| OWNER: | BUSHEHR PETROCHEMICAL COMPANY<br>MEG PLANT | | | | | | | CONTRACTOR | |
|---|---|---|---|---|---|---|---|---|---|
| MC: | MECHANICAL DATA SHEET FOR EMERGENCY INSTRUMENT AIR COMPRESSOR (20-C-7080) | | | | | | | | |
| | Project | Area | Phase | Unit | Dis. | Doc. | Seq. | Contract No : | |
| Owner Document Number : | BU | 20 | VD | 303 | ME | DSH | 0075 | rev 01 | Page: 1 OF 20 |

# MECHANICAL DATA SHEET FOR EMERGENCY INSTRUMENT AIR COMPRESSOR (20-C-7080)

| | |
|---|---|
| | BUSHEHR PETROCHEMICAL COMPANY<br>MEG PLANT |
| **Document Review** | |
| Issue Purpose: | IFA |
| Result Code: AP,AN,CM,RE,NC | AN |
| Next Status : IFC,IFA,IFI,AFC,AB | AFC |
| Responsible Department | MECHANICAL |
| Commented Date | Nov/11/2021 |
| **Approval or review hereunder shall not be construed to relieve Vendor / Subcontractor of his responsibilities and liability under the contract.** | |

| Rev. | Date | Description | Prepared By | Checked By | Approved | AC code. |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| 01 | 4-11-2021 | for approval | KP | KP | JR | |
| 00 | 12-8-2021 | for approval | KP | KP | JR | |

Class:1 | Phase: P

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| 1 | X | X | | | | | | 46 | | | | | | | | 91 | | | | | | | |
| 2 | X | X | | | | | | 47 | | | | | | | | 92 | | | | | | | |
| 3 | X | X | | | | | | 48 | | | | | | | | 93 | | | | | | | |
| 4 | X | X | | | | | | 49 | | | | | | | | 94 | | | | | | | |
| 5 | X | X | | | | | | 50 | | | | | | | | 95 | | | | | | | |
| 6 | X | X | | | | | | 51 | | | | | | | | 96 | | | | | | | |
| 7 | X | X | | | | | | 52 | | | | | | | | 97 | | | | | | | |
| 8 | X | X | | | | | | 53 | | | | | | | | 98 | | | | | | | |
| 9 | X | X | | | | | | 54 | | | | | | | | 99 | | | | | | | |
| 10 | X | X | | | | | | 55 | | | | | | | | 100 | | | | | | | |
| 11 | X | X | | | | | | 56 | | | | | | | | 101 | | | | | | | |
| 12 | X | X | | | | | | 57 | | | | | | | | 102 | | | | | | | |
| 13 | X | X | | | | | | 58 | | | | | | | | 103 | | | | | | | |
| 14 | X | X | | | | | | 59 | | | | | | | | 104 | | | | | | | |
| 15 | X | X | | | | | | 60 | | | | | | | | 105 | | | | | | | |
| 16 | X | X | | | | | | 61 | | | | | | | | 106 | | | | | | | |
| 17 | X | X | | | | | | 62 | | | | | | | | 107 | | | | | | | |
| 18 | X | X | | | | | | 63 | | | | | | | | 108 | | | | | | | |
| 19 | X | X | | | | | | 64 | | | | | | | | 109 | | | | | | | |
| 20 | X | X | | | | | | 65 | | | | | | | | 110 | | | | | | | |
| 21 | | | | | | | | 66 | | | | | | | | 111 | | | | | | | |
| 22 | | | | | | | | 67 | | | | | | | | 112 | | | | | | | |
| 23 | | | | | | | | 68 | | | | | | | | 113 | | | | | | | |
| 24 | | | | | | | | 69 | | | | | | | | 114 | | | | | | | |
| 25 | | | | | | | | 70 | | | | | | | | 115 | | | | | | | |
| 26 | | | | | | | | 71 | | | | | | | | 116 | | | | | | | |
| 27 | | | | | | | | 72 | | | | | | | | 117 | | | | | | | |
| 28 | | | | | | | | 73 | | | | | | | | 118 | | | | | | | |
| 29 | | | | | | | | 74 | | | | | | | | 119 | | | | | | | |
| 30 | | | | | | | | 75 | | | | | | | | 120 | | | | | | | |
| 31 | | | | | | | | 76 | | | | | | | | 121 | | | | | | | |
| 32 | | | | | | | | 77 | | | | | | | | 122 | | | | | | | |
| 33 | | | | | | | | 78 | | | | | | | | 123 | | | | | | | |
| 34 | | | | | | | | 79 | | | | | | | | 124 | | | | | | | |
| 35 | | | | | | | | 80 | | | | | | | | 125 | | | | | | | |
| 36 | | | | | | | | 81 | | | | | | | | 126 | | | | | | | |
| 37 | | | | | | | | 82 | | | | | | | | 127 | | | | | | | |
| 38 | | | | | | | | 83 | | | | | | | | 128 | | | | | | | |
| 39 | | | | | | | | 84 | | | | | | | | 129 | | | | | | | |
| 40 | | | | | | | | 85 | | | | | | | | 130 | | | | | | | |
| 41 | | | | | | | | 86 | | | | | | | | 131 | | | | | | | |
| 42 | | | | | | | | 87 | | | | | | | | 132 | | | | | | | |
| 43 | | | | | | | | 88 | | | | | | | | 133 | | | | | | | |
| 44 | | | | | | | | 89 | | | | | | | | 134 | | | | | | | |
| 45 | | | | | | | | 90 | | | | | | | | 135 | | | | | | | |

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APPLICABLE TO: ● PROPOSALS ○ PURCHASE ○ AS BUILT

FOR/USER BUPC | SITE/LOCATION ASSALUYEH | SERVICE EMERGENCY INSTRUMENT AIR COMP | NO. REQ'D ONE SET 1(STAGE)

NOTE: ○ INDICATES INFO. TO BE COMPLETED BY PURCH. | ☐ BY MANUFACTURER WITH PROPOSAL | ◯ BY MANUFACTURER OR PURCHASER AS APPLICABLE

To be checked with page 9 row 8.

COMPR. MFGR Airpack | TYPE MODEL NO(S) | SERIAL NO(S) TBD

COMPR.THROWS: TOTAL NO. 1 | NO. WITH CYLS. 1 | NOMINAL FRAME RATING 15 | BkW @ RATED RPM OF 400

☐ MAX/MIN ALLOWABLE SPEED 690 / 400 RPM

DRIVER MFGR. WEG | DRIVER NAMEPLATE kW/OPERATING RPM 15 kW / 3000

DRIVE SYSTEM: ○ DIRECT COUPLED ○ GEARED & COUPLED ● V-BELT

TYPE OF DRIVER: ● IND. MOTOR ○ SYN. MOTOR ○ STEAM TURBINE ○ GAS TURBINE ○ ENGINE ○ OTHER

NO NEGATIVE TOLERANCE APPLIES: ○ YES - PURCHASER TO FILL IN "REQUIRED CAPACITY" LINES. | CYLINDERS: ○ LUBE

(NNT) ○ NO - PURCHASER TO FILL IN "MFGR.'S RATED CAP." LINES | ● NON-LUBE

● MAX ACCEPTABLE AVG PISTON SPEED 3.5 m/s

**OPERATING CONDITIONS (EACH MACHINE)**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ● OPERATING CASE | 1 | | | | | | | | |
| ● STAGE | 1 | | | | | | | | |
| ○ SIMULATION BASIS | | | | | | | | | |
| ● NORM. OR ALT. CONDITION | Norm | | | | | | | | |
| ● CERTIFIED PT. (X) MARK ONE | | | | | | | | | |
| ● MOLECULAR WEIGHT | 29 | | | | | | | | |
| ● Cp/Cv (K) @ 65°C OR °C | 1.4 | | | | | | | | |

**INLET CONDITIONS:** AT INLET TO: ● PULSE DEVICES ○ COMPRESSOR CYLINDER FLANGES

NOTE: ○ SIDE STREAM TO _____ STAGE(S), THESE INLET PRESS. ARE FIXED

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ● PRESSURE @ PUL. SUPP. INLET (bara) | 8 (Min.:7, Max:8.5) | | | | | | | |
| ◯ PRESSURE (Bara) @ CYL. FLANGE | 8 (Min.:7, Max:8.5) | | | | | | | |
| ● TEMPERATURE (°C) | AMB.(Min.:10 , Max.:45) | | | | | | | |
| ○ INLET Cp/Cv | 1.4 | | | | | | | |
| ■ COMPRESSIBILITY ($Z_S$) | 1 | | | | | | | |

**INTERSTAGE:** INTERSTAGE Δ P INCL: ● PULSE DEVICES ● PIPING ● COOLERS ● SEPARATORS ○ OTHER

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ◯ Δ P BETWEEN STAGES, % / BAR | / | / | / | / | / | / | / |

**DISCHARGE CONDITIONS:** AT OUTLET FROM: ● PULSE DEVICE ○ COMP. CYL. FLANGES ○ OTHER

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ◯ PRESSURE @ CYL. FLANGE (bara) | 8 (Min.:7, Max:8.5) | | | | | | | |
| ● PRESS. (bara) @ PUL. SUPP. OUTLET | 21 | | | | | | | |
| ☐ TEMP., ADIABATIC, °C | 180 | | | | | | | |
| ☐ TEMP., PREDICTED, °C | 164 | | | | | | | |
| ☐ COMPRESSIBILITY ($Z_2$) OR ($Z_{AVG}$) | 0,04 | | | | | | | |

*** REQUIRED CAPACITY,** RATED FOR PROCESS, AT INLET TO COMPRESSOR, NO NEGATIVE TOLERANCE (-0%)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ● kg/h CAPACITY SPECIFIED | 55 | | | | | | | |
| ○ WET ● DRY | | | | | | | | |
| ○ m³ /h (760 mm HG & 0°C) | 43 | | | | | | | |

*** MFGR.'S RATED CAPACITY** (AT INLET TO COMPRESSSOR) & kW @ CERTIFIED TOLERANCE OF ±3% FOR CAP. & ±3% FOR kW

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ◯ kg/h CAPACITY SPECIFIED | 374 | | | | | | | |
| ○ WET ● DRY | | | | | | | | |
| ◯ INLET m³/h | 173 | | | | | | | |
| ◯ Nm³/h | 173 | | | | | | | |
| ☐ kW/STAGE | 11 | | | | | | | |
| ◯ ABSORBED POWER ESTIMATED, kW | 12 | | | | | | | |
| ☐ TOTAL kW INCLUDING | 13 | | | | | | | |
| V-BELT & GEAR LOSSES | | | | | | | | |

*** CAPACITY FOR NNT**

MANUFACTURER'S = REQUIRED ÷ 0.97

THEREFORE REQUIRED = MFR'S x 0.97

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| | GAS ANALYSIS AT OPERATING CONDITIONS<br>MOLE PERCENT | | | | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 3 | ● SERVICE/ITEM NO. | | | | | | | |
| 4 | ● STAGE | | | | | | | |
| 5 | ○ NORMAL OR ALT | | | | | | | |
| 6 | | M.W. | NORMAL | | | | | |
| 7 | AIR | 28.966 | 100 | | | | | |
| 8 | NITROGEN | 28.016 | | | | | | |
| 9 | WATER 'H2O | 18.016 | | | | | | |
| 10 | CARBON MONOXIDE CO | 28.010 | | | | | | |
| 11 | CARBON DIOXIDE CO2 | 44.010 | | | | | | |
| 12 | HYDROGEN $H_2$ | 2.016 | | | | | | |
| 13 | METHANE $CH_4$ | 16.042 | | | | | | |
| 14 | ETHANE | 30.068 | | | | | | |
| 15 | PROPANE | 44.094 | | | | | | |
| 16 | i-BUTANE | 58,12 | | | | | | |
| 17 | n-BUTANE | 58,12 | | | | | | |
| 18 | i-PENTANE | 72,146 | | | | | | |
| 19 | OXYGEN O2 | 32.00 | | | | | | |
| 20 | HYDRO.SULFIDE | 34,076 | | | | | | |
| 21 | ETHYLENE | 28,052 | | | | | | |
| 22 | PROPYLENE | 42,078 | | | | | | APPLICABLE SPECIFICATIONS |
| 23 | n-PENTANE | 72,146 | | | | | | ● API-618-RECIPROCATING COMPRESSORS |
| 24 | HEXANE PLUS | | | | | | | FOR PETROLEUM, CHEMICAL AND GAS |
| 25 | AMMONIA | 17,031 | | | | | | INDUSTRY SERVICES |
| 26 | HYDRO. CHLORIDE | 36,461 | | | | | | |
| 27 | CHLORINE | 70,914 | | | | | | ● Doc. No. 1216-DE-00-RE-MSS-302 |
| 28 | | | | | | | | |
| 29 | | | | | | | | |
| 30 | | | | | | | | |
| 31 | TOTAL: | | | | | | | |
| 32 | ☐ CALCULATED MOL WT. | | 28,97 | | | | | |
| 33 | ☐ Cp/Cv (K) @ 65° OR Suction temperature °C | | 45 | | | | | |
| 34 | NOTE: IF WATER VAPOR AND/OR CHLORIDES ARE PRESENT, EVEN MINUTE | | | | | | | |
| 35 | TRACES, IN THE GAS BEING COMPRESSED, IT MUST BE INCLUED ABOVE. | | | | | | | |

