HEAT EXCHANGER
- HEAT EXCHANGER GENERAL
- DIRECT CONTACT JET MIXER

PRIME MOVERS FOR MOTOR DRIVEN EQUIPMENT

- ELECTRIC MOTOR
- PNEUMATIC ROTARY MOTOR

MOTOR DRIVEN EQUIPMENT

- CENTRIFUGAL PUMP
- ROTARY BLOWER
- FAN / BLOWER
- VERTICAL CENTRIFUGAL PUMP
- VERTICAL TURBINE
- SUBMERSIBLE PUMP
- CHEMICAL FEED PUMP
- PERISTALTIC PUMPS
- DIAPHRAGM CHEMICAL FEED PUMP–WITH INTERNAL RELIEF VALVE
- PROGRESSIVE CAVITY PUMP
- DIAPHRAGM PUMP (PNEUMATIC OPERATION)
- LIQUID RING VACUUM PUMP
- AGITATOR OR MIXER

PIPING ACCESSORIES AND DETAILS

- STEAM TRAP
- Y STRAINER
- CONE STRAINER
- SCREEN STRAINER OR STATIC MIXER
- STATIC MIXING
- EDUCTOR
- BACKFLOW PREVENTER
- SPRAY NOZZLE OR SPARGER
- CHEMICAL SEAL
- EXPANSION JOINT
- FLEX HOSE
- STRAIGHTENING VANES
- FILTER
- SCOPE LIMITS
- INSTRUMENT TAG
- FLOW METER
- THERMOWELL
- SIMPLEX BASKET STRAINER
- DUPLEX BASKET STRAINER
- AIR FILTER
- MIST ELIMINATOR
- PULSATION DAMPER
- SIGHT GLASS
- SPECTACLE BLIND
- RESTRICTION ORIFICE
- INSULATED FLANGE OR DIELECTRIC UNION — DU
- QUICK DISCONNECT ASSEMBLY
- SUMP/DRAIN
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER FLAT ON TOP
- ECCENTRIC REDUCER FLAT ON BOTTOM
- ORIFICE FLANGE
- INTAKE/EXHAUST MUFFLER

MATERIAL

BRZ – BRASS/BRONZE	PET – POLYETHYLENE
CIR – CAST IRON	POP – POLYPROPYLENE
CST – CARBON STEEL	PVC – POLYVINYL CHLORIDE
CPR – COPPER	RUB – RUBBER
FRP – FIBERGLASS	S04 – 304 STAINLESS STEEL
GCS – GALVANIZED CARBON STEEL	S4L – 304L STAINLESS STEEL
LCS – LINED CARBON STEEL	S16 – 316 STAINLESS STEEL
TEF – TEFLON	S6L – 316L STAINLESS STEEL
CVC – CHLORINATED POLYVINYL CHLORIDE	VIT – VITON

TYPE

D = DUCT P = PIPE
H = HOSE T = TUBE

PIPE LINE DESIGNATION

6"–WW–S04P80–001–HT&I or N

- SIZE
- SERVICE
- PIPING SPECIFICATION
- LINE NO.
- HEAT TRACE (ELECTRIC)
- INSULATION
- NO HEAT TRACE OR INSULATION

VALVE SYMBOLS

- GATE
- GLOBE
- BALL
- PLUG
- 3 WAY PLUG
- BUTTERFLY
- CHECK
- DIAPHRAGM
- PINCH
- NEEDLE
- 3 WAY
- 4 WAY
- ANGLE
- KNIFE GATE
- WEIGHTED RELIEF
- VALVE (UNDEFINED TYPE)
- DAMPER

TANK ACCESSORIES

- MANHOLE/ACCESS
- COUPLING (HALF OR FULL)
- FLANGED NOZZLE
- INSULATION
- FLAME ARRESTOR
- TAG — EQUIPMENT TAG
- X — CONSTRUCTION NOTES NUMBER

GENERAL NOTES:

1. FOR INSTRUMENTATION SYMBOLS, AND LIST OF RELAY FUNCTIONS. SEE SHEET 2, DRAWING 1373–PID–LB.

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HENDERSON, NV

PIPING & INSTRUMENTATION DIAGRAM
LEGEND SHEET
SHEET 1
REPLACEMENT CHROMIUM TREATMENT FACILITY

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SHEET 1 OF 1
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