PROCESS LINE IDENTIFICATION

- PROCESS MAJOR FLOW LINE
- FUTURE PROCESS MAJOR FLOW LINE
- OBJECT OR MINOR FLOW LINE
- MATCHLINE OR SKID OUTLINE BATTERY LIMITS
- FUTURE
- EXISTING
- HEAT TRACED LINE
- SOFTWARE
- PIPE CROSSING
- STREAM CONTINUATION / FROM/TO DESCRIPTION / P04–XXX
- SERVICE DESCRIPTION DWG # — UTILITY SERVICE CONTINUATION FLAG

INSTRUMENT LINE IDENTIFICATION

- INSTRUMENT SUPPLY, OR CONNECTION TO PROCESS
  - . IAS = INSTR. AIR SUPPLY
  - . PA = PLANT AIR SUPPLY
  - . N2 = NITROGEN SUPPLY
- PNEUMATIC SIGNAL LINES
- ELECTRONIC SIGNAL LINES
- CAPILLARY SIGNAL LINE
- HYDRAULIC SIGNAL LINE
- ELECTROMAGNETIC, SONIC, OPTIC, OR NUCLEAR SIGNAL (GUIDED)
- ELECTROMAGNETIC, SONIC, OPTIC, OR NUCLEAR SIGNAL (UNGUIDED) WIRELESS
- INTERNAL SYSTEM LINK (SOFTWARE OR DATA LINK)
- MECHANICAL LINK
- INSTR. OR ELECT. CONTINUATION / FROM/TO DESCRIPTION / P04–XXX

MISCELLANEOUS

- I/A — INSTRUMENT AIR
- CHEMICAL SEAL
- SP XX — SPECIALITY ITEM
- TP XX — TIE IN TO EXISTING PIPING OR PIPING BY OTHERS
- MATERIAL, INSULATION, PIPING SPEC. CHANGE CALLOUT

(F)	FURNISHED
AG	ABOVE GROUND
CS	CARBON STEEL
IPC	INTERNAL PIPE COAT
POLY	POLY PIPE
SR	STRESS RELIEVE
UG	UNDERGROUND
—	JOB SPECIFIC

PIPING IN–LINE COMPONENTS

- METHANOL / P04–XXX / TUBING PIPE 1/2" 1/2" — METHANOL INJECTION
- RUPTURE DISC (PRESSURE)
- RUPTURE DISC (VACUUM)
- FILTER
- STRAINER ("Y" TYPE)
- TEMPORARY STRAINER (S, 3/4")
- FLEXIBLE HOSE
- OPEN DRAIN
- SPECTACLE BLIND (CLOSED)
- SPECTACLE BLIND (OPEN)
- 3"x2" — REDUCER
- WELD CAP
- THREADED CAP
- 1/2" — THREADED PLUG
- BF — BLIND FLANGE
- HOSE CONNECTION
- EXPANSION JOINT
- FLAME ARRESTOR
- 1/2" — BLEED RING
- IF — INSULATING FLANGE SET

FLOW METERS AND INDICATORS

- FLOW SIGHT GLASS
- ROTOMETER
- ORIFICE PLATE W/FLG TAPS
- ORIFICE PLATE IN QUICK CHANGE FITTING
- VORTEX METER
- POSITIVE DISPLACEMENT METER
- TURBINE METER
- AVERAGING PITOT TUBE
- STRAIGHTENING VANE
- C — CORIOLIS
- 2 — ULTRASONIC METER
- SENIOR FITTING

VALVES AND ACTUATORS

- GATE VALVE
- GLOBE VALVE
- NEEDLE VALVE
- BALL VALVE
- BALL VALVE WITH P.P.E. OF VALVE DENOTED
- BUTTERFLY VALVE
- CHECK VALVE
- STOP CHECK VALVE
- PLUG VALVE
- AIR ACTUATED VALVE
- ANGLE VALVE
- 3–WAY VALVE
- 4–WAY VALVE
- RELIEF VALVE
- PILOT OPERATED RELIEF VALVE
- VAC. — VACUUM RELIEF VALVE
- PRESS. — PRESSURE AND VACUUM RELIEF
- FC — CONTROL VALVE (FC = FAIL CLOSED, FLP = FAIL LAST POSITION, FO = FAIL OPEN)
- PRESSURE REDUCING REGULATOR (SELF–CONTAINED)
- BACK PRESSURE REGULATOR (SELF–CONTAINED)
- M — MOTOR OPERATED VALVE
- SINGLE ACTING PISTON OPERATED VALVE
- DOUBLE ACTING PISTON OPERATED VALVE
- SOLENOID OPERATED 3–WAY VALVE
- SOLENOID OPERATED 3–WAY VALVE WITH MANUAL LATCHING RESET
- HANDWHEEL