36 SITE CONDITION (SEE PROJECT SITE CONDITION FOR MORE DETAIL)

37 ELEVATION 8,5 m BAROMETER 1,013 (BARA) AMBIENT TEMPS: MAX 55 °C MIN 5 °C

38 ○ MIN DESIGN METAL TEMP 5 °C (2.14.8) RELATIVE HUMIDITY: MAX 76% MIN 74% %

39 COMPRESSOR LOCATION: ○ INDOOR HEATED ● UNHEATED ● AT GRADE LEVEL ○ ELEVATED: M

40 ● OUTDOOR NO ROOF ● UNDER ROOF ○ PARTIAL SIDES ○ PLATFORM: ● ON-SHORE

41 ○ OFF-SHORE ● WEATHER PROTECTION REQ. ● TROPICALIZATION REQ.

42 ○ WINTERIZATION REQUIRED

43 UNUSUAL CONDITIONS: ○ CORROSIVES ● DUST ● FUMES ● OTHER Sand storm , Thunder & Lightening, Sea Breeze

44

45 ELECTRICAL CLASSIFICATIONS

46 HAZARDOUS NON-HAZRDOUS

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 47 | MAIN UNIT | ● ZONE | 2 | GROUP | IIB | TEMP CLASS | T3 | ○ |
| 48 | L.O. CONSOLE | ● ZONE | 2 | GROUP | IIB | TEMP CLASS | T3 | ○ |
| 49 | CW CONSOLE | ○ ZONE | | GROUP | | TEMP CLASS | | ○ |

50

51

52

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**PART LOAD OPERATING CONDITIONS**

CAPACITY CONTROL BY: ● MFG'S CAP. CONTROL ○ PURCHASERS BY-PASS ○ BOTH ○ OTHER _____

FOR: ○ PART LOAD COND. ○ START-UP ONLY ○ BOTH

WITH: ● AUTO LOADING DELAY INTERLOCK ● AUTO IMMEDIATE UNLOADING

USING: ○ FIXED VOLUME POCK. ● SUCTION VALVE UNLOADERS: ○ FINGER ○ PLUG ○ OTHER

ACTION: ○ DIRECT (AIR-TO-UNLOAD) ● REVERSE (AIR-TO-LOAD/FAIL SAFE)

NUMBER OF STEPS: ● ONE ○ THREE ○ FIVE ○ OTHER _____

○ RAIN COVER REQUIRED OVER UNLOADERS

ALL UNLOADING STEPS BASIS MANUFACTURERS CAPACITY SHOWN ON PAGE 1.

**INLET AND DISCHARGE PRESSURE ARE** ○ **AT CYLINDER FLANGES** ● **PULSATION SUPPRESSOR FLANGES**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ○ SERVICE OR ITEM NO. | | | | | | | |
| ◎ STAGE | 1 | | | | | | |
| ◎ NORMAL OR ALTERNATE CONDITION | Normal | | | | | | |
| ○ PERCENT CAPACITY | 100 | | | | | | |
| ○ WEIGHT FLOW, kg/h | 223 | | | | | | |
| ◎ m³ /h (760 mm HG & 0°C) | 173 | | | | | | |
| □ POCKETS/VALVES OPERATION * | Vavles | | | | | | |
| □ POCKET CLEARANCE ADDED % | NA | | | | | | |
| □ TYPE UNLOADERS, PLUG/FINGER | Plug | | | | | | |
| ◎ INLET TEMPERATURE, °C | 45 | | | | | | |
| ◎ INLET PRESSURE, (BARA) | 8 (Min.:7, Max:8.5) | | | | | | |
| ◎ DISCHARGE PRESSURE, (BARA) | 21,5 | | | | | | |
| □ DISCHARGE TEMP., ADIABATIC °C | 164 | | | | | | |
| □ DISCHARGE TEMP., PREDICTED °C | 180 | | | | | | |
| □ VOLUMETRIC EFF.,%HE/%CE(AVER) | /75 | / | / | / | / | / | |
| □ CALC. GAS ROD LOAD, kN, C ** | 17,5 | | | | | | |
| □ CALC. GAS ROD LOAD, kN, T ** | 17,5 | | | | | | |
| ◇ COMB. ROD LOAD, kN C (GAS & INERTIA) | 13,13 | | | | | | |
| ◇ COMB. ROD LOAD, kN T (GAS & INERTIA) | 12,6 | | | | | | |
| ◇ ROD REV., DEGREES MIN @ X-HD PIN *** | 195 | | | | | | |
| □ BkW/STAGE | 12 | | | | | | |
| □ TOTAL kW @ COMPRESSOR SHAFT | 12 | | | | | | |
| □ TOTAL kW INCL. V-BELT & GEAR LOSSES | 13 | | | | | | |

To be filled in

With reference to page 3, predicated temperature is 164 and adiabatic is 180.

To be checked with page 9.

* SHOW OPERATION WITH THE FOLLOWING SYMBOLS:

HEAD END = HE / OR / CRANK END = CE — PLUS — SUCTION VALVE(S) UNLOADED = S / OR / FIXED POCKET OPEN = F / OR / VARIABLE POCKET OPEN = V

* * C = COMPRESSION T = TENSION *** X - HD = CROSSHEAD

□ MINIMUM PRESSURE REQUIRED TO OPERATE CYLINDER UNLOADING DEVICES, 6 _____ (BARG)

CYLINDER UNLOADING MEDIUM: ● AIR ○ NITROGEN ○ OTHER _____

● PRESSURE AVAILABLE FOR CYLINDER UNLOADING DEVICES, MAX/MIN 6,0 / 8,0 (BARG)

**SPECIAL REMARK:**

Please revise the pressure.
Max: 8
Min: 6

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● SCOPE OF BASIC SUPPLY

PURCHASER TO FILL IN ( ☐ ○ ⬡ ) AFTER COMMODITY TO INDICATE: ☐ BY COMPR. MFR. ○ BY PURCH. ⬡ BY OTHERS

● DRIVER ( ■ ○ ⬡ ): VARIABLE SPEED SPEED RANGE NOT APPLICABLE RPM TO NOT APPLICABLE RPM

● INDUCTION MOTOR ○ SYNCHRONOUS MOTOR ○ STEAM TURBINE ○ ENGINE ○ OTHER _____

○ API-541 ○ API-546 ○ API-611 ○ API-612

Since compressor is not equipped to coupling, please keep it empty.

UTBOARD BEARING ○ PROVISION FOR DRY AIR PURGE FOR OUTBOARD BEARING.

● SLI ■ ○ ⬡ ) SOLE PLATE FOR DRIVER ( ■ ○ ⬡ )

● MO ( ■ ○ ⬡ ); DEFINE Local power distribution board

○ GEAR ( PLATE FOR GEAR ○ API-613 ○ API-677

● COUPLING(S) ( ☐ ○ ⬡ ): ● LOW SPD. ○ HI-SPD. ○ QUILL SHAFT ○ KEY-LESS DRV. ○ KEY'D DRV. ○ OTHER ~~#1~~

○ API 671

○ V-BELT DRIVE ( ■ ○ ⬡ ): ○ SHEAVES & V-BELTS ( ☐ ○ ⬡ ) ○ STATIC CONDUCTING V-BELTS ○ BANDED V-BELTS

● DRIVE GUARD(S) ( ■ ○ ⬡ ): ● MANUFACTURER'S STD. ● NON-SPARKING ○ CALIF CODE ○ API-671 APPENDIX C

○ OTHER _____

● PULSATION SUPPRESSORS WITH INTERNALS ( ☐ ○ ⬡ ): ● INITIAL INLET & FINAL DISCHARGE ● SUPPORTS ( ■ ○ ⬡ )

○ INTERSTAGE ○ SUPPORTS ( ☐ ○ ⬡ )

○ PULSATION SUPPRESSORS WITHOUT INTRNL ( ■ ○ ⬡ ): ○ INITIAL INLET & FINAL DISCHARGE ○ SUPPORTS ( ☐ ○ ⬡ )

○ INTERSTAGE ○ SUPPORTS ( ☐ ○ ⬡ )

○ SUPPRESSOR(S) TO HAVE MOISTURE REMOVAL SECTION: ○ INITIAL INLET ONLY ○ ALL INLET SUPPRESSORS

● ACOUSTICAL SIMUL. STUDY ( ■ ○ ⬡ ): DESIGN APPROACH ● 1, EMPRICAL PULSATION SUPPRESSION DEVICE SIZING

■ DIGITAL ☒ ANALOG ○ 2, ACOUSTIC SIMULATION AND PIPING RESTRAINT ANALYSIS

○ 3, ACOUSTIC SIMULATION AND PIPING RESTRAINT ANALYSIS PLUS MECHANICAL ANALYSIS

STUDY TO CONSIDER: ALL SPECIFIED LOAD COND., INCL. ● SINGLE ACT., PLUS

○ COMP.OPER.IN PARALLEL ○ ALTERNATE GASES

○ WITH EXISTING COMP. AND PIPING SYSTEMS

○ STUDY TO BE WITNESSED ○ COMPRESSOR VALVE DYNAMIC RESPONSE

● VENDOR REVIEW OF PURCHASER'S PIPING ARRANGEMENT ○ PULSATION SUPPRESSEN DEVICE LOW CYCLE FATIGUE ANALYSIS

NOTE: SEE APPENDIX N FOR INFORMATION REQUIRED FOR STUDY ○ PIPING SYSTEM FLEXIBILITY

PACKAGED: ○ NO ● YES ( ■ ○ ⬡ ) DEFINE BASIC SCOPE OF PACKAGING IN REMARKS SECTION .

● SKID Since compressor is not equipped to coupling, please keep it empty. PLT. ● BOLTS OR STUDS FOR SOLEPLT. TO FRAME ○ RAILS ○ CHOKE BLOCKS ● SHIMS

○ SU NG (UNDER SKID AND/OR BASEPLATE)

● LEV SKID DECKING ○ SUB SOLEPLATES

● DIRECT NTED/MORTAR GROUT ○ EPOXY GROUT; MFG/TYPE _____ / _____

● INTERCOOLER(S) ( ☐ ○ ⬡ ) ○ SEPARATOR(S) ( ☐ ○ ⬡ ) ○ AFTERCOOLER(S) ( ■ ○ ⬡ )

**INTERCOOLERS:**

○ INTERSTAGE PIPE ( ☐ ○ ⬡ ) ○ PIPING MATCHMARKED ○ SHOP FITTED ○ MACHINE MTD.

