# EQUIPMENT

WEIGHER
BUCKET FILTER
BLOWER
PUMP
CYLINDER
STRAINER OR FILTER
VERTICAL PUMP
SHELL AND TUBE EXCHANGER
PLATE HEAT EXCHANGER
PULSATION DAMPENER
VENTURY
SEAL GAS INLET FILTER
NOZZLE – EDGE
NOZZLE – FACE
NOZZLE – COUPLING
NOZZLE – RECTANGLE TO ROUND TRANSITION
MIXER
ELECTRICAL ACTUATOR
AIR COOLER
FILTER
SEPARATOR
VESSEL,RECIEVER

## GENERAL

CONTINUATION DRAWING TAG — M5–nnn / 100–XXX–nnn–XX / TO/FROM DESCRIPTION
INSTRUMENT AIR TO INDIVIDUAL USER — IA
DIRECTION OF FLOW
SPECIFIED AND PROVIDED BY EQUIPMENT VENDOR — (*)
CONTRACTOR/CLIENT/VENDOR BATTERY LIMITS — CONTRACTOR / CLIENT

| ABBREVIATIONS | |
|---|---|
| DRAWING | DWG |
| ELEVATION | EL. |
| MAXIMUM | MAX |
| MILLIMETERS | mm |
| MINIMUM | MIN |
| PARTS PER MILLION | PPM |

OR — B.L.

PIPING SPECIFICATION BREAK — C2/C1
AREA No. BREAK — 300 / 100, AREA / AREA
INDICATES EQUIPMENT, PIPING AND INSTRUMENTATION PURCHASED AS AN ASSEMBLY OR FURNISHED WITH MAJOR EQUIPMENT. DETAILS SUBJECT TO VENDOR DESIGN.

# PIPING

## VALVES & FITTINGS

BALL VALVE
BLAST GATE VALVE
BUTTERFLY VALVE
CHECK VALVE
DIAPHRAGM OR PINCH VALVE
GATE VALVE
GLOBE VALVE
KNIFE GATE VALVE
NEEDLE/REGULATOR VALVE
PETCOCK VALVE
PLUG VALVE
BALL CHECK VALVE
INDICATION TYPE
PRESSURE REDUCING VALVE
ANGLE VALVE
3 WAY VALVE
4 WAY VALVE
BREAKING VALVE
CONCENTRIC REDUCER
ECCENTRIC REDUCER (FLAT ON TOP) — FOT
ECCENTRIC REDUCER (FLAT ON BOTTOM) — FOB

## PIPING NOTES

1) FOR EXPLANATION OF PIPING SPECIFICATION CLASSES SEE "SPECIFICATION FOR PIPING MATERIAL"
2) E.O.P. END OF PIPE; T.O.P. TOP OF PIPE; B.O.P. BOTTOM OF PIPE; F.O.T. FLAT ON TOP; F.O.B. FLAT ON BOTTOM; N.O. NORMALLY OPEN; N.C. NORMALLY CLOSED; L.O. LOCKED OPEN; L.C. LOCKED CLOSED
3) PIPE INDENTIFICATION IS AS FOLLOWS.

XXXX–XXX–XXXXX–XX
PIPE SPEC CLASS
SERIAL NO.
SHEET NO.
SYSTEM DESIGNATION
PIPE SIZE (mm)
1000–MWS–00101–C6

4) LINES INDICATED WITH SLOPE ARROW SHALL BE ROUTED IN A MANNER THAT ELIMINATES SYSTEM POCKETS. ALL HORIZONTAL RUNS SHALL SLOPE DOWN FROM THIER SOURCE AT APPROXIMATE RATE OF 5mm PER METER. SLOPE
5) FOR BRICK–LINED PIPE THE PIPE SIZE SHOWN IN PIPING NOTE 3 IS THE INTERNAL DIAMETER OF THE STEEL CASING. DIMENSIONS IN PARENTHESIS INDICATE THE INTERNAL DIAMETER OF THE REFRACTORY.
6) VENTS SHOWING ANGLE TO HAVE 45° ANGLE TURNED IN DIRECTION OF PREVAILING WIND.
7) VENT LINES MUST BE ROUTED IN A MANNER THAT ELIMINATES SYSTEM POCKETS AND MINIMIZES THE NUMBER OF TURNS.
8) INSULATION TYPE IS AS FOLLOWS.

