



DOC. NUMBER:

0601-XS-2020-11-0176-V3-DSH-E

REV

1

PAGE

1 OF 8

DATA SHEETS FOR
3rd Stage Gas Compressor

A02-C-1112/1122

REV	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED
1	2022/1/12	ISSUE FOR PROPOSAL	ZHENG GS	QIZG	QIZG
0	2021/12/10	ISSUE FOR PROPOSAL	ZHENG GS	QIZG	QIZG



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CENTRIFUGAL AND AXIAL COMPRESSOR DATASHEET (API 617-8th, Part 2) SI UNITS (bar)

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1 APPLICABLE TO: PROPOSAL PURCHASE AS BUILT

2 FOR PERSIAN GULF BID BOLAND GAS REFINERY CO.

UNIT 110

3 SITE AZ-AGHAJARI-PU2 Compressor Station & Dehydration

SERIAL NO. A02-C-1112/1122

4 SERVICE 3rd Stage Gas Compressor

NO. REQUIRED 2 (1 in Operation+1 Spare)

5 MANUFACTURER SBW

DRIVER TYPE Electro Motor+VFD

6 MODEL BCL405

DRIVER ITEM NO. _____

7 APPLICABLE STANDARD: U.S. ISO

8 INFORMATION TO BE COMPLETED: BY PURCHASER BY MANUFACTURER MUTUAL AGREEMENT (PRIOR TO PURCHASE)

OPERATING CONDITIONS

(ALL DATA ON PER UNIT BASIS)	3rd Stage(100%)	3rd Stage(110%)	3rd Stage(MIN-80%)	3rd Stage(100%)-(MW-5%)				
<input checked="" type="checkbox"/> GAS HANDLED (ALSO SEE PAGE <u>4</u>)	<u>Sour Gas</u>							
<input checked="" type="checkbox"/> GAS PROPERTIES								
<input checked="" type="checkbox"/> M ³ /H (1.013 barA & 0°C DRY)	<u>5285</u>	<u>5813.5</u>	<u>4228</u>	<u>5502</u>				
<input checked="" type="checkbox"/> WEIGHT FLOW, (kg/h) (WET) (DRY)	<u>7593</u>	<u>8352.3</u>	<u>6074</u>	<u>7593</u>				

13 GAS HANDLED (ALSO SEE PAGE 4)

14 GAS PROPERTIES

15 M³/H (1.013 barA & 0°C DRY)

16 WEIGHT FLOW, (kg/h) (WET) ~~(DRY)~~

17 INLET CONDITIONS

18 PRESSURE (barA)

19 TEMPERATURE (°C)

20 RELATIVE HUMIDITY %

21 MOLECULAR WEIGHT

22 Cp/Cv (K₁) ~~OR (KAVG)~~

23 COMPRESSIBILITY (Z₁) ~~OR (ZAVG)~~

24 INLET VOLUME, (m³/h) (WET / ~~DRY~~)

25 DISCHARGE CONDITIONS

26 PRESSURE (barA)

27 TEMPERATURE (°C)

28 Cp/Cv (K₂) ~~OR (KAVG)~~

29 COMPRESSIBILITY (Z₂) ~~OR (ZAVG)~~

30 GAS POWER REQUIRED (kW)

31 TRAIN POWER REQUIRED (kW)

32 POWER REQ'D AT DRIVER INCL. EXT. LOSSES (kW)

33 SPEED (rpm)

34 TURNDOWN (%)

35 POLYTROPIC HEAD (N-m/kg)

36 POLYTROPIC EFFICIENCY (%)

37 CERTIFIED POINT

38 PERFORMANCE CURVE NUMBER

	1.012 ^{note1}	1.012 ^{note1}	1.012 ^{note1}	1.012 ^{note1}				
	<u>38.6</u>	<u>38.6</u>	<u>38.6</u>	<u>38.6</u>				
	<u>32.2</u>	<u>32.2</u>	<u>32.2</u>	<u>30.59</u>				
	<u>1.17</u>	<u>1.17</u>	<u>1.17</u>	<u>1.178</u>				
	<u>0.992</u>	<u>0.992</u>	<u>0.992</u>	<u>0.993</u>				
	<u>4.16</u>	<u>4.16</u>	<u>4.16</u>	<u>4.16</u>				
	<u>119.79</u>	<u>121.07</u>	<u>120.09</u>	<u>123.73</u>				
	<u>1.146</u>	<u>1.146</u>	<u>1.146</u>	<u>1.152</u>				
	<u>0.984</u>	<u>0.984</u>	<u>0.984</u>	<u>0.987</u>				
	<u>399</u>	<u>440</u>	<u>331</u>	<u>422</u>				
	<u>407</u>	<u>449</u>	<u>338</u>	<u>430</u>				
	<u>11059</u>	<u>11383</u>	<u>10617</u>	<u>11471</u>				
		<u>35.1</u>		<u>34.2</u>				
	<u>127120</u>	<u>127320</u>	<u>127260</u>	<u>134760</u>				
	<u>79.6</u>	<u>78.3</u>	<u>79.8</u>	<u>79.3</u>				
	<u>X</u>							