○ CONDENSATE SEPARATION & COLLECTION FACILITY SYSTEM PER 3.8.12 ○ OFF MOUNTED

● INLET STRAINER(S) ( ■ ○ ⬡ ): ● INITIAL INLET ○ SIDESTREAM INLET ○ SPOOL PIECE FOR INLET STRAINERS

● MANIFOLD PIPING; ○ DRAINS ○ VENTS ● RELIEF VALVES ● AIR/GAS SUPPLY ○ FLANGE FINISH

● RELIEF VALVE(S) ( ■ ○ ⬡ ): ○ INITIAL INLET ○ INTERSTAGE ● FINAL DISCHARGE ○ API-618 FLANGE FINISH

○ RUPTURE DISC(S) ( ☐ ○ ⬡ ) ○ THRU STUDS IN PIPING FLANGES

○ CRANKCASE RAPID PRESSURE RELIEF DEVICE(S) ( ☐ ○ ⬡ ) ● FLANGE FINISH PER ANSI 16.5

○ SPECIAL PIPING REQUIREMENTS ○ SPECIAL FINISH _____

○ INITIAL INLET, ○ INTERSTAGE SUCTION PIPING ARR'D FOR: INSULATION (PP) ( ■ ○ ⬡ ) HEAT TRACING ( ☐ ○ ⬡ )

○ FOR ATMOSPHERIC INLET AIR COMPR. ONLY: ○ INLET AIR FILTER ( ☐ ○ ⬡ ) ○ INLET FILTER -SILENCER ( ☐ ○ ⬡ )

● PREFERRED TYPE OF CYLINDER COOLING ( ■ ○ ⬡ ): ● FORCED ○ THERMOSYPHON _____ STAGE CYL'(S)

○ STATIC (STAND-PIPE) _____ STAGE CYL'(S)

NOTE: MANUFACTURER SHALL RECOMMENDBEST TYPE OF COOLING AFTERFINAL ENGINEERING REVIEW OF ALLOPERATING CONDITIONS

● CYL. COOLING WATER PIPING ( ■ ○ ⬡ ) ○ MATCH M'RKED

● SINGLE INLET/OUTLET MANIFOLD & VALVES ● SIGHT GL'SS(S)

● INDIVIDUAL INLET/ OUTLET PER CYL. ● VALVE(S)

○ CLOSED SYS. WITH WATER PUMP, COOLER, SURGE TANK, & PIPING

~~#1: Flexible/ all-metal/spacer type/non-sparking couplings~~ ○ SHOP RUN ○ ARR'D FOR HEATING JACKET AS WELL AS COOLING

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| MC: | MECHANICAL DATA SHEET FOR EMERGENCY<br>INSTRUMENT AIR COMPRESSOR (20-C-7080) | |

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○ SCOPE OF BASIC SUPPLY (Con't)

○ SEPARATE COOLING CONSOLE ( □ ○ ⬡ ): ○ ONE FOR EA. UNIT ○ ONE CMMN TO ALL UNITS ○ DUAL PUMPS (AUX .& MAIN)
○ ARRANGED FOR HEATING JACKET WATER AS WELL AS COOLING

○ ROD PRESS. PACKING COOLING SYSTEM ( □ ○ ⬡ ) ○ SEPARATE CONSOLE ○ COMBINE WITH JKT SYSTEM ○ FILTERS

● FRAME LUBE OIL SYSTEM ( ■ ○ ⬡ ): ○ AUX. PUMP ○ DUAL FILTERS WITH TRANSFER VALVE ○ SHOP RUN
○ CONTINUOUS FLOW IN SENSING LINE TO PRESSURE SWITCHES

○ SEPARATE LUBE OIL CONSOLE ( □ ○ ⬡ ): ○ EXTENDED TO MOTOR OUTBOARD BEARING ○ SHOP RUN
API 614 APPLIES ○ NO ○ YES

NOTE: PIPING BETWEEN ALL CONSOLES AND COMPRESSOR UNIT BY PURCHASER

● CAPACITY CONTROL ( ■ ○ ⬡ ): ○ SEE DATA SHEET PAGE 5 FOR DETAILS ● INSTRUMENT & CONTROL PANEL
○ SEPARATE MACHINE MOUNTED PANEL ● SEPARATE FREE STANDING PANEL
● PNEUMATIC ○ ELECTRIC ● ELECTRONIC ○ HYDRAULIC
○ PROGRAMMABLE CONTROLLER

● INSTRUMENT & CONTROL PANEL ( ■ ○ ⬡ ): ● ONE FOR EACH UNIT ○ ONE COMMON TO ALL UNITS
○ MACHINE MOUNTED ● FREE STANDING (OFF UNIT)

○ BUFFER GAS CONT )= ○ ONE FOR EACH UNIT ○ ONE COMMON TO ALL UNITS
○ MACHINE MOUNTED DING (OFF UNIT)

SEE INSTRUMENTA AILS OF PANEL, ADDITIONAL REMARKS, AND
NOTE: ALL TUBING ETWEEN OFF-UNIT FREE STANDING PANELS URCHASER

Compressor is equipped oil heater, therefor please fill in the circle

Since compressor is Lv, please keep it empty.

● HEATERS ( ■ ○ ⬡ ): ● FRAME LUBE OIL ○ CYL. LUBRICATORS ○ COOLING WATER ● DRIVER(S) ○ GEAR OIL
● ELECTRIC ○ STEAM

● BARRING DEVICE ( ■ ○ ⬡ ): ● MANUAL ○ PNEUMATIC ○ ELECTRIC ● FLYWHEEL LOCKING DEVICE ( ■ ○ ⬡ )

○ ROD PRESSURE PACKING COOLING SYSTEM ( □ ○ ⬡ ): ○ SEPARATE CONSOLE ○ FILTERS

○ SPECIAL CORROSION PROTECTION: ● NO ○ YES ○ MFR'S STANDARD ○ OTHER _____

○ HYDRAULIC TENSIONING TOOLS ○ NO ○ YES

● MECHANICAL RUN TEST: ○ NO ● YES ● MFG'S STANDARD ○ OTHER **Approved test procedure**
○ COMPLETE SHOP RUN TEST OF ALL MACHINE MOUNTED EQUIPMENT, PIPING & APPURT.'(S)

PAINTING: ● MANUFACTURER'S STANDARD ○ SPECIAL Project specification for color

NAMEPLATES: ○ U.S. CUSTOMARY UNITS ● SI UNITS

SHIPMENT: ○ DOMESTIC ○ EXPORT ● EXPORT BOXING REQUIRED ( ■ ○ ⬡ )
○ STANDARD 6 MONTH STORAGE PREPARATION ( □ ○ ⬡ ), PER SPEC _____
● OUTDOOR STORAGE FOR OVER 12 MONTHS ( ■ ○ ⬡ ), PER SPEC _____

○ INITIAL INSTALLATION AND OPERATING TEMP ALIGNMENT CHECK AT JOBSITE BY VENDOR REPRESENTATIVE

○ COMPRESSOR MANUFACTURER'S USER'S LIST FOR SIMILAR SERVICE

● PERFORMANCE DATA REQUIRED PER 9.3.3:
○ BkW VS. SUCTION PRESSURE CURVES
○ ROD LOAD/GAS LOAD CHARTS
○ VALVE FAILURE DATA CHARTED
● SPEED/TORQUE CURVE DATA

○ BkW VS. CAPACITY PERFORMANCE CURVES OR TABLES REQUIRED FOR UNLOADING STEPS AND/OR VARIABLE SUCTION/DISCHARGE PRESSURES

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## UTILITY CONDITIONS

| ELECTRICAL POWER: | AC VOLTS | / PHASE | / HERTZ | DC VOLTS | | AC VOLTS | / PHASE | / HERTZ | DC VOLTS |
|---|---|---|---|---|---|---|---|---|---|
| ● MAIN DRIVER | 400 | / 3 | / 50 | | INSTRUMENT | 110 | / 1 | / 50 | / 24 |
| ● AUXILIARY MOTORS | 400 | / 3 | / 50 | | ALARM & SHTDWN | | / | / 50 | / 24 |
| ● HEATERS | Below 0.2 Kw : 230 | 1 | 50 | | SOLENOID VALVES | | | 50 | 24 |

INSTRUMENT AIR: NORMAL PRESSURE **6** barg MAX/MIN 7,0 / 9,0 barg

**STEAM** FOR: DRIVERS

| | | | | | |
|---|---|---|---|---|---|
| INLET: PRESS | (BARG) (kPa) | MAX/MIN | / | (BARG) (kPa) | |
| (NORM.) TEMP | °C | MAX/MIN | / | °C | |
| EXH'ST: PRESS | (BARG) (kPa) | MAX/MIN | / | (BARG) (kPa) | |
| (NORM.) TEMP | °C | MAX/MIN | / | °C | |

**HEATERS**

| | | | | | |
|---|---|---|---|---|---|
| INLET: PRESS | (BARG) (kPa) | MAX/MIN | / | (BARG) (kPa) | |
| (NORM.) TEMP | °C | MAX/MIN | / | °C | |
| EXH'ST:PRESS | (BARG) (kPa) | MAX/MIN | / | (BARG (kPa) | |
| (NORM.) TEMP | °C | MAX/MIN | / | °C | |

**COOLING WATER** FOR: **COMPRESSOR CYLINDERS**

| TYPE WATER | | | | | |
|---|---|---|---|---|---|
| SUPPLY PRESS | 5,5 (BARA) | MAX/MIN | 5,5 / 5,5 | (BARA) | |
| (NORM.) TEMP | 35 °C | MAX/MIN | 35 / 35 | °C | |
| RETURN:PRESS | 2,5 (BARG) | MAX/MIN | 2,5 / 2,5 | (BARG) | |
| (NORM.) TEMP | 45 °C | MAX/MIN | 45 / 45 | °C | |

**COOLERS**

| TYPE WATER | | | | | |
|---|---|---|---|---|---|
| SUPP.: PRESS | 5,5 (BARG | MAX/MIN | 5,5 / 5,5 | (BARG) | |
| (NORM.) TEMP | 35 °C | MAX/MIN | 35 / 35 | °C | |
| R'T'RN: PRESS | 2,5 (BARG) | MAX/MIN | 2,5 / 2,5 | (BARG) | |
| (NORM.) TEMP | 45 °C | MAX/MIN | 45 / 45 | °C | |

COOLING FOR ROD PACKING:

TYPE FLUID _____ SUPPLY PRESS _____ (BARG) @ _____ @

FUEL GAS: NORMAL PRESSURE (BARG) (kPa) MAX/MIN / (BARG) (kPa)

COMPOSITION

**REMARKS/SPECIAL REQUIREMENTS:**

Discrepancy with PID.

With reference to clause 6.1.7 of API618 5th edition, allowable pressure drop along heat exchanger shall not exceed 1bar. Also with reference to clause 4.3.6 of BU-20-D-000-PR-SPC-101-06 pressure unit is bara.