HC – HEAT CONSERVATION
PP – PERSONNEL PROTECTION
SC – SOUND CONTROL
F – WINTERIZE — XX
ET – ELECTRIC TRACE — ET

## PIPING IDENTIFICATION CODES

| SYSTEM DESIGNATION | PIPING CLASS | SYSTEM |
|---|---|---|
| AA | C4 | AUXILIARY AIR |
| BSG | C3 | BOTTOM SEAL GAS |
| CA | C3,C4,C8 | COMBUSTION AIR |
| CG | C2, C3 | COOLING GAS |
| CHB | P1 | CHEMICAL ADDITIVE, BIOCIDE |
| CHD | C1 | CHEMICAL ADDITIVE, DISSPERSANT |
| CHF | C1 | CHEMICAL ADDITIVE, FLOCCULANT |
| CHM | P1 | CHEMICAL ADDITIVE, CORROSION INHIBITOR |
| DA | C4 | DILUTION AIR |
| DP | C10, C13 | DUST COLLECTION/VAPOR REMOVAL |
| DW | C1 | DRAIN WATER |
| FG | C3 | FLUE GAS |
| FW | C12/P2 | FIRE FIGHTING WATER (ABOVE GROUND/UNDER GROUND) |
| HF | C9,C16 | HYDRAULIC FLUID |
| IA | C5 | INSTRUMENT AIR |
| IP | C6 | IMPULSE PURGE |
| LO | C9 | LUBE OIL |
| MWR | C1 | MACHINERY COOLING WATER RETURN |
| MWS | C1 | MACHINERY COOLING WATER SUPPLY |
| NG | C6,C8,C15 | NATURAL GAS |
| PA | C1 | PLANT AIR |
| PG | C6,C11,C17 | PURGE GAS |
| PRG | C2,C8,C17 | PROCESS GAS |
| PW | C5 | POTABLE WATER |
| PWR | C1 | PROCESS WATER RETURN |
| PWR | S1 | SEAL GAS CONDENSATE |
| PWS | C1, C7 | PROCESS WATER SUPPLY |
| RF | C3,C17 S2 | REFORMER FEED GAS |
| RG | C3 | REFORMED GAS |
| SG | C6, C17 | SEAL GAS |
| SL | C7 | SLURRY |
| SW | C1 | SEAL WATER/MAKEUP WATER |
| TG | C3 | TOP GAS |
| TGF | C2 | TOP GAS FUEL |
| VE | C4 | VENT |
| RW | C1 | RAW WATER |
| IG | C6 | INERT GAS |
| OX | S3 | OXYGEN(GASEOUS) |
| BA | C4 | BLOWING AIR |
| RJW | S4 | REJECTED WATER |
| AC | C5 | COMPRESSED AIR |

## MISCELLANEOUS (PIPING SPECIALS)

EXPLOSION FLAP
RUBBER EXPANSION JOINT, VIBRATION ISOLATOR
BELLOWS
TEXTTILE TYPE EXPANSION JOINT
FLEXIBLE HOSE
AIR TRAP
FIRE HYDRANT
HOSE REEL W/PRESSURE REDUCING ANGLE VALVE
EXPANSION SLEEVE
PADDLE BLIND (NORMALLY OPEN)
PADDLE BLIND (NORMALLY CLOSED)
Y–TYPE STRAINER (ALL STRAINERS TO HAVE BASKET DRAINS)
T–TYPE STRAINER
FLAME ARRESTOR
SCREWED CONNECTION
FLANGED CONNECTION
SPRAY NOZZLE
TEST POINT — TP

## MISCELLANEOUS (PIPING GRAPHICS)

PIPE CAP OR WELDED DISHED HEAD
BLINDING(SCREWED CAP)
UNDER GROUND PIPING
SUPPLIED BY VENDOR WITH EQUIPMENT PACKAGE
BRICK LINED PIPING (SEE PIPING NOTE 5)
HYDRAULIC PIPING
INSULATION (SEE PIPING NOTE 9)
UNION (IN–LINE)
UNION
INSULATED VESSEL
GUIDE VANES
FUNNEL OR HUB DRAIN
VENT CAP
GOOSE NECK VENT
HOSE CONNECTION FULL COUPLING. THD.