39 PROCESS CONTROL

40 METHOD SUCTION THROTTLING VARIABLE INLET SPEED VARIATION DISCHARGE COOLED BYPASS

41 FROM _____ (barA) GUIDE VANES FROM 65 % BLOWOFF FROM _____

42 TO _____ (barA) TO 105 % TO _____ TO _____

43 SIGNAL SOURCE (1-5.5.2.1)

44 TYPE ELECTRONIC PNEUMATIC OTHER _____

45 RANGE 4-20 MA _____ (barG)

46 START-UP FROM SETTLING OUT CONDITON NORMAL SUCTION PRESSURE OTHER: _____

47 REMARKS: NOTE1: The strainer and orifice plate are before the inlet, and the total pressure drop is 0.128bar.

48 _____
49 _____
50 _____
51 _____
52 _____
53 _____
54 _____
55 _____
56 _____



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Table with columns: Gas Analysis (MOL %), Normal, Other Conditions (A, B, C, D), Remark. Rows include H2O, H2S, CO2, Nitrogen, Methane, Ethane, Propane, i-Butane, n-Butane, i-Pentane, n-Pentane, n-Hexane, C7+,4th, C7+,3rd, and Total.

LOCATION: INDOOR, HEATED, UNHEATED, OUTDOOR, UNDER ROOF, PARTIAL SIDES, GRADE, MEZZANINE. SITE DATA: ELEVATION 160 (m), BAROMETER 1.007 (barA). DRY BULB, WET BULB temperatures. UNUSUAL CONDITIONS: DUST, FUMES, OTHER. COATING: ROTATING COMPONENTS, STATIONARY COMPONENTS. REMARKS:

NOISE SPECIFICATIONS: APPLICABLE TO MACHINE: 90 dB(A) @1m for the complete unit. APPLICABLE SPECIFICATIONS: API 617-8th, Part2. VENDOR HAVING UNIT RESPONSIBILITY. GOVERNING SPECIFICATION (IF DIFFERENT). ELEC.AREA CLASS: NEC, IEC. EQUIPMENT CLASS, GROUP, DIV., ZONE, TEMP CLASS. CONTROL PANNELS. INSTRUMENT AND CONTROLS: STANDARD NEMA, IEC. CONTROL ENCLOSURE, TERMINAL BOX.



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CONSTRUCTION FEATURES

SPEEDS: MAX. CONT. 12045 (rpm) TRIP 12045 (rpm) MAX. TIP SPEEDS: 240.25 (m/s) @ 100% SPEED 252.26 (m/s) @ MAX. CONT. SPEED LATERAL CRITICAL SPEEDS (DAMPED) FIRST CRITICAL (rpm) MODE SECOND CRITICAL (rpm) MODE THIRD CRITICAL (rpm) MODE FOURTH CRITICAL (rpm) MODE LATERAL ANALYSIS ADDITIONAL REQUIREMENTS TRAIN LATERAL ANALYSIS REQUIRED TRAIN TORSIONAL ANALYSIS REQUIRED TORSIONAL CRITICAL SPEEDS: FIRST CRITICAL (rpm) SECOND CRITICAL (rpm) THIRD CRITICAL (rpm) FOURTH CRITICAL (rpm) LIST OF TRAIN UNDESIRABLE SPEEDS STABILITY ANALYSIS VIBRATION: ALLOWABLE TEST LEVEL ± 25.35 (µm) (PEAK TO PEAK)