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | ○ CYLINDER DATA AT FULL LOAD CONDITION | | | | | | | |
| 2 | SERVICE/ITEM NO. | Air | | | | | | |
| 3 | STAGE | 1 | | | | | | |
| 4 | INLET PRESSURE, (BARA) } @ CYLINDER | 8,0 | | | | | | |
| 5 | DISCHARGE PRESSURE, (BARA } FLANGES | 21,0 | | | | | | |
| 6 | CYLINDERS PER STAGE | 2 | | | | | | |
| 7 | SINGLE OR DOUBLE ACTING (SA OR DA) | SA | | | | | | |
| 8 | BORE, mm | 170 | | | | | | |
| 9 | STROKE, mm | 140 | | | | | | |
| 10 | RPM: RATED / MAX ALLOW | 400/690 | | | | | | |
| 11 | PISTON SPEED, m/s: RATED / MAX ALLOW | | | | | | | |
| 12 | CYLINDER LINER, YES/NO | yes | | | | | | |
| 13 | LINER NOMINAL THICKNESS, mm | | | | | | | |
| 14 | PISTON DISPLACEMENT, m³/h | 36,9 | | | | | | |
| 15 | CYLINDER DESIGN CLEARANCE, % AVERAGE | | | | | | | |
| 16 | VOLUMETRIC EFFICIENCY, % AVERAGE | 73 | | | | | | |
| 17 | VALVES, INLET/DISCHARGE, QTY PER CYL. | 1/1 | | | | | / | / |
| 18 | TYPE OF VALVES | plate | | | | | | |
| 19 | VALVE LIFT, INLET/DISCHARGE, mm | / | / | / | / | / | / | / |
| 20 | VALVE VELOCITY, API 4TH EDITION, m/s | | | | | | | |
| 21 | SUCTION VALVE(S) | 16,65 | | | | | | |
| 22 | DISCHARGE VALVE(S) | 16,65 | | | | | | |
| 23 | ROD DIAMETER, (mm) | 30 | | | | | | |
| 24 | MAX ALLOW. COMBINED ROD LOADING, kN, C * | 17,5 | | | | | | |
| 25 | MAX ALLOW. COMBINED ROD LOADING, kN, T * | 17,5 | | | | | | |
| 26 | CALCULATED GAS ROD LOAD, kN, C * | 11,06 | | | | | | |
| 27 | CALCULATED GAS ROD LOAD, kN, T * | 0,36 | | | | | | |
| 28 | COMBINED ROD LOAD (GAS + INERTIA), kN, C * | 10,83 | | | | | | |
| 29 | COMBINED ROD LOAD (GAS + INERTIA), kN, T * | 0,20 | | | | | | |
| 30 | ROD REV., DEGREES MIN @ X-HD PIN** | 195,00 | | | | | | |
| 31 | RECIP WT. (PISTON, ROD, X-HD & NUTS), kg** | 10,74 | | | | | | |
| 32 | MAX ALLOW. WORKING PRESSURE, (BARG) | 24 | | | | | | |
| 33 | MAX ALLOW. WORKING TEMPERATURE, °C | 230 | | | | | | |
| 34 | HYDROSTATIC TEST PRESSURE, (BARG) | 36 | | | | | | |
| 35 | HELIUM TEST PRESSURE, (BARG) | 3 | | | | | | |
| 36 | INLET FLANGE SIZE/RATING at CYLINDER | / | / | / | / | / | / | |
| 37 | FACING at CYLINDER | | | | | | | |
| 38 | DISCHARGE FLANGE SIZE/RATING at CYLINDER | / | / | / | / | / | / | |
| 39 | FACING at CYLINDER | | | | | | | |
| 40 | DISCHARGE RELIEF VALVE SETTING DATA AT INLET PRESSURES GIVEN ABOVE: | | | | | | | |
| 41 | RECOMMENDED SETTING, (BARG) | ~25 | | | | | | |
| 42 | GAS ROD LOAD, kN, C * | 17,5 | | | | | | |
| 43 | GAS ROD LOAD, kN, T * | 17,5 | | | | | | |
| 44 | COMBINED ROD LOAD, kN, C * | 13,13 | | | | | | |
| 45 | COMBINED ROD LOAD, kN, T * | 12,6 | | | | | | |
| 46 | ROD REVERSAL, °MIN @ X-HD PIN** | 195 | | | | | | |
| 47 | NOTE: CALCULATED AT INLET PRESSURES | | | | | | | |
| 48 | GIVEN ABOVE & RECOMMENDED SETTING. | | | | | | | |
| 49 | ○ SETTLE-OUT GAS PRESSURE | | | | | | | |
| 50 | (DATA REQUIRED FOR STARTING) | | | | | | | |
| 51 | * C = COMPRESSION * T = TENSION **X-HD = CROSSHEAD | | | | | | | |
| 52 | **NOTES/REMARKS:** | | | | | | | |
| 53 | | | | | | | | |

Please check the total cylinder number again. With reference to P&ID, compressor is 1stage and 1 cylinder.

Liner thickness shall be added.

shall be completed.

To be completed

Since compressor is equipped to spill back capacity control, Compressor settle out pressure shall be added

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | ○ CONSTRUCTION FEATURES | | | | | | | |
| 2 | SERVICE ITEM NO. | | | | | | | |
| 3 | STAGE | 1 | | | | | | |
| 4 | CYLINDER SIZE (BORE DIA), mm | 90 | | | | | | |
| 5 | ROD RUN-OUT: NORMAL COLD VERTICAL | | | | | | | |
| 6 | (per appendix C) | | | | | | | |
| 7 | MATERIALS OF CONSTRUCTION | | | | | | | |
| 8 | CYLINDER(S) | DUCTILE CAST IRON | | | | | | |
| 9 | CYLINDER LINER(S) | EN-GJL-250 (SLG) | | | | | | |
| 10 | PISTON(S) | AlCu4PbMgMn T3 | | | | | | |
| 11 | PISTON RINGS | PTFE compaund | | | | | | |
| 12 | WEAR BANDS ○ REQUIRED | | | | | | | |
| 13 | PISTON ROD(S): MATERIAL/YIELD, N/mm² | | | | | | | |
| 14 | THREAD ROOT STRESS @ MACRL * @ X-HD END | | | | | | | |
| 15 | PISTON ROD HARDNESS, BASE MATERIAL, Rc | | | | | | | |
| 16 | PISTON ROD COATING ○ REQUIRED | plasma nitrided to = 1000 HV1 | | | | | | |
| 17 | COATING HARDNESS, Rc | | | | | | | |
| 18 | VALVE SEATS / SEAT PLATE | | | | | | | |
| 19 | VALVE SEAT MIN HARDNESS, Rc | | | | | | | |
| 20 | VALVE GUARDS (STOPS) | 79RL | | | | | | |
| 21 | VALVE DISCS | 79RL | | | | | | |
| 22 | VALVE SPRINGS | 79RLX | | | | | | |
| 23 | ROD PRESSURE PACKING RINGS | NBR, 70-ShA | | | | | | |
| 24 | ROD PRESSURE PACKING CASE | Niro (1.4305) | | | | | | |
| 25 | ROD PRESSURE PACKING SPRINGS | - | | | | | | |
| 26 | SEAL / BUFFER PACKING, DISTANCE PIECE | SK703 E | | | | | | |
| 27 | SEAL / BUFFER PACKING, INTERMEDIATE | SK703 E | | | | | | |
| 28 | WIPER PACKING RINGS | SK703 E | | | | | | |
| 29 | MAIN JOURNAL BEARINGS, CRANKSHAFT | - | | | | | | |
| 30 | CONNECTING ROD BEARING, CRANKPIN | - | | | | | | |
| 31 | CONNECTING ROD BUSHING, X-HD END | G-Cu Sn 12 | | | | | | |
| 32 | CROSSHEAD (X-HD) PIN BUSHING | - | | | | | | |
| 33 | CROSSHEAD PIN | 17Cr3 (1.7016) | | | | | | |
| 34 | CROSSHEAD | EN-GJS-400-15 | | | | | | |
| 35 | CROSSHEAD SHOES | EN-GJS-400-15 | | | | | | |
| 36 | CYLINDER INDICATOR VALVES (X) | | | | | | | |
| 37 | INDICATOR CONNECTIONS ABOVE 5000 PSI | | | | | | | |
| 38 | FLUOROCARBON SPRAYED CYLINDER (X) | | | | | | | |
| 39 | INSTRUMENTATION IN (X) COLD SIDE | | | | | | | |
| 40 | CONTACT W/PROCESS GAS (X) HOT SIDE | | | | | | | |
| 41 | * MAXIMUM ALLOWABLE COMBINED ROD LOAD | | | | | | | |

To be checked with page 9 row8.

1- ASTM material equivalent shall be added.
2- Since aluminum piston is selected, rider ring shall be consider for piston protection.
3- Piston rod material shall be specified.
4- Piston rod hardness material shall be specified.

Material shall be specified.

Please clarify about base material of 79RL

USE (X) IN APPROPRIATE COLUMN WHERE APPLICABLE

42 ● COMPRESSOR CYLINDER ROD PACKING
43 ● FULL FLOATING PACKING
44 ● VENTED TO: ○ FLARE @ _____ ● ATM
45 ○ SUCTION PRESSURE @ _____ (BARG)
46 ○ FORCED LUBRICATED ● NON-LUBE ○ TFE
47 ☐ WATER COOLED, _____ STAGE(S), _____ m³/h REQ'D
48 ☐ OIL COOLED, _____ STAGE(S), _____ m³/h REQ'D
49 ○ WATER FILTER PROV.FUTURE WATER/OIL COOLING
50 ○ VENT/BUFFER GAS SEAL PACKING ARR. (Ref: Appndx I FIG I-1)
51 ○ CONSTANT OR ○ VARIABLE DISPOSAL SYSTEM
52 ○ BUFFER GAS PRESSURE, _____ (BARG)
53 ○ SPLASH GUARDS FOR WIPER PACKING

DISTANCE PIECE(S): ○ TYPE A ● TYPE B ○ TYPE C ○ TYPE D
Ref: Appendix G, Fig. G-3

COVERS: ● SOLID METAL ○ SCREEN ○ LOUVERED

CYLINDER COMPARTMENT: (Outboard Distance Piece)
● VENTED TO amb _____ (BARG)
○ PURGED AT _____ (BARG)
○ PRESSURIZED TO _____ (BARG)
○ WITH RELIEF VALVE

FRAME COMPARTMENT: (Inboard Distance Piece)
○ VENTED TO _____ (BARG)
○ PURGED AT _____ (BARG)
○ PRESSURIZED TO _____ (BARG)
○ WITH RELIEF VALVE

☐ DISTANCE PIECE MAWP 0 (BARG)

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**CONSTRUCTION FEATURES (CONTINUED)**

○ FABRICATED CYLINDER, HEADS, & CONNECTION SKETCHES FOR DESIGN REVIEW BY PURCHASER.

○ BUFFER GAS PACKING ARR. Ref: Appendix I
○ OIL WIPER PACKING PURGE Figures I-1, I-2 &I-3
○ INTERMEDIATE PARTITION PURGE
INERT BUFFER PURGE GAS: ● $N_2$ ○ OTHER _____
● VENT, DRAIN, PURGE PIPING BY MFG'R ○ NO ● YES

**○ COUPLING(S)** ○ LOW-SPEED Between Compressor & Driver or Gear ○ HI-SPEED Between Driver & Gear

| | | |
|---|---|---|
| ◆ BY MANUFACTURER | | |
| ◆ MODEL | | |
| ◆ TYPE | | |
| | | |

API-671 APPLIES ● YES ○ NO

**■ V-BELT DRIVE**

| | DRIVEN SHEAVE (Compressor Shaft) | DRIVE SHEAVE (Driver Shaft) |
|---|---|---|
| RPM (EXPECTED) | 400 | 1475 |
| PITCH DIA. (Inches) | | |
| ◆ QTY & GROOVE X-SEC. | 4 | |
| POWER TRANSMITT'D | 13 | 15 Incl. Belt Losses |

DRIVER NAMEPLATE HP RATING _____
◇ CENTER DISTANCE (INCHES) _____
◇ QTY, TYPE, _____
X-SEC., & LENGTH BELTS _____
◇ BELT SERVICE FACTOR (RELATIVE TO DRIVER NAMEPLATE HP RATING) _____

**○ INSPECTION AND SHOP TESTS**

| | REQ'D | WITN. | OBSER. |
|---|---|---|---|
| *SHOP INSPECTION | ● | ○ | ○ |
| ACTUAL RUNNING CLEARANCES AND RECORDS | ○ | ○ | ○ |
| MFG STANDARD SHOP TESTS | ● | ○ | ○ |
| CYLINDER HYDROSTATIC TEST | ○ | ○ | ○ |
| CYLINDER PNEUMATIC TEST | ○ | ○ | ○ |
| CYLINDER HELIUM LEAK TEST | ○ | ○ | ○ |
| CYL. JACKET WATER HYDRO TEST | ○ | ○ | ○ |
| *MECHANICAL RUN TEST (4 HR) | ● | ○ | ● |
| BAR-OVER TO CHECK ROD RUNOUT | ○ | ○ | ○ |
| *LUBE OIL CONSOLE RUN/TEST (4 HR) | ● | ○ | ● |
| *COOLING $H_2O$ CONSOLE RUN/TEST | ● | ○ | ● |
| RADIOGRAPHY BUTT WELDS | ○ | ○ | ○ |
| ○ GAS ○ OIL ○ FAB CYLS. MAG PARTICLE/LIQUID PENETRANT OF WELDS SPECIFY ADDITIONAL REQUIREMENTS (4.2.1.3) | ○ | ○ | ○ |
| QC OF INACCESSIBLE WELDS (2.14.5.2.4) | ○ | | |
| SHOP FIT-UP OF PULSATION SUPPL. DEVICES & ALL ASSOCIATED GAS PIPING | ○ | ○ | ○ |
| *CLEANLINESS OF EQUIP., PIPING, & APPURTENANCES | ● | ○ | ○ |
| *HARDNESS OF PARTS, WELDS & HEAT AFFECTED ZONES | ○ | ○ | ○ |
| *NOTIFICATION TO PURCHASER OF ANY REPAIRS TO MAJOR COMPONENTS | ● | ● | |
| SOUND LEVEL TEST | ● | ○ | ○ |
| DISMANTLING INSPECTION | ○ | ○ | ○ |

*SPECIFIC REQUIREMENTS TO BE DEFINED, FOR EXAMPLE, DISMANTLING, AUX EQUIPMENT OPERATIONAL & RUN TESTS.