MANUAL VALVE POSITIONS

CSO	CAR SEAL OPEN
CSC	CAR SEAL CLOSED
NO	NORMALLY OPEN
NC	NORMALLY CLOSED

SPECIAL FITTINGS & SYMBOLS

- TRAP — T
- TRAP ASSEMBLY — TA
- EXPANSION JOINT
- HOSE COUPLING
- STRAINER
- TEMPORAY STRAINER — TS
- SIGHT FLOW INDICATOR
- CONSERVATION VENT
- ATMOSPHERIC PRESSURE VENT
- VACUUM BREAKER
- FLAME ARRESTOR — IN–LINE TYPE / CAP TYPE
- COMBINATION CONSERVATION VENT & FLAME ARRESTOR
- EMERGENCY VENT (MANWAY HATCH)
- BLEED BLIND (BLEED VALVES SIZE AS PER SPEC.) — TRANSMITTER
- BLEED RING (MAY HAVE 1 OR 2 VALVES, SIZE AS PER PIPING SPEC.)
- SEAL FLUSH — SF
- RUPTURE DISC
- RESTRICTION ORIFICE
- VESSEL ENTRY SPECTACLE BLIND
- SPACER RING — SR
- CATHODIC PROTECT
- VALVE BOX
- DIAPHRAGM SEAL
- SLOPE LINE IN DIRECTION SHOWN AT GIVEN SLOPE — X"/FT — POCKETS NOT PERMITTED

PIPE STANDARDS

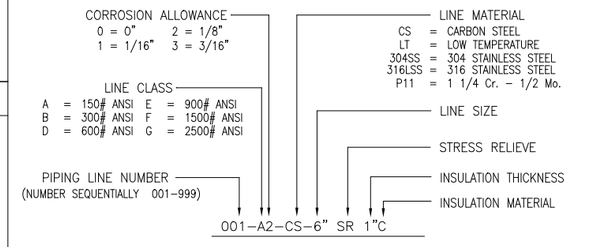
REQUIREMENTS FOR POTABLE WATER, SEWER AND DRAIN SYSTEMS THAT DO NOT HAVE A PROCESS FUNCTION.

ASME – B31.1 – POWER PIPING
ASME – B31.4 – LIQUID PETROLEUM TRANSPORTATION PIPING SYSTEMS
ASME – B31.5 – REFRIGERATION PIPING
ASME – B31.8 – GAS TRANSMISSION AND DISTRIBUTION PIPING SYSTEMS
ASME – B31.9 – BUILDING SERVICES PIPING
ASME – B31.11 – SLURRY TRANSPORTATION PIPING SYSTEMS
ANSI/AGA – Z223.1 – NATIONAL FUEL GAS CODE (SAME AS NFPA 54)
AWWA – C100 – CAST IRON PIPE FITTINGS
AWWA – C200 – STEEL PIPE
AWWA – C500 – VALVES AND HYDRANTS
AWWA – C600 – PIPE LAYING
AWWA – C900 – PVC PRESSURE PIPE
AWWA – M11 – STEEL PIPE–GUIDE FOR DESIGN AND INSTALLATION
NFPA – MULTIPLE – FIRE PROTECTION SYSTEMS