# INSTRUMENTATION

SOFTWARE SIGNAL
ELECTRICAL SIGNAL
GAMMA RADIATION (R), INFRARED (I), OR SONIC (S), OR MICROWAVE (M) SIGNAL
INSTRUMENT AIR PIPING
INSTRUMENT IMPULSE PIPING
CONTROL INSTRUMENT (PANEL OR SOFTWARE)
LOCALLY MOUNTED INSTRUMENT
MOTOR LOCAL PANEL — MN / XXX

## FLOW

IN–LINE FLOW DEVICES
ROTAMETER; VORTEX OR THERMAL METER; AVERAGING PITOT TUBE; V–CONE; INTEGRAL ORIFICE
TURBINE; MAGNETIC METER; PITOT TUBE; ULTRASONIC; ORIFICE

FI OR FT — 15 — 15 — FE — FIG. 1 RADIUS TAPS
FO — RESTRCTION BLANK ORIFICE
FI OR FT — FLOWMETER WITH ORIFICE PLATE TAP — FE
F : FLANGE TAP
FLOW ELEMENT WITH TEST POINTS — TP TO INCLUDE HOSE CONNECTOR AND SHUT–OFF VALVE. (SEE INSTRUMENTATION NOTE 1) — TP
FI OR FT
INDICATES LOCKED OPEN VALVE WITHOUT 2–VALVE MANIFOLD

## TEMPERATURE

TW — THERMO WELL
TE — TT — TI — THERMOCOUPLE/RTD
TI — THERMO METER

## PRESSURE

PI — PT — PRESSURE TRANSMITTER
PDI — PDT — PRESSURE DIFFERENTIAL TRANCMITER
PI — PRESSURE INDICATOR WITH DIAPHRAGM SEAL — PIPING — INSTR — 8D — 5–15
INDICATES 2–VALVE MANIFOLD WITH ISOLATION VALVES
FIG. 1 IS TO BE USED TO INDICATE FIG. 2 (INSTRUMENTATION NOTE 6)
PI OR PT — PIPING — INSTR — FIG. 1
PI OR PT — PIPING — INSTR — FIG. 2

## CONTROL VALVES AND ACTUATORS

PRESSURE SAFETY VALVE — PSV
PRESSURE CONTROL VALVE WITH EXTERNAL PRESSURE TAP (15mm HALF COUPLING)
TEMPERATURE CONTROL VALVE
SELF–CONTAINED PRESSURE REGULATOR
SELF–CONTAINED BACK LOADED PRESSURE REGULATOR
DIAPHRAGM
PISTON
BALANCED DIAPHRAGM
SOLENOID (ALL SOLENOIDS TO BE SUPPLIED WITH VALVES.) — S
VALVE FAIL POSITION — FAIL–LAST; FAIL–OPEN; FAIL–CLOSE
AIR ACTUATED CONTROL VALVES (FIG.1 IS TO BE USED TO INDICATE FIG. 2) — IA — F/R — xxY — I/P — (AS REQ'D) — S — FIG. 1 — FIG. 2

## INSTRUMENT TAG

INSTRUMENT TAG IDENTIFICATION — XXXXX / XXXX — LOOP NO. — SUFFIX — SYSTEM NO. (SEE INSTRUMENTATION NOTE 3) — AREA NO. (OPTIONAL) — FY
EXAMPLE: FLOW CONTROLLER — FC / 1M38 — FSH – HIGH INTERLOCK & ALARM; FAL – LOW ALARM — LOOP NO. — SUFFIX — MACHINERY COOLING WATER — AREA NO. (OPTIONAL)

