XXX-G-XXXA/B

MAKEUP PUMP

MAX FLOW RATE: GPM

MAX DISCH. PRESS.: PSIG

MOTOR: HP

START PUMP WHEN LOWEST SEAL PRESSURE DROPS TO PSIG

STOP PUMP WHEN LOWEST SEAL PRESSURE REACHES PSIG

TRIP PUMP ON LL LEVEL

PERMISSIVE TO PUMP STARTUP

XA XXX

HS XXX

PI XX

BLADDER ACCUMULATOR

LOW LEVEL ALARM SET Ø FROM BOTTOM

LOW LOW LEVEL ALARM SET Ø FROM BOTTOM

LA XXX L LL

LT XXX

DUTY PUMP SELECTOR

SET Ø PSIG

PZV XXX

PZV XXX

PI XXX

PI XX

ML

STOP HS

START HS

NOTE 3

LT XX

XXX-GM-XXX

XXX-GM-XXX

NOTE 2

LG

XXX-D-XXX

XXX-G-XXXA

XXX-G-XXXB

HIGH ALARM SET Ø PSIG

LOW ALARM SET Ø PSIG

PA XX H L

PI XX

PIT XX

BLADDER ACCUMULATOR

NOTE 3

NOTE 1

TI XX

TIT XX

RUNNING

XL

ML

STATUS

M

STOP HS

START HS

BETWEEN BEARING PUMP

HIGH ALARM H SET Ø PSIG

L LOW ALARM SET Ø PSIG

OVERHUNG PUMP

NOTE 6

## NOTES:

1- MAKEUP LINE SHOULD BE ROUTED TO THE EDGE OF THE BASEPLATE AND SHALL TERMINATE WITH FLANGED CONNECTION. A QUICK COUPLING JOINT SHALL BE USED INSTEAD OF THE FLANGE CONNECTION IF A PORTABLE MAKEUP UNIT IS SPECIFIED.

2- VERTICAL OR HORIZONTAL POSITIVE DISPLACEMENT PUMPS TYPE SHALL BE USED.

3- STAINLESS STEEL STRAINERS MESH WITH A MESH OPENING SIZE OF 25 µm OR LOWER.

4- ALL PIPING SHALL BE STAINLESS STEEL

5- ALL TRANSMITTERS AND INDICATORS SHALL BE EQUIPPED WITH SUITABLE MANIFOLDS TO ENABLE BLOCK AND BLEED.

6- A COOLER WITH TWO SEPARATE CELLS (ONE CELL FOR EACH SEAL) MAY BE USED FOR BETWEEN BEARING PUMPS INSTEAD OF TWO COOLERS (ONE PER SEAL)

7- WHEN A PORTABLE MAKEUP UNIT IS USED, A QUICK COUPLING CONNECTION SHALL BE ADDED TO EACH SEAL MAKEUP LINE UPSTREAM THE STRAINER.

## LEGEND

**PIPING MATERIAL SPECIFICATION SAES-L-105**

- PROCESS LINE
- INSTRUMENT AIR LINE
- INSTRUMENT ELECTRICAL LINE
- REDUCER
- SPECTACLE PLATE-OPEN
- SPECTACLE PLATE-CLOSED
- GATE VALVE
- GLOBE VALVE
- CHECK VALVE
- PLUG VALVE
- BALL VALVE
- DOUBLE DISC GATE VALVE
- ANGLE VALVE
- PRESS RELIEF VALVE
- VACUUM RELIEF VALVE
- MOTOR OPERATED VALVE
- PISTON OPERATED VALVE
- CONTROL VALVE
- BALL TYPE CONTROL VALVE WITH POSITIONER
- SOLENOID VALVE
- VALVE NORMALLY CLOSED

IBT -INVERTED BUCKET STEAM TRAP
TSO -TIGHT SHUT OFF
S.C. -SAMPLE CONN.
-DRAIN TO PRESSURE SEWER
OWS -OILY WATER SEWER
D -DRAIN
V -VENT