NAMEPLATE US CUSTOMARY METRIC ROTATION, VIEWED FROM DRIVEN END CW CCW

MATERIALS INSPECTION REQUIREMENTS DETAILS SEE ITP

CASING: MODEL BCL400 CASING SPLIT VERTICAL MATERIAL ASTM A266 CL2 THICKNESS (mm) CORR. ALLOW. (mm) 3.2 MAX. ALLOWABLE PRESS 5 (barG) TEST PRESS: (barG) HELIUM HYDRO 7.5 MAX. ALLOWABLE TEMPERATURE 150 (°C) MAX OPER. TEMP. 123.73 (°C) MIN. OPER. TEMP. -3.5 (°C) MAX CASING CAPACITY (m³/h) SYSTEM RELIEF VALVE SET PT. (barG) Q.C. OF INACCESSIBLE WELDS

DIAPHRAGMS: MATERIAL ASTM A516 /ASTM A216 WCB/AISI 410 AXIALLY SPLIT YES NO DIAPHRAGM MAX. Δ P(BAR)(kPa):

REMARKS:

INTERMEDIATE MAIN PROCESS CONNECTIONS DISCH. PRESSURE: (barG) MAX MIN INLET PRESSURE: (barG) MAX MIN GUIDE VANES IGW EXTERNAL PURGE VANE CONTROL SYSTEM NUMBER OF AXIAL BLADE ROWS NUMBER OF ADJUSTIBLE ROWS NO. VANES GUIDE VANE MATERIAL

IMPELLERS: NO. 5 DIAMETERS 400*5 NO. VANES EA. IMPELLER TYPE (OPEN, ENCLOSED, ETC.) ENCLOSED TYPE FABRICATION MILLED AND WELDED MATERIAL ASTM A705 type630 MIN. YIELD STRENGTH (MPa) 686 HARDNESS: (Rc)(BRINNEL) MAX 319 MIN 255 SMALLEST TIP INTERNAL WIDTH (mm) MAX. MACH. NO. @ IMPELLER EYE MAX. IMPELLER HEAD @ 100% SPD (N-m/kg)

SHAFT: ONE PIECE BUILT UP MATERIAL AISI 4340 DIA @ IMPELLERS (mm) DIA @ COUPLING (mm) SHAFT END: TAPERED CYLINDRICAL SPLINED INTEGRAL FLANGE MIN. YIELD STRENGTH (MPa) 735 SHAFT HARDNESS (BNH)(Rc) 262-331 MAX TORQUE CAPABILITY (N-m)

BALANCE PISTON: MATERIAL AISI 410 AREA (mm²) FIXATION METHOD SHRINK NORMAL CLEARANCE (mm) FLOW WITH NORMAL CLEARANCE (kg/h) FLOW WITH 2x NORMAL CLEARANCE (kg/h)

PRESS. CONN. BAL LINE DOWNSTREAM SHAFT SLEEVES: AT INTERSTG. CLOSE MATL AISI 410 CLEARANCE POINTS AT SHAFT SEALS MATL AISI 410

ACCESSIBLE ROTOR DISASSEMBLY AND REASSEMBLY AT SPEED BALANCING SEQUENTIAL LOW SPEED BAL. PREC. AT SPEED BAL. RESIDUAL BALANCE CHECK

LABYRINTHS: INTERSTAGE TYPE TOOTHED MATERIAL ASTM B247 BALANCE PISTON TYPE TOOTHED MATERIAL ASTM B247



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CONSTRUCTION FEATURES (CONTINUED)

SHAFT SEALS:

- SEAL TYPE: TANDEM TYPE DRY GAS SEAL WITH INTERMEDIATE LABYRINTH
SETTLING OUT PRESSURE (barG): 4
MIN. SEALING PRESSURE (barG)
SUPPLEMENTAL DEVICE REQUIRED FOR CONTACT SEALS TYPE
BUFFER GAS SYSTEM REQUIRED
TYPE BUFFER GAS: SELF GAS FROM COMPRESSOR DISCHARGE
PRESSURE (barG)
FLOWRATE (kg/h)
FILTRATION (um)
MANIFOLD
METHOD OF CONTROL

- BUFFER GAS CONTROL SYSTEM SCHEMATIC BY VENDOR
PRESSURIZING GAS FOR SUBATMOSPHERIC SEALS: EDUCTOR, INJECTION
SEAL MANUFACTURER
LEAKAGE TO PROCESS (l/day/seal)
BUFFER GAS REQUIRED FOR: AIR RUN-IN, OTHER
FLOW (PER SEAL): NORM., MAX. (kg/h @ bar, delta P)
BEARING HOUSING CONSTRUCTION: TYPE (SEPARATE, INTEGRAL), MATERIAL

AXIAL COMPRESSOR

Table with columns for STAGE (1-18) and rows for ROTOR and STATOR parameters (Blade Material, Root Type, Cord Width, Outer Diameter, Blade Height, Blade Quantity).