VARIABLES
ABS (ABSOLUTE); MF (MASS FLOW); (SUMATION); (SQUARE ROOT EXTRACTOR); RAT (RATIO); RSP (REMOTE SET POINT); SP (SET POINT); AVG (AVERAGE); (HIGH SELECT); (LOW SELECT); (SUBTRACT)
CALC (CALCULATE); (MULTIPLY); (DIVIDE); (ADDITION); (PULSE SIGNAL)

# LEVEL

GAMA RADIATION LEVEL SYSTEM — RX — R — LISL
ULTRASONIC / MICROWAVE / RADAR LEVEL TRANSMITTER — LT

## ELECTRICAL

ELECTRIC MOTOR — M
HORN

## MISCELLANEOUS SYMBOLS

TIE IN POINT — TP

## INSTRUMENTATION NOTES

1) 150 VALVE ON TEST POINTS TO BE BALL EXCEPT FOR PIPING SPECIFICATION CLASS C3, C8 AND S2 WHICH WILL BE GATE VALVES.
2) BRICK–LINED PIPE TEST POINTS TO HAVE HIGH TEMPERATURE GATE VALVE FROM PIPING SPECIFICATION CLASS C3. THIS ALSO APPLIES TO HIGH TEMPERATURE TEST POINTS ON EQUIPMENT.
3) FOR INSTRUMENTATION CONTROL LOOP NUMBERS, THE LETTER INSIDE TO THE BALLOON IS FOR SYSTEM IDENTIFICATION.
   A PROCESS SYSTEM
   B COMBUSTION SYSTEM
   C FLUE GAS SYSTEM
   D SEAL GAS SYSTEM
   E PROCESS WATER SYSTEM
   F OXIDE MATERIAL HANDLING SYSTEM
   G PROCESS SUPPORT SYSTEM
   H DR/HBI PRODUCTION SYSTEMS
   J PRODUCT HANDLING SYSTEM
   K BRIQUETTING SYSTEM
   M MACHINERY COOLING WATER SYSTEM
   N GAS GENERATING AND/OR STORAGE SYSTEM
   P BOTTOM SEAL GAS
   Q SPECIAL SYSTEMS (REVERSE OSMOSIS)
   S SEA WATER SYSTEM
4) LIMIT SWITCH TAG NUMBERS ARE AS FOLLOWS.
   ZS–Xnn.A LIMIT SWITCH CLOSES WHEN VALVE IS OPEN.
   ZS–Xnn.B LIMIT SWITCH CLOSES WHEN VALVE IS CLOSED.
5) ALL DIGITAL (ON–OFF) SIGNALS FROM ALARM AND SWITCH CONTACTS IN LOCALLY MOUNTED INSTRUMENTS (EXAMPLE: ZS, FIAS, PAS) ARE TRANSMITTED TO THE MAIN CONTROL BUILDING AND ARE INTEGRATED INTO THE PROCESS ANNUNCIATOR AND INTERLOCK SYSTEM. INDICATION ON THESE DEVICES REMAINS LOCAL.
6) ALL ISOLATION VALVES MUST BE INSTALLED IMMEDIATELY ADJACENT TO THE PROCESS LINE ON EACH PROCESS TAP LINE UNLESS DESIGNATED OTHERWISE.
7) ORIFICE FLANGES GREATER THAN 200MM HAVE RADIUS TAPS EXCEPTIONS WILL BE NOTED ON DRAWING.
8) ALL FIELD PRESSURE, TEMPERATURE & FLOW TRANSMITTERS TO INCLUDE INTEGRAL INDICATOR.
9) CONTROL VALVE POSITION ARE TIED BACK TO DCS FOR POSITION INDICATION.
10) ALL MOTORS WILL BE STARTED FROM PCS IF NOT OTHERWISE STATED AS (LOCAL ONLY) ON INDIVIDUAL MOTOR.
11) CONTOROL VALVE SIZES SHALL BE FINALZED AFTER VALVE SIZING