APPENDIX K COMPLIANCE: ○ VENDOR ○ PURCHASER

NOTE: - INSPECTION AND TESTING SHALL BE AS PER SCOPE OF INSPECTION SHEETS ATTACHED TO MATERIAL REQUISITION.

**○ CYLINDER LUBRICATION**

● NON-LUBE _____ STAGE(S)/SERVICE
○ LUBRICATED _____ STAGE(S)/SERVICE
TYPE OF LUBE OIL: ○ SYNTHETIC _____ ○ HYDROCARBON _____
LUBRICATOR DRIVE BY: ☐ COMP. CRANKSHAFT, DIRECT ☐ CHAIN, FROM CRANKSHAFT ◎ ELECTRIC MOTOR ◎ OTHER _____
◇ LUBRICATOR MFR _____ ◇ MODEL _____
TYPE LUBRICATOR: ○ SINGLE PLUNGER PER POINT (2.13) ○ DIVIDER BLOCKS _____
◈ COMPARTM'T, TOT _____
◈ PLUNGERS (PUMP _____
◈ SPARE PLUNGERS _____
◈ SPARE COMPART _____
○ HEATERS: ○ ELECTRIC W/THERM.(S) ○ STEAM

With reference to GA of compressor 7080, total weight is 3200 kG. Please check it again.

**☐ ESTIMATED WEIGHTS AND NOMINAL DIMENSIONS**

| | | |
|---|---|---|
| ☐ TOTAL COMPR. WT, LESS DRIVER & GEAR | | kg |
| ◆ WT, OF COMPLETE UNIT, (LESS CONSOLES) | 3000 | kg |
| ◇ MAXIMUM ERECTION WEIGHT | | kg |
| ◆ MAXIMUM MAINTENANCE WEIGHT | 211 | kg |
| ◆ DRIVER WEIGHT/GEAR WEIGHT | / 211 | kg |
| ◇ LUBE OIL/COOLING $H_2O$ CONS. | / | kg |
| ◇ FREE STANDING PANEL | | |

| SPACE REQUIREMENTS-mm: | LENGTH | WIDTH | HEIGHT |
|---|---|---|---|
| ◇ COMPLETE UNIT | | | |
| ◇ LUBE OIL CONSOLE | | | |
| ◇ COOLING $H_2O$ CONSOLE | | | |
| ◇ FREE STANDING PANEL | | | |
| ☐ PISTON ROD REMOVAL DIST. | | | |

OTHER EQUIPMENT SHIPPED LOOSE (DEFINE)

| | | |
|---|---|---|
| ◇ PULSATION SUPP., WEIGHT | 70 | kg |
| ◇ PIPING | 50 | kg |
| ◇ INTERSTAGE EQUIPMENT | | kg |

| OWNER: | BUSHEHR PETROCHEMICAL COMPANY<br>MEG PLANT | CONTRACTOR: |
|---|---|---|
| MC: | MECHANICAL DATA SHEET FOR EMERGENCY<br>INSTRUMENT AIR COMPRESSOR (20-C-7080) | |

| Project | Area | Phase | Unit | Dis. | Doc. | Seq. | Contract No : 52-98/445 | |
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## UTILITY CONSUMPTION

### ELECTRIC MOTORS

| | NAMEPLATE HP (kW) | LOCKED ROTOR AMPS | FULL LOAD AMPS | |
|---|---|---|---|---|
| ◆ MAIN DRIVER | 15 | 239 | 28,5 | |
| ◇ MAIN LUBE OIL PUMP | | | | |
| ◇ AUX LUBE OIL PUMP | | | | |
| ◇ MAIN COOLING WATER PUMP | | | | |
| ◇ AUX COOLING WATER PUMP | | | | |
| ◇ ROD PACKING COOLING PUMP | | | | |
| ◇ CYLINDER LUBRICATOR | | | | |

### ELECTRIC HEATERS

| | WATTS | VOLTS | HERTZ |
|---|---|---|---|
| ◆ FRAME OIL HEATER(S) | TBC | 110 | 50 |
| ◇ COOLING WATER HEATER(S) | | | |
| ◇ CYL. LUBRICATOR HEATER(S) | | | |
| ◇ MAIN DRIVER SPACE HEATER(S) | | | |

### STEAM-NOT APPLICABLE

| | FLOW | PRESSURE | TEMPERATURE | BACK PRESSURE |
|---|---|---|---|---|
| ◇ MAIN DRIVER | kg/h @ | (BARG) (kPa) | °CTT TO | (BARG) (kPa) |
| ◇ FRAME OIL HEATER(S) | kg/h @ | (BARG) (kPa) | °CTT TO | (BARG) (kPa) |
| ◇ CYL. LUB. HEATER(S) | kg/h @ | (BARG) (kPa) | °CTT TO | (BARG) (kPa) |
| | kg/h @ | (BARG) (kPa) | °CTT TO | (BARG) (kPa) |
| | kg/h @ | (BARG) (kPa) | °CTT TO | (BARG) (kPa) |

### COOLING WATER REQUIREMENTS-(NOTE 9)

| | FLOW m³/h | INLET TEMP °C | OUTLET TEMP °C | INLET PRESS (BARG) | OUTLET PRESS (BARG) | MAX PRESS (BARG) |
|---|---|---|---|---|---|---|
| ☐ CYLINDER JACKETS | | | | | | |
| ◆ INTERCOOLER(S) | 1,7 | 35 | 45 | 4,5 | 3,5 | 6 |
| ◇ AFTERCOOLER | | | | | | |
| ◇ FRAME LUBE OIL COOLER | | | | | | |
| ◇ ROD PRESSURE PACKING* | | | | | | |
| ◆ CYLINDER COOLANT CONSOLE | 0,90 | 35 | 45 | 4,5 | 3,5 | 6 |
| ◆ TOTAL QUANTITY, m³/h | 2,6 | | | | | |

| OWNER: | BUSHEHR PETROCHEMICAL COMPANY<br>MEG PLANT | CONTRACTOR: |
|---|---|---|
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| | Project | Area | Phase | Unit | Dis. | Doc. | Seq. | |
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○ **FRAME LUBE OIL SYSTEM**

● **BASIC LUBE OIL SYSTEM FOR FRAME:** ■ SPLASH (TBA) ○ PRESSURE (FORCED) ● HEATERS REQUIRED:

☐ REF: TYPE MAIN BEARINGS: ○ TAPERD ROLLER ○ PRECISION SLEEVE ● ELEC. W/THERMOSTAT(S) ○ STEAM

● **PRESSURE SYSTEM:** ● MAIN OIL PUMP DRIVEN BY: ● COMP. CRANKSHAFT ○ ELEC. MOTOR ○ OTHER _____

☐ PSV FOR MAIN PUMP EXTERNAL TO CRANKCASE _____

○ AUX OIL PUMP DRIVEN BY: ○ ELEC. MOTOR ○ OTHER _____

☐ HAND OPERATED PRE-LUBE PUMP FOR STARTING ● OPERATIONAL TEST & 4 HOUR MECH RUN TEST

○ API-614 LUBE SYSTEM: ○ NO ○ YES ○ CHECK VALVE ON MAIN PUMP

○ CONTINUOUS FLOW THROUGH OIL (7.7.2.5)

○ **SEP. CONSOLE FOR PRESS. LUBE SYS:** ○ ONE CONSOLE FOR EA. COMP. ○ ONE CONSOLE FOR _____ COMPRESSORS

○ CONSOLE TO BE OF DECK PLATE TYPE CONSTRUCTION SUITABLE FOR MULTI-POINT SUPPORT AND GROUTING WITH GROUT & VENT HOLES.

○ ELECTRICAL CLASSIFICATION : ZONE 2 , GROUP IIB CLASS _____ T3 ○ NON-HAZARDOUS

■ **BASIC SYS. REQ'MTS (NORM. OIL FLOWS & VOLUMES)**

| ■ LUBE OIL | FLOW m³/h | PRESSURE (BARG) | VISCOSITY cst @ 40°C | VISCOSITY cst @ 100°C | SUMP VOLUME m³ |
|---|---|---|---|---|---|
| ☐ COMPRESSOR FRAME | | | | | |
| ◇ DRIVER | | | | | |
| ◇ GEAR | | | | | |

☐ SYSTEM PRESSURES: ☐ DESIGN _____ (BARG) ☐ HYDROTEST _____ (BARG)

☐ PRESSURE CONTROL VALVE SETTING _____ VTS (BARG) ☐ PUMP RELIEF VALVE(S) SET _____ (BARG

● **PIPING MATERIALS:**

| | CARBON STEEL | STAINLESS STEEL WITH SS FLANGES | STAINLESS STEEL WITH CARBON STEEL FLANGES |
|---|---|---|---|
| ● UPSTREAM OF PUMPS & FILTERS | ● | ○ | ○ |
| ● DOWNSTREAM OF FILTERS | ● | ○ | ○ |
| ○ _____ | ○ | ○ | ○ |
| ○ _____ | ○ | ○ | ○ |

☐ PUMPS

| | ◆ RATED FLOW | ◆ PRESSURE (BARG) | ◆ COLD START REQ'D kW | ◆ DRIVER kW | ◆ SPEED RPM | COUPLING REQ'D | MECH. SEAL REQ'D |
|---|---|---|---|---|---|---|---|
| MAIN | NA | 2,0 | NA | SHAFT DRIVEN | NA | ○ | ○ |
| AUXILIARY | | | | | | ○ | ○ |

■ PUMP CASING MATERIAL MAIN PUMP STEEL AUX PUMP _____

○ GUARD(S) REQ. FOR COUPLING(S): ○ MAIN PUMP ○ AUX PUMP ○ GUARD TYPE OR CODE _____

○ AUXILIARY PUMP CONTROL: ○ MANUAL ○ AUTOMATIC ○ ON-OFF-AUTO SEL. SWITCH: ○ BY PURCH. ○ BY MFR.

○ WIRING TO TERMINAL BOX: ○ BY PURCH. ○ BY MFR.

○ SWITCHES ○ RTD'S/THERMOCOUPLES

○ **COOLERS:** ○ SHELL & TUBE ○ SINGLE ○ DUAL W/TRANSFER VALVE ○ MFG'S STD. ○ TEMA C ○ TEMA R

○ REMOVABLE BUNDLE ○ WATER COOLED ○ AIR COOLED W/AUTO TEMP CONTROL

○ W/BYPASS & TEMP CONTROL VALVE: ○ MANUAL ○ AUTO ○ SEE SEPARATE HEAT EXCHANGER DATA SHTEET

○ **FILTER(S)** ○ SINGLE ○ DUAL W/TRANSFER VALVE ○ ASME CODE DESIGN ○ ASME CODE STAMPED

☐ DESIGN PRESSURE, _____ (BARG) ☐ △P CLEAN, _____ (BARG) ☐ △P COLLAPSE, _____ (BARG)

☐ MICRON RATING, _____ ☐ CARTRIDGE MATERIAL, _____ ◇ CARTRIDGE P/N _____

☐ BONNET MATERIAL, _____ ☐ CASING MATERIAL, _____ ● FURN.SPARE CARTR.,QTY _____

☐ **SYS. COMPONENT SUPP.**

| | MANUFACTURER | MODEL | | MANUFACTURER | MODEL |
|---|---|---|---|---|---|
| ◆ MAIN PUMP | Airpack | | ◇ OIL COOLER(S) | | |
| ◇ AUXILIARY PUMP | | | ◇ TRANSFER VALVE(S) | | |
| ◆ MECHANICAL SEALS | Airpack | | ◇ PUMP COUPLING(S) | | |
| ◆ ELECTRIC MOTORS | WEG | | ◆ SUCTION STRAINER(S) | TBC | |
| ◇ STEAM TURBINES | | | ◆ CHECK VALVE(S) | TBC | |
| ◆ OIL FILTER(S) | Airpack | | ◇ | | |

| OWNER: | BUSHEHR PETROCHEMICAL COMPANY<br>MEG PLANT | CONTRACTOR: |
|---|---|---|
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| | Project | Area | Phase | Unit | Dis. | Doc. | Seq. | Contract No : 52-98/445 | |
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**COOLING WATER SYSTEM**

**BASIC COOLING SYS. FOR:** ● COMPRESSOR CYL.(S) ○ INTERCOOLER(S) ● AFTERCOOLER ○ OIL COOLER(S)
○ HEATERS REQ.'D FOR PRE-HEATING: ● ELEC.,W/ THERMOSTAT(S) ○ STEAM

**PRESSURE FORCED CIRCULATING SYS:** ● OPEN, PIPING BY: ○ PURCH ● MFR ○ CLOSED, PIPING BY MFR.
MAIN WATER PUMP DRIVEN BY: ○ ELEC. MOTOR ○ STEAM TURBINE ○ OTHER _____
AUX WATER PUMP DRIVEN BY: ○ ELEC. MOTOR ○ STEAM TURBINE ○ OTHER _____

○ **SEP. CONSOLE FOR COOLING WATER SYS.:** ○ ONE CONSOLE FOR EA. COMP. ○ ONE CONSOLE FOR _____ COMP'RS
○ CONSOLE TO BE OF DECK PLATE TYPE CONSTRUCTION SUITABLE FOR MULTI-POINT SUPPORT AND GROUTING WITH GROUT & VENT HOLES.

○ ELECTRICAL CLASSIFICATION ZONE 2 IIB T3 _____ _____ ○ NON-HAZARDOUS

**BASIC SYS. REQ'MTS (NORM. COOLING WATER FLOW DATA)** ○ COOL'G WATER TO BE _____ % ETHYL'NE GLYC'L

| | FORCED COOL'G | THERMO SYPHON | STAND PIPE | FLOW m³/h | PRESSURE (BARG) | INLET TEMP °C | OUTLET TEMP °C | SITE FLOW IND'TR |
|---|---|---|---|---|---|---|---|---|
| CYLINDER(S), ___ STAGE | ● | ○ | ○ | 0,9 | 4,5 | 35 | 45 | ● |
| CYLINDER(S), ___ STAGE | ○ | ○ | ○ | | | | | ○ |
| CYLINDER(S), ___ STAGE | ○ | ○ | ○ | | | | | ○ |
| CYLINDER(S), ___ STAGE | ○ | ○ | ○ | | | | | ○ |
| CYLINDER(S), ___ STAGE | ○ | ○ | ○ | | | | | ○ |
| CYLINDER(S), ___ STAGE | ○ | ○ | ○ | | | | | ○ |
| PISTON ROD PACK'G TOTAL | ○ | | | | | | | ○ |
| INTERCOOLER(S) TOTAL | ○ | | | | | | | ○ |
| AFTERCOOLER | ○ | | | | | | | ○ |
| OIL COOLER(S) | ○ | | | | | | | ○ |
| JACKET COOLER | ○ | | | | | | | ○ |
| TOTAL FLOW | | | | | | | | |

□ **SYS. PRESSURES:** □ DESIGN, _____ (BARG) (kPa) □ HYDROTEST, _____ (BARG) (kPa) ○ **RELIEF VALVE(S), SETTING** _____ PSIG

○ **WATER RESERVOIR:** ◇ SIZE, _____ mm DIA X _____ mm HT. ◇ CAPACITY _____ m @ Normal Operating Level

◇ RESERVOIR MATERIAL c.s ◇ INTERNAL COATING, TYPE _____

○ LEVEL GAUGE ○ LEVEL SWITCH ○ DRAIN VALVE ○ INSPECTION & CLEAN-OUT OPENINGS

□ **PUMPS: (Centrifugal Only)**

| | ◇ RAT'D FL'W m³/h | ◇ PRESS. (BARG) | ◇ REQ'D kW | ◇ DRIVER kW | ◇ SPEED RPM | COUPLING REQ'D | MECH.SEAL REQ'D |
|---|---|---|---|---|---|---|---|
| MAIN | | | | | | ○ | ○ |
| AUXILIARY | | | | | | ○ | ○ |

□ PUMP CASING MATERIAL (Ref 6.14.2.1.5): MAIN PUMP _____ AUX PUMP _____

○ GUARD(S) REQ.'D FOR COUP'G(S) ○ MAIN PUMP ○ AUX PUMP ○ GUARD TYPE OR CODE _____

○ AUX.PUMP CONTROL: ○ MANUAL ○ AUTO ○ ON-OFF-AUTO SEL. SWITCH: ○ BY PURCH. ○ BY MANUFACTURER
○ WIRING TO TERMINAL BOX: ○ BY PURCH. ○ BY MANUFACTURER

○ **COOLING WATER HEAT EXCH.:** ○ SHELL & TUBE ○ SINGLE ○ DUAL W/TRANSFER VALVE ○ TEMA C ○ TEMA R(API-660)

○ AIR COOLED EXCHANGER W/AUTO TEMP CONTROL (API-661 Data Sheets Attached)
○ W/BYPASS & TEM. CONTROL VALVE ○ MANUAL ○ AUTO ○ LOUVERS FOR AIR EXCH.
○ SEE SEPARATE COOLER DATA SHEET FOR DETAILS; SPECIFY % GLYCOL ON BOTH SIDES OF SHELL & TUBE

| SYS. COMPONENT SUPP. | MANUFACTURER | MODEL | | MANUFACTURER | MODEL |
|---|---|---|---|---|---|
| ◇ MAIN PUMP | | | ◇ TEMP CONTROL VALVE(S) | | |
| ◇ AUXILIARY PUMP | | | ◇ TRANSFER VALVE(S) | | |
| ◇ MECHANICAL SEALS | | | ◇ PUMP COUPLING(S) | | |
| ◇ ELECTRIC MOTORS | | | ◇ | | |
| ◇ STEAM TURBINES | | | ◇ | | |

| OWNER: | BUSHEHR PETROCHEMICAL COMPANY<br>MEG PLANT | CONTRACTOR: |
|---|---|---|
| MC: | MECHANICAL DATA SHEET FOR EMERGENCY INSTRUMENT AIR COMPRESSOR (20-C-7080) | |

| Project | Area | Phase | Unit | Dis. | Doc. | Seq. | Contract No : 52-98/445 | |
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**PULSATION SUPPRESSION DEVICES FOR RECIPROCATING COMPRESSORS**

THESE SHEETS TO BE FILLED OUT FOR EACH SERVICE AND/OR STAGE OF COMPRESSION

APPLICABLE TO: ● PROPOSALS ○ PURCHASE ○ AS BUILT

FOR/USER: BUSHEHR PETROCHEMICAL COMPANY (BUPC)

SITE/LOCATION: ASSALUYE — AMBIENT TEMPERATURE MIN/MAX: 5 / 55 °C

COMPRESSOR SERVICE: EMERGENCY INSTRUMENT AIR COMP — NUMBER OF COMPRESSORS: 1 SET

COMPRESSOR MFG.: — MODEL/TYPE:

SUPPRESSOR MFG.:

NOTE: ○ Ind.Data Comp.'d Purch. ☐ By Compr/Supp.Mfg.w/Proposal ◇ By Mfg(s) after order ◎ By Mfg(s)/Purchaser as Applicable

**GENERAL INFORMATION APPLICABLE TO ALL SUPPRESSORS**

TOTAL NUMBER OF SERVICES AND/OR STAGES:

TOTAL NUMBER OF COMPRESSOR CYL.: 2 — TOTAL NUMBER OF CRANKTHROWS: 1 — STROKE: mm RPM:

● ASME CODE DESIGN ○ GOVERNMENTAL CODES OF: — CODE REGULATIONS APPLY

○ OTHER APPLICABLE PRESSURE VESSEL SPEC. OR CODE:

○ LUBE SERVICE ● NON-LUBE SERV. ○ NO OIL ALLOWED INTERNALLY — DRY TYPE INTER.CORR.COATING ○ YES ○ NO

○ RADIOGRAPHY (X-RAY OF WELDS): ○ NONE ● SPOT ○ 100% ○ IMPACT TEST ○ SPECIAL WELDING REQUIREMENTS

● SHOP INSPECTION ○ WITNESS HYDROTEST ● OUTDOOR STORAGE OVER 12 MONTHS ○ SPECIAL PAINT SPEC: BU-20-D-000-PI-SPC-409

○ WITNESSED ○ OBSERVED

1

**CYLINDER, GAS, OPERATING, AND SUPPRESSOR DESIGN DATA**

SERVICE: EMERGENCY INSTRUMENT AIR COMP — STAGE NO.: 2

☐ COMPRESSOR MANUFACTURER'S RATED CAPACITY — LBS/HR: — SCFM: — MMSCFD:

| | INLET SUPPRESSOR | DISCHARGE SUPPRESSOR |
|---|---|---|
| ☐ LINE SIDE OPERATING PRESSURE | INLET, (BARA) | DISCHARGE, (BARA) |
| ☐ OPERATING TEMP. WITHIN SUPPRESSORS | INLET, °C | DISCHARGE, °C |
| ○ ALLOWABLE PRESSURE DROP THROUGH SUPPRESSORS | Δ P (BAR) / % | Δ P (BAR) / % |
| ● SUPRESSOR TAG NUMBER | 20-DC-7080-1 | 20-DC-7080-2 |
| ● COMBINATION INLET SUPP SEPARATOR/INTERNALS | ○ YES ● NO / ○ YES ● NO | ○ YES ● NO / ○ YES ● NO |
| ◎ NO. (QTY) OF INLET & DISCH. SUPP. PER STAGE | | 1 |
| ○ ALLOWABLE PEAK-PEAK PULSE @ LINE SIDE NOZZLE | % | (BAR) / % |
| ○ ALLOWABLE PEAK-PEAK PULSE @ CYL FLANGE NOZZLE | % | (BAR) / % |
| ● DESIGN FOR FULL VACUUM CAPABILITY | ○ YES ● NO | ○ YES ● NO |
| ● MIN. REQ'D WORKING PRESSURE & TEMPERATURE<br>NOTE: AFTER DESIGN, THE ACTUAL MAWP & TEMP ARE TO BE DETERMINED BASED ONTHE WEAKEST COMPONENT AND STAMPED ON THE VESSEL, THE ACTUAL MAWP IS TO BE SHOWN ON PG. 14 LINE 12 AND ON THE U1A FORMS | (BARA) 13,5 @ 80 °C | (BARA) 25 @ 210 °C |
| ● INITIAL SIZING VOL. PER FORMULA OF 7.9.3.2<br>NOTE: This is a Reference | 0,3 m³ | 0,3 m³ |
| ◆ AS BUILT VOLUME (m³) | m³ | m³ |

With reference to clause 4.4.1 of BU-20-D-000-PR-SPC-101-06, design temperature shall not be less than 85 C.

**#2 : PULSATION DAMPING FOR INLET AND OUTLET OF EACH CYLINDER, BY VOLUME BOTTLES.**

| OWNER: | BUSHEHR PETROCHEMICAL COMPANY<br>MEG PLANT | CONTRACTOR: |
|---|---|---|
| MC: | MECHANICAL DATA SHEET FOR EMERGENCY INSTRUMENT AIR COMPRESSOR (20-C-7080) | |

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**PULSATION SUPPRESSION DEVICES FOR RECIPROCATING COMPRESSORS (CONT'D)** SERVICE _____

THESE SHEETS TO BE FILLED OUT FOR EACH SERVICE AND/OR STAGE OF COMPRESSION STAGE NO. _____

| CONSTRUCTION REQUIREMENTS & DATA | INLET SUPPRESSOR | DISCHARGE SUPPRESSOR |
|---|---|---|
| ● SUPRESSOR TAG NUMBER | | |
| ● BASIC MATERIAL REQUIRED, CS, SS, ETC. | Carbon Steel | Carbon Steel |
| ◇ ACTUAL MATERIAL DESIGNATION | / | / |
| ○ SPECIAL HARDNESS LIMITATIONS, Rc | L & HEADS WELDS | SHELL & HEADS WELDS |
| ● CORROSION ALLOWANCE., mm | 3 mm | 3 mm |
| ◆ WALL THICKNESS, mm SHELL/HEAD | mm/ mm | mm, mm |
| □ NOM. SHELL DIA X OVERALL LGTH. (mm/m³) | mm/ mm³ | mm, mm³ |
| □ PIPE OR ROLLED PLATE CONSTRUCTION | □ PIPE □ ROLLED PLATE | □ PIPE □ ROLLED PLATE |
| ◆ ACT. MAX ALLOW. WORKING PRESS. AND TEMPERATURE | (BAR) @ °C | (BAR) @ °C |
| ● MINIMUM DESIGN METAL TEMP (2.14.8) | °C | °C |
| ○ INLET SUPRESS. TO BE SAME MAWP AS DISCH'RGE SUPPRESS. | ○ YES ○ NO | |
| ◇ MAX EXPECTED PRESSURE DROP(Δ P, %) LINE PRESS | Δ P (BAR) / % | Δ P (BAR)/ % |
| ◇ WEIGHT (EACH) | kg | kg |
| ○ INSUL CLIP | VTS | VTS |
| ◇ EXPECTED P-P PULSE @ LINE SIDE/CYL FLG, % LINE PRESS BASED ON FINAL SUPPRESSOR DESIGN | %/ % | %/ % |
| ◎ SUPPORTS, TYPE/QUANTITY | | |

All remaining data of pulsation dampener, such as pressure drop and etc. shall be completed

| CONNECTION REQUIREMENTS & DATA | | |
|---|---|---|
| ● LINE SIDE FLANGE. SIZE/RATING/FACING/TYPE | VTS/VTS/RF/WN | VTS/VTS/RF/WN |
| ● COMP CYL FLANGE(S), QTY/SIZE/RATING/FACING/TYPE | VTS | VTS |
| ○ FLANGE FINISH, ○ PER 3.9.3.15 >3.2 <6.4 ○ SPECIAL (SPECIFY) ● PER ANSI 16.5 | | |
| ● INSPECTION OPENINGS REQUIRED | ○ YES ● NO ○ BLINDED | ○ YES ● NO ○ BLINDED |
| ● SPEC. QTY. SIZE, /FLG TYPE & RATING | | |
| ◇ * QTY. SIZE, /FLG TYPE & RATING | | |
| ● VENT CONNECTIONS REQUIRED | ○ YES ● NO | ○ YES ● NO |
| ○ SPEC. QTY. SIZE, /FLG TYPE & RATING | | |
| ◇ * QTY. SIZE, /FLG TYPE & RATING | | |
| ● DRAIN CONNECTIONS REQUIRED | ○ YES ● NO | ○ YES ● NO |
| ○ SPEC. QTY. SIZE, /FLG TYPE & RATING | | |
| ◇ * QTY. SIZE, /FLG TYPE & RATING | | |
| ● PRESSURE CONNECTIONS REQUIRED | ○ YES ● NO | ○ YES ● NO |
| ○ SPEC. QTY. SIZE, /FLG TYPE & RATING | | |
| ◇ * QTY. SIZE, /FLG TYPE & RATING | | |
| ● TEMPERATURE CONNECTIONS REQUIRED | ○ YES ● NO | ○ YES ● NO |
| ○ SPEC. QTY. SIZE, /FLG TYPE & RATING | | |
| ○ CYL NOZZLE ○ MAIN BODY | | |
| ◇ * QTY. SIZE, /FLG TYPE & RATING | | |

Drain connection is required.

| OTHER DATA AND NOTES | | |
|---|---|---|
| ◆ COMPRESSOR MFG'S SUPP. OUTLINE OR DRAWING NO. | | |
| ◇ SUPP. MFG'S OUTLINE OR DRAWING NO. | | |

| OWNER: | BUSHEHR PETROCHEMICAL COMPANY<br>MEG PLANT | CONTRACTOR: |
|---|---|---|
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○ INSTRUMENTATION

PURCHASER TO FILL IN ( ☐ ○ ⬡ ) AFTER COMMODITY TO INDICATE: ☐ BY COMP. MFR. ○ BY PURCH. ⬡ BY OTHERS

INSTRUMENT & CONTROL PANEL ( ■ ○ ⬡ ):
- ● ONE FOR EA. UNIT ○ ONE COMMON TO ALL UNITS
- ○ MACHINE MT'ED ● FREE STANDING (OFF UNIT) / ○ LOCAL ● REMOTE ○ INDOORS
- ○ PNEUMATIC ○ ELEC. ● ELECTRONIC ○ HYDRAULIC ● PROGRAMMABLE CONTL'R
- ○ NEMA 7, CLASS _____, GROUP IIB, DIVISION _____ ○ INTRINSICALLY SAFE (Exi)
- ● I/S BARRIERS ( ■ ○ ⬡ )
- ○ NEMA 4, WATERTIGHT & DUSTTIGHT ○ PURGED TO NFPA 496 TYPE ○ X ○ Y ○ Z
- ● OTHER NEMA IP42 LOW P[illegible] ○ ALARM ○ SHUTDOWN
- ○ VIB, ISOLATORS ○ STRIP HEATERS [illegible]. ○ EXTRA CUTOUTS
- ● ANNUNCIATOR W/FIRST-OUT INDICATION LOCATED ON CONTROL PANEL
- ● PURCHASER'S CONN. BROUGHT OUT TO TERMINAL BOX BY VENDOR
- ● IP PROTECTION : ~~IP 55~~ FOR LOCAL PANEL , IP 42 FOR CONTROL INDOOR PANEL.

Local panel is IP65.

BUFFER GAS CONTROL PANE ○ ONE FOR EA. UNIT ○ ONE COMMON TO ALL UNITS

● INSTRUMENTATION SUITABLE FOR: ○ INDOORS ● OUTDOORS ● IP PROTECTION: IP-65 ○ OTHER

● PREFERRED INSTRUMENT SUPPLIERS, (TO BE COMPLETED BY PURCHASER), OTHERWISE MFR'S STANDARD APPLIES

| | | | | | | |
|---|---|---|---|---|---|---|
| PRESSURE GAUGES | MFR | as per instrument data sheets | SIZE & TYPE | as per instrument data sheets | MTL | |
| TEMPERATURE GAUGES | MFR | as per instrument data sheets | SIZE & TYPE | as per instrument data sheets | MTL | |
| LIQUID LEVEL GAUGES | MFR | as per instrument data sheets | TYPE | as per instrument data sheets | MTL | |
| DIFF. PRESSURE GAUGES | MFR | as per instrument data sheets | SIZE & TYPE | as per instrument data sheets | MTL | |
| PRESS. TRANSMITTERS | MFR | as per instrument data sheets | TYPE | as per instrument data sheets | MTL | |
| LIQUID LEV. TRANSMITTER | MFR | as per instrument data sheets | TYPE | as per instrument data sheets | MTL | |
| PRESSURE SWITCHES | MFR | as per instrument data sheets | TYPE | as per instrument data sheets | MTL | |
| TEMPERATURE SWITCHES | MFR | as per instrument data sheets | TYPE | as per instrument data sheets | MTL | |
| LIQUID LEVEL SWITCHES | MFR | as per instrument data sheets | TYPE | as per instrument data sheets | MTL | |
| DIFF. PRESSURE SWITCHES | MFR | as per instrument data sheets | TYPE | as per instrument data sheets | MTL | |
| CONTROL VALVES | MFR | as per instrument data sheets | TYPE | as per instrument data sheets | MTL | |
| PRESSURE SAFETY VALVES | MFR | as per instrument data sheets | TYPE | as per instrument data sheets | MTL | |
| SIGHT FLOW INDICATORS | MFR | as per instrument data sheets | TYPE | as per instrument data sheets | MTL | |
| VIBRATION MONITORS & EQUIP. | MFR | as per instrument data sheets | TYPE | as per instrument data sheets | MTL | |
| THERMOCOUPLES | MFR | as per instrument data sheets | TYPE | as per instrument data sheets | MTL | |
| RTD'S | MFR | as per instrument data sheets | TYPE | as per instrument data sheets | MTL | |
| SOLENOID VALVES | MFR | as per instrument data sheets | TYPE | as per instrument data sheets | MTL | |
| ANNUNCIATOR | MFR | | MODEL & (QTY SPARE POINTS) | | ( ) | |
| PROGRAMMABLE CONTROLLER | MFR | | TYPE | | MTL | |
| | MFR | | TYPE | | MTL | |
| | MFR | | TYPE | | MTL | |

PRESSURE GAUGE REQUIREMENTS ● LIQUID FILLED PRESSURE GAUGES: ● YES ○ NO

| FUNCTION | LOCALLY MOUNTED | PANEL MOUNTED |
|---|---|---|
| LUBE OIL MAIN PUMP DISCHAR. | ( ☐ ○ ⬡ ) | ( ☐ ○ ⬡ ) |
| LUBE OIL AUX. PUMP DISCHARG. | ( ☐ ○ ⬡ ) | ( ☐ ○ ⬡ ) |
| LUBE OIL PRESS. AT FRAME HEADER | ( ☐ ○ ⬡ ) | ( ☐ ○ ⬡ ) |
| LUBE OIL FILTER Δ P | ( ☐ ○ ⬡ ) | ( ☐ ○ ⬡ ) |
| COOLING $H_2O$ INLET HEADER | ( ■ ○ ⬡ ) | ( ☐ ○ ⬡ ) |
| | ( ☐ ○ ⬡ ) | ( ☐ ○ ⬡ ) |
| | ( ☐ ○ ⬡ ) | ( ☐ ○ ⬡ ) |

| | | LOCALLY MOUNTED | PANEL MOUNTED |
|---|---|---|---|
| PROCESS GAS: INLET PRESS. | | | |
| | @ EA. STAGE | ( ■ ○ ⬡ ) | ( ☐ ○ ⬡ ) |
| DISCH. PRESS. | @ EA. STAGE | ( ■ ○ ⬡ ) | ( ☐ ○ ⬡ ) |
| | | ( ☐ ○ ⬡ ) | ( ☐ ○ ⬡ ) |
| | | ( ☐ ○ ⬡ ) | ( ☐ ○ ⬡ ) |
| | | ( ☐ ○ ⬡ ) | ( ☐ ○ ⬡ ) |

REMARKS:

| OWNER: | BUSHEHR PETROCHEMICAL COMPANY<br>MEG PLANT | CONTRACTOR: |
|---|---|---|
| MC: | MECHANICAL DATA SHEET FOR EMERGENCY<br>INSTRUMENT AIR COMPRESSOR (20-C-7080) | |

| Project | Area | Phase | Unit | Dis. | Doc. | Seq. | Contract No : 52-98/445 |
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## INSTRUMENTATION (CONT'D)

**TEMPERATURE MEASUREMENT REQUIREMENTS**

| FUNCTION | LOCALLY MOUNTED | PANEL MOUNTED | GAUGE W/ CAPIL'RY | THERMO CPL SYS | RTD SYS | I/S SYS |
|---|---|---|---|---|---|---|
| LUBE OIL ○ INLET TO ○ OUT OF FRAME | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ |
| LUBE OIL ○ INLET TO ○ OUT OF COOLER | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ |
| MAIN JRNL BEARINGS (THERMOCOUPLES OR RTD'S ONLY) | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ |
| MOTOR BEARING(S) (THERMOCOUPLES OR RTD'S ONLY) | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ |
| COOLING WATER HEADER: ● INLET ● OUTLET | ( ■ ○ ⬡ ) | ( □ ○ ⬡ ) | ● | ○ | ○ | ○ |
| CYL. COOLING WATER: ○ INLET ● OUTLET ● EA. CYL | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ |
| PROCESS GAS: ● INLET ● DISCH. ○ EACH CYL | ( ■ ○ ⬡ ) | ( ■ ○ ⬡ ) | ● | ○ | ● | ● |
| PROCESS GAS: ○ INLET ○ GAS ○ WATER | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ |
| INTERCOOLER(S) ○ INLET ○ GAS ○ WATER | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ |
| ○ INLET ○ GAS ○ WATER | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ |
| AFTERCOOLER: ○ INLET ○ GAS ○ WATER | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ |
| ○ INLET ○ GAS ○ WATER | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ |
| COOLING WATER ○ INLET ○ OUTLET/COOLED PKG CASE(S) | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ |
| PRESS. PGK CASE, CYL PIST ROD (THRM'CPLS OR RTD'S ONLY) | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ |
| COMPRESSOR VALVES ○ SUCT. ○ DISCH. TC'S OR RTD'S ONLY | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ |
| _____ | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ |

**ALARM & SHUTDOWN SWITCH REQ'MTS**

NOTE: ALARM & SHUTDOWN SWITCHES SHALL BE INDIVIDUALLY SEPARATE

ALARM DEVICES ● TRANSMITTER

SHUTDOWN DEVICES ● TRANSMITTER

| FUNCTION | ALARM | SHUT DOWN | ANNUNCIATION POINTS: ALARM IN PNL BY MFR | ALARM IN CTL ROOM PANEL OTH'RS | SHUTDOWN IN PNL BY MFR | SHUTDOWN IN CTL ROOM PANEL OTH'RS | TOTAL NO. OF POINTS |
|---|---|---|---|---|---|---|---|
| LOW LUBE OIL PRESS. @ BEARING HEADER | ( □ ○ ⬡ ) | ( ■ ○ ⬡ ) | ○ | ○ | ● | ● | 1 |
| HIGH LUBE OIL Δ P ACROSS FILTER | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ | |
| LOW LUBE OIL LEVEL, FRAME | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ | |
| AUX LUBE OIL PUMP, FAIL TO START | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ | |
| CYL LUBE SYSTEM PROTECTION | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ | |
| COMPR. VIBRATION, SHUTDOWN ONLY | | ( ■ ○ ⬡ ) | ○ | ○ | ● | ● | |
| VIBRATION, W/ CONTINUOUS MONITORING | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ | |
| ROD DROP DETECTOR, CONTACT TYPE(1/CYL) | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ | |
| ROD DROP PROXIMITY PROBE (1/CYL) | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ | |
| OIL TEMP OUT OF FRAME | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ | |
| HIGH GAS DISCH. TEMP EACH CYLINDER | ( □ ○ ⬡ ) | ( ■ ○ ⬡ ) | ○ | ○ | ● | ● | |
| HIGH JACKET WATER TEMP., EA. CYL | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ | |
| LOW SUCTION PRESS., FIRST STG INLET | ( □ ○ ⬡ ) | ( ■ ○ ⬡ ) | ○ | ○ | ● | ● | |
| HI DISCH. PRESS. ○ FINAL ● EA STG | ( □ ○ ⬡ ) | ( ■ ○ ⬡ ) | ○ | ○ | ● | ● | |
| HI CYL. GAS Δ P, EACH STAGE | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ | |
| HI LIQ. LEV., SEPARATOR | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ | |
| LOW PURGE GAS PRESS, DISTANCE PIECE(S) | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ | |
| HI X-HD PIN TEMP | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ | |
| PRESS PKG CASE (PISTON ROD TEMP) | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ | |
| LOW PRESSURE COOLING WATER INLET _____ | ( □ ○ ⬡ ) | ( □ ○ ⬡ ) | ○ | ○ | ○ | ○ | |
| | | TOTAL NUMBER OF ANNUNCIATION POINTS | | | | | |

SWITCH CONTACT OPERATION

NOTE: EACH SWITCH SHALL BE MINIMUM SPDT ARRANGEMENT

ALARM CONTACTS SHALL:
- ● OPEN ( DE-ENER.) TO SOUND ALARM & BE ENERGIZED WHEN COMPR. IS IN OPERATION(NORMALLY CLOSE)
- ○ CLOSE (ENERGIZE) TO SOUND ALARM & BE DE-ENERGIZED WHEN COMPR. IS IN OPERATION(NORMALLY OPEN)

SHUTDOWN CONTACTS SHALL:
- ● OPEN ( DE-ENERGIZED) TO SHUTDOWN & BE ENERGIZE WHEN COMPR. IS IN OPERATION(NORMALLY CLOSE)
- ○ CLOSE (ENERGIZE) TO SHUTDOWN & BE DE-ENERGIZE WHEN COMPR. IS IN OPERATION(NORMALLY OPEN)

REF: 7.6.6.2 FOR MINIMUM RECOMMENDED PROTECTION REQUIREMENTS

| OWNER: | BUSHEHR PETROCHEMICAL COMPANY<br>MEG PLANT | CONTRACTOR: |
|---|---|---|
| MC: | MECHANICAL DATA SHEET FOR EMERGENCY INSTRUMENT AIR COMPRESSOR (20-C-7080) | Chagalesh-Enerchimi-Steam Joint Venture<br>BUPC-MEG PLANT PROJECT |

| | Project | Area | Phase | Unit | Dis. | Doc. | Seq. | Contract No : 52-98/445 | |
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○ INSTRUMENTATION (CONT'D)

● MISCELLANEOUS INSTRUMENTATION — ○ INTERCLR(S) ○ AFTERCLR ○ OIL CLR ○ $H_2O$ CLR

| | | | |
|---|---|---|---|
| SIGHT FLOW IND. (COOLING $H_2O$ ONLY) | ( □ ○ ⬡ ) | FOR: ○ CYL JACKET WATER ○ ROD PRESS. PKG CASES | |
| PNEUMATIC PRESSURE TRANSMITTERS | ( □ ○ ⬡ ) | FOR: | |
| PRESSURE TRANSMITTERS (ELEC. OUTP.) | ( □ ○ ⬡ ) | FOR: | |
| PNEUMATIC LEVEL TRANSMITTERS | ( □ ○ ⬡ ) | | |
| ALARM HORN & ACKN'LMT TEST BUTTON | ( □ ○ ⬡ ) | | |
| CONDUIT & WIRING W/JUNCT. BOXES (CON-SOLES) | ( □ ○ ⬡ ) | | |
| TEST VALVES | ( □ ○ ⬡ ) | FOR: | |
| DRAIN VALVES | ( □ ○ ⬡ ) | FOR: Coolers | |
| GAUGE GLASS(ES) | ( ■ ○ ⬡ ) | FOR: Recirculating Oil, | |
| TACHOMETER | ( □ ○ ⬡ ) | SPEED RANGE ____ TO ____ RPM | |
| CRANKSHAFT KEY PHASER AND TRANSDUCER | ( □ ○ ⬡ ) | FOR: | |
| LEVEL GAUGE ON SUCTION SUPPRESSOR | ( □ ○ ⬡ ) | | |
| OIL LEVEL SWITCH ON CRAKCASE | ( □ ○ ⬡ ) | | |

○ SEPARATE LUBE OIL CONSOLE INSTRUMENTATION: — PURCH. TO LIST REQ'MTS IN ADDITION TO ANY ABOVE REQ'MTS

| | | |
|---|---|---|
| | ( □ ○ ⬡ ) | |
| | ( □ ○ ⬡ ) | |
| | ( □ ○ ⬡ ) | |
| | ( □ ○ ⬡ ) | |
| | ( □ ○ ⬡ ) | |
| | ( □ ○ ⬡ ) | |

○ SEPARATE COOLING WATER CONSOLE INSTRUMENT: — PURCH. TO LIST REQ'MTS IN ADDITION TO ANY ABOVE REQ'MTS

| | | |
|---|---|---|
| | ( □ ○ ⬡ ) | |
| | ( □ ○ ⬡ ) | |
| | ( □ ○ ⬡ ) | |
| | ( □ ○ ⬡ ) | |
| | ( □ ○ ⬡ ) | |
| | ( □ ○ ⬡ ) | |

● RELIEF VALVES

| LOCATION | BY | MANUFACTURER | TYPE | ◇ SIZE | ◇ SETTING |
|---|---|---|---|---|---|
| EACH STAGE DISCHARGE | ( ■ ○ ⬡ ) | TBC | | 1" / 11/2" | 26 barg |
| COOLING WATER OUTLET | ( □ ○ ⬡ ) | | | | |
| | ( □ ○ ⬡ ) | | | | |
| | ( □ ○ ⬡ ) | | | | |
| | ( □ ○ ⬡ ) | | | | |
| | ( □ ○ ⬡ ) | | | | |
| | ( □ ○ ⬡ ) | | | | |
| | ( □ ○ ⬡ ) | | | | |
| | ( □ ○ ⬡ ) | | | | |
| | ( □ ○ ⬡ ) | | | | |

NOTES:
#1 SEE MOTOR DATA SHEET FOR ADDITIONAL MOTOR INSTRUMENTATION REQUIREMENTS

| OWNER: | BUSHEHR PETROCHEMICAL COMPANY<br>MEG PLANT | | | | | | | CONTRACTOR: |
|---|---|---|---|---|---|---|---|---|
| MC: | MECHANICAL DATA SHEET FOR EMERGENCY INSTRUMENT AIR COMPRESSOR (20-C-7080) | | | | | | | |
| | Project | Area | Phase | Unit | Dis. | Doc. | Seq. | Contract No : 52-98/445 |
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## GENERAL NOTES

(1) COMPRESSOR STARTS BY MEANS OF A LOW-PRESSURE SWITCH ON DELIVERY PIPE AND STOPS WHEN HIGH PRESSURE IS REACHED .
THE REQUIRED LOW/HIGH PRESSURE SWITCHES TO MAITAIN THE REQUIRED DELIVERY PRESSURE SHALL BE SUPPLIED BY VENDOR .
THE OPERATION IS INTERMITTENT.
(2) DELETED, VENDOR SHALL PROVIDE AFTER-COOLER .AFTERCOOLER OUTLET GAS TEMPERATURE TO BE 40 DEG C.
(3) DELETED
(4) DELETED
(5) FOR UTILITIES SUPPLY CONDITION AND CLIMATE CONDITION REFER TO "AMBIENT ,SITE CONDITION & UTILITY DATA" , BU-20-B-000-PR-SPC-111
(6) MINIMUM METAL TEMPRATURE = 0 DEG C
(7) DELETED
(8) DEW POINT AT INLET -170 DEG C, DEW POINT AT ATM. -194.6 DEG C
9) TYPE OF COMPRESSOR : VERTICAL
(10) VENDOR ALSO SHALL PROVIDE BELOW ITEMS:
SPARE PARTS
TEMPORARY STRAINER
(11)GENERAL NOTES :
A. PROVIDE CONTACTS OPEN FOR CUMULATIVE ALARM AND CUMULATIVE SHUTDOWN .
B. PROVIDE SAFETY VALVE ON COMPRESSOR DISCHARGE ,WITH LOCKED OPEN ISOLATING VALVE .
C. PROVIDE SEPARATE INSTRUMENT FOR ALARM AND SHUTDOWN.
D. THE VENDOR TOGETHER WITH THE INSTRUMENT DOCUMENTATION MUST SUPPLY. A COMPLETE LIST OF ALL THE ALARMS AND INTERLOCKS WITH ALL SET VALUES.
E. PROVIDE A VISUAL FLOWMETER ON COOLING WATER RETURN LINE.
F. NOISE PRESSURE LEVEL AT 1 M. SHALL BE LESS THAN 80 DB(A)
(12)VENDOR SHOULD FOLLOW DOC NO BU-20-D-000-IN-SPC-676 FOR SPECIFICATION OF APPLICABLE INSTRUMENT.
(13)PLC PACKAGE SYSTEM (UCP) WILL BE INSTALLED IN CONTROL/AUXILIARY ROOM.
LOCAL PANEL INCLUDING START/STOP PUSH BUTTONS ,LAMPS AND INDICATORS, TRIP RESET PUSH BUTTON ,AMMETER AND ETC
(AS PER PROJECT REQUIREMENTS) WILL BE INSTALLED IN FIELD.
INSTRUMENT WILL BE INSTALLED ON MACHINE OR FREE STANDING.
(14) DELETED
(15) THE CAPACITY TO BE SUPPLIED CONSIDERING NO NEGATIVE TOLERANCE. THE REQUIRED CAPACITY (NNT ) IS 1.1*50=55 KG/H.
(16) Compressor type is reciprocating.

This document is supposed to be the vendor data sheet. The mentioned switches must be specified.