REMARKS:

Blank lines for entering remarks.



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CONSTRUCTION FEATURES (CONTINUED)

BEARINGS AND BEARING HOUSINGS

MAGNETIC BEARINGS

Table with columns: RADIAL, THRUST, NON-THRUST, THRUST, ACTIVE, INACTIVE. Rows include TYPE, MANUFACTURER, LENGTH, SHAFT DIA., UNIT LOAD, BASE MATERIAL, BABBIT THICKNESS, NO. PADS, LOAD, PIVOT, PAD MATERIAL, BEARING SPAN.

BEARING TEMPERATURE DETECTORS

Table with columns: RESISTANCE TEMP DETECTORS, LOCATION-JOURNAL BRG, LOCATION-THRUST BRG, LOCAL DISCONNECTION, MONITOR SUPPLIED BY, KEY PHASOR REQUIRED.

KEY PHASOR REQUIRED

COMPRESSOR, GEAR H.S., GEAR L.S.

CASING CONNECTIONS (1-4.6.4.2)

Table with columns: CONNECTION, ANSI/ASME, FACING, BORE, ORIENTATION, FLANGED OR STUDDED, MATING FLG & GASKET BY VENDOR, GAS VELOCITY. Rows include INLET, DISCHARGE.

BOROSCOPIC INSPECTION PORTS



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1 OTHER CONNECTIONS

SERVICE:	NO.	SIZE	TYPE	NO.	SIZE	TYPE
LUBE-OIL INLET				PRESSURE		
LUBE OIL OUTLET				TEMPERATURE		
SEAL-OIL INLET				SOLVENT INJECTION		
SEAL-OIL OUTLET				PURGE FOR:		
SEAL GAS INLET				BRG. HOUSING		
SEAL GAS OUTLET				BTWN BRG & SEAL		
CASING DRAINS				BTWN SEAL & GAS		
STAGE DRAINS						

11 INDIVIDUAL STAGE DRAINS REQUIRED
 12 VALVED & BLINDED
 13 VALVED & BLINDED & MANIFOLD

14 LUBRICATION AND SEALING SYSTEMS (1-5.3)(1-5.6.1.2)

15 SEE ATTACHED API 614 DATASHEET
 16 SEPARATE COMBINED
 17 INTEGRAL OIL RESERVOIR
 18 OIL TYPE ISO VG 46

19 ACCESSORIES

20 COUPLING AND GUARDS (5.2)
 21 NOTE: SEE ROTATING ELEMENTS - SHAFT ENDS
 22 SEE ATTACHED API 671 DATA SHEET KEYLESS HYDRAULIC KEYED FLANGED OTHER _____
 23 COUPLING FURNISHED BY SBW MOUNTED BY _____
 24 MANUFACTURER _____ TYPE FLEXIBLE MODEL _____
 25 COUPLING GUARD FURNISHED BY: _____ SBW
 26 TYPE: FULLY ENCLOSED SEMI-OPEN OTHER

27 COUPLING DETAILS

28 MAX O.D. _____ (mm) PLUG AND RING GAUGES LAPPING TOOL
 29 HUB WEIGHT _____ (kg) LUBRICATION REQUIREMENTS:
 30 SPACER LENGTH _____ (mm) NON-LUBE CONT. OIL LUBE OTHER _____
 31 SPACER WEIGHT _____ (kg) QUANTITY PER HUB _____ (kg) or (L/min)

32 MOUNTING PLATES

33 BASEPLATES FURNISHED BY SBW SOLEPLATES FURNISHED BY _____
 34 COMPRESSOR ONLY DRIVER GEAR THICKNESS _____ (mm)
 35 OTHER _____ SUBSOLE PLATES REQUIRED
 36 NONSKID DECKING SLOPED DECK EXTENT OF PIPING _____
 37 LEVELING PADS OR TARGETS STAINLESS STEEL SHIM THICKNESS _____ (mm)
 38 COLUMN MOUNTING COMPRESSOR
 39 SUB-SOLE PLATES REQUIRED COUNTER BORE ANCHOR BOLT HOLES
 40 STAINLESS STEEL SHIM THICKNESS _____ (mm)
 41 MACHINED MOUNTING PADS REQUIRED