### INSTRUMENT TAG IDENTIFICATION

| | FIRST LETTER | | SUCCEEDING LETTERS | |
|---|---|---|---|---|
| | MEASURED OR CONTROLLED VARIABLE | MODIFIER | READOUT OR PASSIVE FUNCTION | OUTPUT FUNCTION |
| A | ANALYSIS | | ALARM | |
| B | BURNER,COMBUSTION | | | |
| C | | | | CONTROL |
| D | DENSITY | DIFFERENTIAL | | |
| E | VOLTAGE | | PRIMARY ELEMENT | |
| F | FLOW RATE | RATIO | | |
| G | | | GLASS | |
| H | HAND | | | HIGH |
| I | CURRENT, ELECT | | INDICATE | |
| J | POWER | SCAN | | |
| K | TIME, TIME SCHED | TIME RATE of CHANGE | | CONTROL STATION |
| L | LEVEL | | | LOW |
| M | MOISTURE | MOMENTARY | | |
| N | TORQUE | | | |
| O | | | ORIFICE (RESTRICTING) | |
| P | PRESSURE, VACUUM | | POINT(TST CONNECTION) | |
| Q | QUANTITY | INTEGRATE,TOTALIZE | | |
| R | RADIATION | | RECORD | |
| S | SPEED, FREQUENCY | SAFETY | | SWITCH |
| T | TEMPERATURE | | | TRANSMIT |
| U | MULTI–VARAIBLE | | MULTIFUNCTION | MULTIFUNCTION |
| V | VIBRATION | | | VALVE,LOUVRE,DAMPER |
| W | WEIGHT | | WELL | |
| X | | | USER'S CHOICE | |
| Y | EVENT | | | RELAY,COMPUTE,CONVERT |
| Z | POSITION,DIMENSION | | | DRIVER, ACTUATOR |

EXCEPTIONS:
PRV – PRESSURE REGULATING VALVE
RD – RUPTURE DISC
SOV – SOLENOID OPERATED VALVE
SOL – SOLENOID OPERATED DEVICE
AH – ALARM HORN
SV – PROCESS (IN–LINE) SOLENOID DEVICE
SG – SIGHT GLASS

TORQUE SAFETY HIGH
TORQUE SAFETY HIGH HIGH
TORQUE ALARM HIGH HIGH

| REV. | DATE | DESCRIPTION | PURPOSE OF ISSUE | PREPARE | CHECK | APPROVE |
|---|---|---|---|---|---|---|
| Z | 06/2019 | AS BUILT | ASB | KHALILPOOR | SHAGHAGHI | MOHAMMAD ZADEH |
| 5 | 01/2017 | ISSUE FOR CONSTRUCTION | IFC | MMTE | SHAGHAGHI | MOHAMMAD ZADEH |
| 4 | 10/2015 | ISSUE FOR CONSTRUCTION | IFC | KHALILPOOR | PARVANI | KIOMARSI |
| 3 | 03/2015 | ISSUE FOR CONSTRUCTION | IFC | KHALILPOOR | PARVANI | KIOMARSI |
| 2 | 09/2014 | ISSUE FOR CONSTRUCTION | IFC | KHALILPOOR | PARVANI | KIOMARSI |
| 1 | 08/2014 | ISSUE FOR APPROVAL | IFA | KHALILPOOR | PARVANI | KIOMARSI |

Project: KOWSAR GISD MEGA MODULE PROJECT

Client: شرکت توسعه آهن و فولاد گل گهر G.I.S.D.Co
Contractor: MINES & METALS TECHNOLOGICAL ENGINEERING CO. MMTE

| Client's Project | Project Code | Main Contractor | Area Code | Plant Group | Equipment Code | Document Type | Eng. Discipline | Serial No. |
|---|---|---|---|---|---|---|---|---|
| GISD | 7–2 | 119 | 1002 | 7 | AA | 04 | P | 200 |

| | SIGNATURE | DATE |
|---|---|---|
| DESIGNED | MMTE | 01/2017 |
| PREPARED | MMTE | 01/2017 |
| CHECKED | SHAGHAGHI | 01/2017 |
| APPROVED | MOHAMMAD ZADEH | 01/2017 |

designation: PIPING & INSTRUMENTATION DIAGRAM STANDARD SYMBOLOGY
drawing–No.: KGMMPG00M5000
repl. for: — repl. by :
SCALE: AS SHOWN; REV.: Z; SIZE: A3; SHEET: 1/2; CONT. & PROJ. NO.: 92/5499

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