FLUID OR GAS SYMBOL CODES

AC – ACIDIFIED COOL CONDENSATE
AD – AMINE DRAIN
AF – ANTIFOAM
AF – ANTI FREEZE
AM – AMMONIA
AN – ACRLYLONITRILE
AV – AMINE VAPOR
AVS – ANALYZER VENT SCRUBBER
BC – BLOWDOWN, CONTINUOUS
BD – BLOWDOWN, INTERMITTENT
BF – BOILER FEED WATER
CC – CHILLED CONDENSATE
CD – CARBON DIOXIDE
CDR – CLOSED DRAIN
CE – CONDENSATE (EXHAUST)
CL – CONDENSATE, LOW PRESSURE
CLS – CLEAN WATER SEWER
CM – CONDENSATE, MEDIUM PRESSURE
CPC – PROCESS CONDENSATE
CR – CRUDE AN
CTG – TURBOGEN CONDENSATE
CWD – CLEAN WATER DITCH
CWR – COOLING/CIRCULATING WATER RETURN
CWS – COOLING/CIRCULATING WATER SUPPLY
CWT – COOLING/CIRCULATING WATER, TEMPERED
DNx – DEDICATED NITROGEN (x = SERVICE)
DR – DRAIN
DSW – DESUPERHEATING WATER
DW – DEMINERALIZED WATER
FG – FUEL GAS
FL – FIRE PROTECTION LIQUID (FOAM)
FLO – FLUSH OIL
FLR – FLARE
FO – FUEL OIL
FW – FIRE PROTECTION WATER
GH – GAS HYDROCARBON
GPW – GENERAL PROCESS WATER
GS – GAS SUPPLY
HBF – HIGH PRESSURE BOILER FEED WATER, 1250 PSIG
HCL – 36% HCL
HCP – THERMINOL PRIMARY CONDENSATE
HCS – THERMINOL SECONDARY CONDENSATE
HLS – THERMINOL LIQUID SUPPLY
HLR – THERMINOL LIQUID RETURN
HM – HEATING MEDIA
HOA – HIGH PRESSURE DEAERATOR WATER OUT
HV – THERMINOL VENT
HVP – THERMINOL PRIMARY VAPOR
HVR – THERMINOL VAPOR RELIEF
HVS – THERMINOL SECONDARY VAPOR
HVV – THERMINOL VACUUM VENT
HW – HOT WATER
IA – INSTRUMENT AIR
IG – INERT GAS
JW – JACKET WATER
K – CHEMICALS
KLR – COOLING LIQUID RETURN
KLS – COOLING LIQUID SUPPLY
KxR – DEDICATED KLR (x = SERVICE)
KxS – DEDICATED KLS (x = SERVICE)
LA – LEAN AMINE
LBF – LOW PRESSURE BOILER FEED WATER, 450 PSIG
LG – LEAN GYCOL
LH – LIQUID HYDROGEN
LO – LUBE OIL
M – MIXTURE (STEAM & WATER)
MBF – MEDIUM PRESSURE BOILER FEED WATER, 600 PSIG
ME – METHANOL
MOA – MEDIUM PRESSURE DEAERATOR WATER OUT
NIL – NITROGEN, LOW PRESSURE
NG – NATURE GAS
NIH – NITROGEN, HIGH PRESSURE
OD – OPEN DRAIN
OM – OIL MIST
OR – ORGANIC VAPOR RELEASE
OX – OXYGEN
PA – PLANT AIR
PD – PROCESS DRAIN
PF – PROCESS FLARE
PF – PRODUCED FLUID
PG – PRODUCED GAS
PO – PRODUCED OIL
PR – PROPYLENE
PRW – PROCESS WATER
PS – PROCESS SEWER
PV – PROCESS VENT
PW – POTABLE WATER
RA – RICH AMINE
RF – REFRIGERANT
RG – RICH GLYCOL
RO – REVERSE OSMOSIS WATER
RW – RAW WATER
SA – SULFURIC ACID
STA – STARTING AIR
SE – STEAM, EXHUAST (STM. < 50 PSIG)
SG – START GAS
SH – STEAM, HIGH (STM. > 650 PSIG)
SL – STEAM, LOW (STM. > 50 PSIG & < 200 PSIG)
SLG – SEAL GAS
SM – STEAM, MEDIUM (STM. > 200 PSIG & < 650 PSIG)
SW – POLISHED ZEOLITE WATER
SW – SEAL WATER
TW – TREATED WATER
TWR – TOWER WATER RETURN
TWS – TOWER WATER SUPPLY
UA – UTILITY AIR
UW – UTILITY WATER
V – VENT
VC – VACUUM
W – WATER (PRODUCED)
WC – CLARIFIED WATER
WF – FILTERED WATER
WW – WASTE WATER
ZW – ZEOLITE WATER / POLISHED WATER

LINE DESCRIPTION



FLANGE RATING

A	150# ANSI
B	300# ANSI
D	600# ANSI
E	900# ANSI
F	1500# ANSI
G	2500# ANSI

VALVE MATERIAL

1	CARBON STEEL
2	LOW TEMP
3	304SS
4	316LSS
5	1 1/4 Cr. – 1/2 Mo.
6	CPVC
7	BRASS

NOTE:

1. ANY STAINLESS STEEL USED IN CO2, AMINE, OR WET SOUR SERVICE SHALL BE L–GRADE.

REFERENCE DRAWINGS

NO.	TITLE
–	–

REVISIONS

NO.	FIRM	DATE	DESCRIPTION	BY	CHK.	APP.
A	MSC	04/15/21	ISSUED FOR REVIEW	GJR	–	–
B						
C						
D						
E						
F						

XXXX

ENGINEERING RECORD

	BY	DATE
DRN:	GJR	04/15/21
DES:	–	–
CHK:	–	–
APP:	–	–
AFE No.	–	–
SE&C JOB NO.		–
PROJ. ENGR:		–
SCALE:	NONE	

MSC MARS SPACE CONSTRUCTION, LLC
ENGINEERING, DESIGN & CONSTRUCTION
TEXAS REGISTERED ENGINEERING FIRM F–XXXX

CLIENT LOGO

MARS BASE PROCESS SERVICES
UTIILTY SERVICES

P&ID LEGEND
MONTGOMERY COUNTY, TEXAS

PLOT SCALE N/A
CAD NO. PID–101
DWG. NO. D–XXXX–P05–101
REV A

C:\DESIGN\ P&ID\ MSC\MSC–D–XXXX–P04–101_A