**INSTRUMENT DEFINITION & SYMBOLS SAES-J-004**

| | |
|---|---|
| AC/AFO | -AIR TO CLOSE/AIR FAILURE OPEN |
| AC/AFS | -AIR TO CLOSE/AIR FAILURE STEADY |
| AO/AFC | -AIR TO OPEN/AIR FAILURE CLOSE |
| AO/AFS | -AIR TO OPEN/AIR FAILURE STEADY |
| AOV | -AIR OPERATED VALVE |
| AT | -ANALYZER TRANSMITTER |
| DT | -DENSITY TRANSMITTER |
| ESD | -EMER. SHUTDOWN SYSTEM |
| FC | -FLOW CONTROLLER |
| FV | -FLOW CONTROL VALVE |
| FCV | -FLOW CONTROL VALVE (SELF-ACTUATED) |
| FE | -FLOW ELEMENT |
| FG | -FLOW SIGHT GLASS |
| FHV | -FLOW MANUAL CONT. VALVE |
| FHTd | -FLOW MANUAL TRANSDUCER |
| FIC | -FLOW INDICATOR CONTROLLER |
| FM | -FLOW METER |
| FO | -RESTRICTION ORIFICE |
| FQI | -FLOW TOTALIZER INDICATOR |
| FR | -FLOW RECORDER |
| FT | -FLOW TRANSMITTER |
| FY | -FLOW RELAY |
| HIC | -HAND INDICATOR CONTROLLER |
| HS | -HAND SWITCH |
| LA | -LEVEL ALARM |
| LV | -LEVEL CONTROL VALVE |
| LCV | -LEVEL CONTROL VALVE (SELF-ACTUATED) |
| LG | -LEVEL GAUGE GLASS |
| LIC | -LEVEL INDICATOR CONTROLLER |
| LI | -LEVEL INDICATOR |
| LR | -LEVEL RECORDER |
| LS | -LEVEL SWITCH |
| LT | -LEVEL TRANSMITTER |
| LTd | -LEVEL TRANSDUCER |
| ML | -MOTOR STATUS LIGHT |
| MOV | -MOTOR OPERATED VALVE |
| NA | -ANNUNCIATOR |
| PB | -PUSHBUTTON |
| PC | -PRESSURE CONTROLLER |
| PV | -PRESS. CONTROL VALVE |
| PCV | -PRESS. CONTROL VALVE (SELF ACTUATED) |
| PdC | -PRESS. DIFF. CONTROLLER |
| PdI | -PRESS. DIFF. INDICATOR |
| PdIC | -PRESSURE DIFFERENTIAL INDICATOR CONTROLLER |
| PdIS | -PRESSURE DIFFERENTIAL INDICATOR SWITCH |
| PdT | -PRESS. DIFF. TRANSMITTER |
| PdTd | -PRESS. DIFF. TRANSDUCER |
| PG | -PRESSURE GAGE |
| PI | -PRESSURE INDICATOR |
| PIC | -PRESS. INDICATOR CONTROLLER |
| PR | -PRESSURE RECORDER |
| PS | -PRESSURE SWITCH |
| PT | -PRESSURE TRANSMITTER |
| PX | -PRESSURE POINT |
| PY | -PRESS. COMPUTATION MOD. |
| PZV | -PRESSURE RELIEF VALVE |
| RTD | -RESIST. TEMP. DETECTOR |
| SI | -SPEED INDICATOR |
| SS | -SPEED SWITCH |
| TC | -TEMP. CONTROLLER |
| TV | -TEMP. CONTROL VALVE |
| TCV | -TEMP. CONTROL VALVE (SELF-ACTUATED) |
| TE | -TEMP. ELEMENT |
| TG | -THERMOMETER |
| THS | -TEMP. HAND SWITCH |
| TI | -TEMP. INDICATOR |
| TR | -TEMP. RECORDER |
| TS | -TEMP. SWITCH |
| TT | -TEMP. TRANSMITTER |
| TTd | -TEMP. TRANSDUCER |
| TW | -THERMOWELL |

SAMA

- DATA LOGGER POINT (FLOW P-PRESS. L-LEVEL T-TEMP. X-MISC. A-ALARM)
- LOCAL PANEL MOUNTED INSTR.
- BOARD MOUNTED INSTRUMENT
- R/G XL STATUS LIGHTS R-RED, G-GREEN PILOT LIGHT (DO NOT USE FOR MOTOR STATUS)
- ML MOTOR STATUS PILOT LIGHT
- LOCAL MOUNTED INSTRUMENT
- MOUNTED BEHIND LOCAL PANEL
- RACK MOUNTED (OR BACK OF PANEL)
- INSTRUMENT AIR SUPPLY REQUIRED
- ELECTRICAL SUPPLY REQUIRED
- H HIGH / L LOW
- TWO PEN RECORDER
- FF FOUNDATION FIELDBUS INSTRUMENT

**DISTRIBUTED CONTROL/SHARED DISPLAY SYMBOLS**

- (DCS) DISTRIBUTED CONTROL SYSTEM, OPERATOR ACCESSIBLE IN CONTROL ROOM
- (DCS) DISTRIBUTED CONTROL SYSTEM, OPERATOR INACCESSIBLE IN CONTROL ROOM
- (DCS) DISTRIBUTED CONTROL SYSTEM, OPERATOR INACCESSIBLE IN FIELD

**DISTRIBUTED CONTROL INTERCONNECTING LOGIC CONTROLLER WITH BINARY OR SEQUENTIAL FUNCTIONS**

- (PLC) PROGRAMMABLE LOGIC CONTROLLER, NORMALLY INACCESSIBLE OR BEHIND THE PANEL DEVICE OR FUNCTIONS
- (PLC) PROGRAMMABLE LOGIC CONTROLLER FUNCTION, CAN BE NORMALLY DISPLAYED ON CRT
- LOCAL DCS OR AUXILIARY DCS LOCATION NORMALLY ACCESSIBLE TO OPERATOR
- (PLC) PROGRAMMABLE LOGIC CONTROLLER I/O POINT NORMALLY INACCESSIBLE BY OPERATOR

## REFERENCE DRAWINGS

| | |
|---|---|
| LETTER IDENTIFICATION OF LINES | AD-036204 |
| PIPING SYMBOLS | AB-036227 |
| EQUIPMENT SYMBOLS | AB-036305 |
| INSTRUMENT SYMBOLS | AC-036950 |
| PIPING LAYOUT INDEX | |
| PLOT PLAN | |
| PROCESS FLOW DIAGRAM | |
| HYDROSTATIC TEST DIAGRAM | |
| DRAWING CONTROL FOR J.O. | |
| INSTRUMENT INSTALLATION SCHEDULES | |

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**SAUDI ARABIAN OIL COMPANY**

PIPING & INSTRUMENT DIAGRAM — DRAWING TYPE: PID

PUMP SEAL FLUSH PLAN 53B WITH MAKEUP UNIT

STANDARD DRAWING

STD. DWG. SAUDI ARABIA

| PLANT NO. | INDEX | DRAWING NUMBER | SHT. NO. | REV. NO. |
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