42 ANTI-SURGE SYSTEM FURNISHED BY PURCHASER SUPPLIER

43 ANTI-SURGE VALVE SIZING ONLY
 44 PRESSURE UPSTREAM: _____ (barG) DOWNSTREAM Δ P _____ (barG)
 45 Δ P VALVE _____ STROKE TIME OPEN - CLOSE _____ (sec)

46 RECIRCULATION VALVE SIZING ONLY
 47 BLOWOFF VALVE SIZING ONLY
 48 CONTROL SYSTEM
 49 PIPING
 50 FLOW ELEMENT
 51 _____ _____
 52 _____ _____
 53 _____ _____
 54 _____ _____
 55 _____ _____
 56 _____ _____

REMARKS: _____



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UTILITIES

UTILITY CONDITIONS: STEAM: INLET MIN, NORM, MAX, EXHAUST. MIN, NORM, MAX. ELECTRICITY: VOLTAGE, HERTZ, PHASE. REDUCED VOLTAGE START. NUMBER OF STARTS. INSTRUMENT AIR: MAX PRESS, MIN PRESS.

MANUALS: DRAFT MANUAL FOR REVIEW, TECHNICAL DATA MANUAL

MISCELLANEOUS: RECOMMENDED STRAIGHT RUN OF PIPE DIAMETERS BEFORE SUCTION. COMPRESSOR TO BE SUITABLE FOR FIELD RUN-IN ON AIR. PROVISION FOR LIQUID INJECTION. INJECTION MANIFOLD. VENDOR'S REVIEW & COMMENTS ON PURCHASER'S CONTROL SYSTEMS. SHOP FITUP OF VENDOR PROCESS PIPING. WELDING HARDNESS TESTING. INSPECT CLEANLINESS. DESIGN AUDIT. BALANCE PISTON Δ P. PROVIDE TAIL END SCHEDULES.

SHOP INSPECTION AND TESTS

(SEE INSPECTOR'S CHECKLIST) HYDROSTATIC, IMPELLER OVERSPEED, MECHANICAL RUN, CONTRACT COUPLING, IDLING ADAPT, CONTRACT PROBES, SHOP PROBES, PURCHASER VIB. EQUIPMENT, VARY LUBE & SEAL OIL PRESSURES AND TEMPERATURES, POLAR FORM VIB DATA, TAPE RECORD VIB DATA, SHAFT END SEAL INSP., GAS LEAK TEST AT DISCH PRESS, POST TEST INTERNAL INSP., BEFORE GAS LEAKAGE TEST, AFTER GAS LEAKAGE TEST, INTERMEDIATE HEAD/PRESSURE TOL., PERFORMANCE TEST (GAS) (AIR), COMPLETE UNIT TEST, TANDEM TEST, GEAR TEST, HELIUM LEAK TEST, SOUND LEVEL TEST (SURVEY ONLY), AUX. EQUIPMENT TEST, FULL LOAD / SPEED / PRESS TEST, HYDRAULIC COUPLING INSP, SPARE PARTS TEST, INSPECTOR'S CHECKLIST COMPLIANCE, GAS SEAL TEST VENDOR SHOP, ADDITIONAL INSPECTION

DETAILS SEE ITP

VENDOR'S REPRESENTATIVE SHALL: OBSERVE FLANGE PARTING, CHECK ALIGNMENT AT TEMPERATURE, BE PRESENT AT INITIAL ALIGNMENT

WEIGHTS: (kg) COMPR., GEAR, DRIVER, BASE, ROTORS: COMPR., DRIVER, GEAR, COMPRESSOR UPPER CASE, MAX. FOR MAINTENANCE (IDENTIFY), TOTAL SHIPPING WEIGHT

SPACE REQUIREMENTS: (mm) COMPLETE UNIT: L, W, H

SPECIAL TOOL PACKAGING: METAL STORAGE CONTAINER, OTHER:

PAINTING: MANUFACTURER'S STD., OTHER: FBB-A02-000-MT-SPC-0003

SHIPMENT: DOMESTIC, EXPORT, EXPORT BOXING REQ'D., OUTDOOR STORAGE MORE THAN 6 MONTHS MONTH, SPARE ROTOR ASSEMBLY PACKAGE, HORIZONTAL STORAGE, VERTICAL STORAGE, METAL STORAGE CONTAINER, N2 PURGE, OTHER:

REMARKS: