MECHANICAL DATA SHEET FOR NITROGEN GAS BOOSTER

BUSHEHR PETROCHEMICAL COMPANY MEG PLANT	
Document Review	
Issue Purpose:	AB
Result Code: AP,AN,CM,RE,NC	AP
Next Status : IFC,IFA,IFI,AFC,AB	-
Responsible Department	MECHANICAL
Commented Date	May.06,2023
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.
07	26-4-2023	as built	KP	JR	CL	
06	2-6-2022	Approved for Construction	KP	JR	CL	
05	28-4-2022	Approved for Construction	KP	JR	LDM	
04	6-4-2022	Approved for Construction	KP	JR	LDM	
03	11-3-2022	Approved for Construction	KP	JR	LDM	
02	7-12-2021	Issued for approval	KP	JR	LDM	
01	25-11-2021	Issued for approval	KP	JR	LDM	
00	9-11-2021	Issued for approval	KP	JR	LDM	

OWNER:	BUSHEHR PETROCHEMICAL COMPANY MEG PLANT							CONTRACTOR
MC:	DATA SHEET FOR NITROGEN GAS BOOSTER COMPRESSOR (20-C-1002)							
	Project	Area	Phase	Unit	Dis.	Doc.	Seq.	Contract No : 52-98/445
Owner Document Number : 17811-11A	BU	20	VD	303	ME	DSH	0022	Rev 07 / Page: 2 OF 22

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1	x	x	x	x	x	x	x		x	
2	x	x	x	x	x	x	x		x	
3	x	x	x	x	x	x	x			
4	x	x	x	x	x	x	x			
5	x	x	x	x	x	x	x			
6	x	x	x	x	x	x	x			
7	x	x	x	x	x	x	x			
8	x	x	x	x	x	x	x			
9	x	x	x	x	x	x	x			
10	x	x	x	x	x	x	x			
11	x	x	x	x	x	x	x			
12	x	x	x	x	x	x	x			
13	x	x	x	x	x	x	x			
14	x	x	x	x	x	x	x			
15	x	x	x	x	x	x	x			
16	x	x	x	x	x	x	x			
17	x	x	x	x	x	x	x			
18	x	x	x	x	x	x	x			
19	x	x	x	x	x	x	x			
20	x	x	x	x	x	x	x			
21				x	x	x	x			
22				x	x	x	x			

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APPLICABLE TO: ● PROPOSALS ○ PURCHASE ○ AS BUILT

FOR/USER BUPC SITE/LOCATION ASSALUYEH SERVICE NITROGEN BOOSTER COMPRESSOR NO. REQ'D ONE SET (Two stages)

NOTE: ○ INDICATES INFO. TO BE COMPLETED BY PURCH. ☐ BY MANUFACTURER WITH PROPOSAL ◇ BY MANUFACTURER AFTER ORDER ⊡ BY MANUFACTURER OR PURCHASER AS APPLICABLE

COMPR. MFGR TYPE MODEL NO(S) SERIAL NO(S) TBC

COMPR.THROWS: TOTAL NO. 1 NO. WITH CYLS. 1 NOMINAL FRAME RATING 35 BkW @ RATED RPM OF 690

☐ MAX/MIN ALLOWABLE SPEED 450 / 690 RPM

DRIVER MFGR. WEG DRIVER NAMEPLATE kW/OPERATING RPM 45 kW / 690

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)

	NITROGEN 1st stage	NITROGEN 1st stage	NITROGEN 1st stage	NITROGEN 2nd stage	NITROGEN 2nd stage	NITROGEN 2nd stage
● OPERATING CASE						
○ SIMULATION BASIS						
● NORM. OR ALT. CONDITION	Normal	Min pressure	Max pressure	Normal	Min pressure	Max pressure
○ CERTIFIED PT. (X) MARK ONE	X	X	X	X	X	X
● MOLECULAR WEIGHT	28	28	28	28	28	28
○ Cp/Cv (K) @ 65°C OR °C	1.4	1,4	1,4	1,4	1,4	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	7	9	14,5	14,5	14,5
⊡ PRESSURE (Bara) @ CYL. FLANGE	8	7	9	14,5	14,5	14,5
● TEMPERATURE (°C)	52	52	52	50	50	50
○ INLET Cp/Cv	1,4	1,4	1,4	1,4	1,4	1,4
■ COMPRESSIBILITY (Z_s)	1	1	1	1	1	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)	14,5	14,5	14,5	23,5	23,5	23,5
● PRESS. (bara) @ PUL. SUPP. OUTLET	14,5	14,5	14,5	23,5	23,5	23,5
☐ TEMP., ADIABATIC, °C	115	<115	<115	64	64	64
☐ TEMP., PREDICTED, °C	134	<134	<134	81	81	81
☐ COMPRESSIBILITY (Z_2) OR (Z_{AVG})	1	1	1	1	1	1
*** REQUIRED CAPACITY,** RATED FOR PROCESS, AT INLET TO COMPRESSOR, NO NEGATIVE TOLERANCE (-0%)						
● kg/h CAPACITY SPECIFIED	707	707	707	707	707	707
○ WET ● DRY						
● m³ /h (760 mm HG & 0°C)	565	565	565	565	565	565
*** MFGR.'S RATED CAPACITY** (AT INLET TO COMPRESSSOR) & kW @ CERTIFIED TOLERANCE OF ±3% FOR CAP. & ±3% FOR kW						
⊡ kg/h CAPACITY SPECIFIED	718	718	718	718	718	718
○ WET ○ DRY						
⊡ INLET m³/h						
⊡ Nm³/h	574	574	574	574	574	574
☐ kW/STAGE	17,5	17,5	17,5	17,5	17,5	17,5
☒ ABSORBED POWER ESTIMATED, kW	35	35	35	35	35	35
☐ TOTAL kW INCLUDING						
V-BELT & GEAR LOSSES	37	37	37	37	37	37

*** CAPACITY FOR NNT**

MANUFACTURER'S = REQUIRED ÷ 0.97

THEREFORE REQUIRED = MFR'S x 0.97

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GAS ANALYSIS AT OPERATING CONDITIONS
MOLE PERCENT

	M.W.						
○ SERVICE/ITEM NO.							
○ STAGE							
● NORMAL OR ALT							
NITROGEN	28,016	Min: 99.9	mol%				
WATER H_2O	18.016	1 (max)	ppm				
CARBON MONOXIDE CO	72.146	10	ppm				
CARBON DIOXIDE CO2	34.076						
HYDROGEN H_2	2,016						
METHANE CH_4	16.042						
ETHANE	30.068						
PROPANE	44.094						
i-BUTANE	58,12						
n-BUTANE	58,12						
i-PENTANE	72,146						
OXYGEN O2	32.00	Max:10	ppm				
S content S		Max: 0.2	ppm (by weight)				
TOTAL:							
☐ CALCULATED MOL WT.							

☐ Cp/Cv (K) @ 65° OR Suction temperature °C

NOTE: IF WATER VAPOR AND/OR CHLORIDES ARE PRESENT, EVEN MINUTE TRACES, IN THE GAS BEING COMPRESSED, IT MUST BE INCLUED ABOVE.

REMARKS

APPLICABLE SPECIFICATIONS

● API-618-RECIPROCATING COMPRESSORS FOR PETROLEUM, CHEMICAL AND GAS INDUSTRY SERVICES

● MATERIAL STANDARD SPECIFICATION FOR RECIPROCATING GAS COMPRESSOR BU-20-D-000-MA-SPC-302

SITE CONDITION (SEE PROJECT SITE CONDITION FOR MORE DETAIL)

ELEVATION 8,3 m BAROMETER 1,013 (BARA) AMBIENT TEMPS: MAX 52 °C MIN 5 °C

● MIN DESIGN METAL TEMP 0 °C (2.14.8) RELATIVE HUMIDITY: MAX 100% MIN 74% %

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

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

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

○ WINTERIZATION REQUIRED

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

ELECTRICAL CLASSIFICATIONS

	HAZARDOUS							NON-HAZRDOUS
MAIN UNIT	●	ZONE	2	GROUP	IIB	TEMP CLASS	T3	○
L.O. CONSOLE	○	ZONE		GROUP		TEMP CLASS		○
CW CONSOLE	○	ZONE		GROUP		TEMP CLASS		○

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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

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

○ SERVICE OR ITEM NO.							
☒ STAGE	1	2					
☒ NORMAL OR ALTERNATE CONDITION	NORMAL	NORMAL					
● PERCENT CAPACITY	100%	100%					
○ WEIGHT FLOW, kg/h	718	718					
☒ m³ /h (760 mm HG & 0°C)	574	574					
☐ POCKETS/VALVES OPERATION *	Valves	Valves					
☐ POCKET CLEARANCE ADDED %	NA	NA					
☐ TYPE UNLOADERS, PLUG/FINGER	Plug	Plug					
☒ INLET TEMPERATURE, °C	5…55	45					
☒ INLET PRESSURE, (BARG)	6…8	14,5					
☒ DISCHARGE PRESSURE, (BARG)	13,5	22,5					
☐ DISCHARGE TEMP., ADIABATIC °C	115	64					
☐ DISCHARGE TEMP., PREDICTED °C	134	83					
☐ VOLUMETRIC EFF.,%HE/%CE(AVER)	78/85	78/85	/	/	/	/	
☐ CALC. GAS ROD LOAD, kN, C **	16,43	8,78					
☐ CALC. GAS ROD LOAD, kN, T **	14,54	5,28					
◇ COMB. ROD LOAD, kN C (GAS & INERTIA)	16,57	9,13					
◇ COMB. ROD LOAD, kN T (GAS & INERTIA)	14,26	5,45					
◇ ROD REV., DEGREES MIN @ X-HD PIN ***	195	195					
☐ BkW/STAGE	22,5	12,5					
☐ TOTAL kW @ COMPRESSOR SHAFT	35	35					
☐ TOTAL kW INCL. V-BELT & GEAR LOSSES	37	37					

* 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, _____ (BARG)

CYLINDER UNLOADING MEDIUM: ○ AIR ● NITROGEN ○ OTHER _____

● PRESSURE AVAILABLE FOR CYLINDER UNLOADING DEVICES, MAX/MIN 7,5 / 6,0 (BARG)

SPECIAL REMARK:

Capacity control by valve unloaders insteps of 0-50-100 %. , in between these steps by recycle over the compressor.

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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
● OUTBOARD BEARING ○ PROVISION FOR DRY AIR PURGE FOR OUTBOARD BEARING.
● SLIDE BASE FOR DRIVER (■ ○ ⬡) SOLE PLATE FOR DRIVER (■ ○ ⬡)
● MOTOR STARTING EQUIPMENT (■ ○ ⬡); DEFINE Local power distribution board
○ GEAR (☐ ○ ⬡): ○ BASEPLATE FOR GEAR ○ API-613 ○ API-677
○ COUPLING(S) (☐ ○ ⬡): ○ LOW SPD. ○ HI-SPD. ○ QUILL SHAFT ○ KEY-LESS DRV. ○ KEY'D DRV. ○ OTHER _____
○ 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
○ PIPING SYSTEM FLEXIBILITY

PACKAGED: ○ NO ● YES (■ ○ ⬡) DEFINE BASIC SCOPE OF PACKAGING IN REMARKS SECTION .
● SKID ● SOLEPLT. ● BASEPLT. ● BOLTS OR STUDS FOR SOLEPLT. TO FRAME ○ RAILS ○ CHOKE BLOCKS ○ SHIMS
○ SUITABLE FOR COLUMN MOUNTING (UNDER SKID AND/OR BASEPLATE)
○ LEVELING SCREWS ○ NON-SKID DECKING ○ SUB SOLEPLATES
● DIRECT GROUTED ● CEMENTED/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 (■ ○ ⬡) 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
○ SHOP RUN ○ ARR'D FOR HEATING JACKET AS WELL AS COOLING

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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 CONTROL PANEL (□ ○ ⬡)= ○ ONE FOR EACH UNIT ○ ONE COMMON TO ALL UNITS
○ MACHINE MOUNTED ○ FREE STANDING (OFF UNIT)

SEE INSTRUMENTATION DATA SHEETS FOR DETAILS OF PANEL, ADDITIONAL REMARKS, AND INSTRUMENTATION
NOTE: ALL TUBING, WIRING, & CONNECTIONS BETWEEN OFF-UNIT FREE STANDING PANELS AND COMPRESSOR UNIT BY PURCHASER

● 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 _____
● 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 5.3.3: ○ 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 **7** barg MAX/MIN 7,5 / 6,0 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	6 (BARG)	MAX/MIN	5,5 / 5,5	(BARG)	
(NORM.)	TEMP	35 °C	MAX/MIN	35 / 35	°C	
RETURN	PRESS	2,5 (BARG)	MAX/MIN	3 / 2,5	(BARG)	
(NORM.)	TEMP	45 °C	MAX/MIN	45 / 45	°C	

COOLERS

TYPE WATER MACHINERY COOLING WATER(MCW)-(NOTE 4)

SUPP.:	PRESS	4,5 (BARG)	MAX/MIN	6 / 6	(BAR	
(NORM.)	TEMP	35 °C	MAX/MIN	35 / 35	°C	
R'T'RN:	PRESS	2,5 (BARG)	MAX/MIN	3 / 3	(BARG)	
(NORM.)	TEMP	45 °C	MAX/MIN	45 / 45	°C	

COOLING FOR ROD PACKING:

TYPE FLUID _____ SUPPLY PRESS _____ (BARG) @ _____ °C RETURN _____ @ _____ °C

FUEL GAS: NORMAL PRESSURE _____ (BARG) (kPa) MAX/MIN _____ / _____ (BARG) (kPa) LHV _____ MJ/m³

COMPOSITION _____

REMARKS/SPECIAL REQUIREMENTS:

OWNER:

MC:

CONTRACTOR:

BUSHEHR PETROCHEMICAL COMPANY
MEG PLANT

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CYLINDER DATA AT FULL LOAD CONDITION

SERVICE/ITEM NO.								
STAGE		1	2					
INLET PRESSURE, (BARG)	@ CYLINDER	6...8	13,5					
DISCHARGE PRESSURE, (BARG)	FLANGES	14,5	22,5					
CYLINDERS PER STAGE		1	1					
SINGLE OR DOUBLE ACTING (SA OR DA)		DA	DA					
BORE, mm		160	100					
STROKE, mm		140	140					
RPM:	RATED / MAX ALLOW	450 / 850						
PISTON SPEED, m/s:	RATED / MAX ALLOW	3.5	3.5					
CYLINDER LINER, YES/NO		YES	YES					
LINER NOMINAL THICKNESS, mm		48	24					
PISTON DISPLACEMENT, m³/h		131,9	49,5					
CYLINDER DESIGN CLEARANCE, % AVERAGE								
VOLUMETRIC EFFICIENCY, % AVERAGE		78	87					
VALVES, INLET/DISCHARGE, QTY PER CYL.		2	2	/	/	/	/	
TYPE OF VALVES		plate	plate					
VALVE LIFT, INLET/DISCHARGE, mm		1,05 / 1,05	1,05 / 1,05	/	/	/	/	
VALVE VELOCITY, API 4TH EDITION, m/s		21,1	21,1					
SUCTION VALVE(S)		13,55	18,56					
DISCHARGE VALVE(S)		13,55	18,56					
ROD DIAMETER, (mm)		35	35					
MAX ALLOW. COMBINED ROD LOADING, kN, C *		31	31					
MAX ALLOW. COMBINED ROD LOADING, kN, T *		31	31					
CALCULATED GAS ROD LOAD, kN, C *		16,43	8,78					
CALCULATED GAS ROD LOAD, kN, T *		14,51	5,28					
COMBINED ROD LOAD (GAS + INERTIA), kN, C *		16,57	9,13					
COMBINED ROD LOAD (GAS + INERTIA), kN, T *		14,26	5,45					
ROD REV., DEGREES MIN @ X-HD PIN**		195,00	195,00					
RECIP WT. (PISTON, ROD, X-HD & NUTS), kg**		23,9	23,93					
MAX ALLOW. WORKING PRESSURE, (BARG)		34	45					
MAX ALLOW. WORKING TEMPERATURE, °C		230	230					
HYDROSTATIC TEST PRESSURE, (BARG)		51	67,5					
HELIUM TEST PRESSURE, (BARG)		3	3					
INLET FLANGE SIZE/RATING at CYLINDER		DN100	DN65	/	/	/	/	
FACING at CYLINDER		R.F	R.F					
DISCHARGE FLANGE SIZE/RATING at CYLINDER		DN65	DN65	/	/	/	/	
FACING at CYLINDER		R.F	R.F					
DISCHARGE RELIEF VALVE SETTING DATA AT INLET PRESSURES GIVEN ABOVE:								
RECOMMENDED SETTING, (BARG)		~16	~25					
GAS ROD LOAD, kN, C *		17,5	17,5					
GAS ROD LOAD, kN, T *		17,5	17,5					
COMBINED ROD LOAD, kN, C *		13,13	17,24					
COMBINED ROD LOAD, kN, T *		12,6	15,3					
ROD REVERSAL, °MIN @ X-HD PIN**		195	195					
NOTE: CALCULATED AT INLET PRESSURES								
GIVEN ABOVE & RECOMMENDED SETTING.								
SETTLE-OUT GAS PRESSURE		6.5...8.5	6.5...8.5					
(DATA REQUIRED FOR STARTING)								

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

NOTES/REMARKS:

2. Special flanges are applied, therefore size cannot be given

OWNER:	BUSHEHR PETROCHEMICAL COMPANY MEG PLANT	CONTRACTOR:
MC:	DATA SHEET FOR NITROGEN GAS BOOSTER COMPRESSOR (20-C-1002)	

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1		☐ CONSTRUCTION FEATURES							
2	SERVICE ITEM NO.	NITROGEN BOOSTER COMPRESSOR							
3	STAGE	1	2						
4	CYLINDER SIZE (BORE DIA), mm								
5	ROD RUN-OUT: NORMAL COLD VERTICAL								
6	(per appendix C)								
7		MATERIALS OF CONSTRUCTION							
8	CYLINDER(S)	DUCTILE CAST IRON	DUCTILE CAST IRON						
9	CYLINDER LINER(S)	EN-GJL-250	EN-GJL-250						
10	PISTON(S)	AlSi10Mg	SS (1.4305)						
11	PISTON RINGS	HS21027/H6	HS21027/H6						
12	WEAR BANDS ○ REQUIRED	-	-						
13	PISTON ROD(S): MATERIAL/YIELD, MPA	1.2316 (X36CrMo17QT)	1.2316 (X36CrMo17QT)						
14	THREAD ROOT STRESS @ MACRL * @ X-HD END	-	-						
15	PISTON ROD HARDNESS, BASE MATERIAL, Rc	29 – 33	29 – 33						
16	PISTON ROD COATING ● X REQUIRED	TUNGSTEN CARBIDE	TUNGSTEN CARBIDE						
17	COATING HARDNESS, Rc								
18	VALVE SEATS / SEAT PLATE	SS/SS	SS/SS						
19	VALVE SEAT MIN HARDNESS, Rc								
20	VALVE GUARDS (STOPS)	SS	SS						
21	VALVE DISCS	X20Cr13G / AISI 420	X20Cr13G / AISI 420						
22	VALVE SPRINGS	SS	SS						
23	ROD PRESSURE PACKING RINGS	FKM, 75-ShA	FKM, 75-ShA						
24	ROD PRESSURE PACKING CASE	SS	SS						
25	ROD PRESSURE PACKING SPRINGS	-	-						
26	SEAL / BUFFER PACKING, DISTANCE PIECE	HS21027/H6	HS21027/H6						
27	SEAL / BUFFER PACKING, INTERMEDIATE	HS21027/H6	HS21027/H6						
28	WIPER PACKING RINGS	bronze	bronze						
29	MAIN JOURNAL BEARINGS, CRANKSHAFT	SS	SS						
30	CONNECTING ROD BEARING, CRANKPIN	SS	SS						
31	CONNECTING ROD BUSHING, X-HD END	SnSb12Cu6Cd	SnSb12Cu6Cd						
32	CROSSHEAD (X-HD) PIN BUSHING	-	-						
33	CROSSHEAD PIN	16MnCr5 (1.7131)	16MnCr5 (1.7131)						
34	CROSSHEAD	EN-GJL-250	EN-GJL-250						
35	CROSSHEAD SHOES	EN-GJL-250	EN-GJL-250						
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								

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 ATM	(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 _____ (BARG)									

OWNER:

MC:

CONTRACTOR:

BUSHEHR PETROCHEMICAL COMPANY
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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 ○ HI-SPEED

	Between Compressor & Driver or Gear	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)	690	1475
PITCH DIA. (Inches)		
◇ QTY & GROOVE X-SEC.	4	
POWER TRANSMITT'D	35	37 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	○X	○	○
*MECHANICAL RUN TEST (4 HR)	●	○	●
BAR-OVER TO CHECK ROD RUNOUT	○X	○	○
*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 APPROVED ITP

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: (2.13) ○ SINGLE PLUNGER PER POINT ○ DIVIDER BLOCKS
- ◈ COMPARTM'T, TOTAL QTY.
- ◈ PLUNGERS (PUMPS), TOTAL QTY.
- ◈ SPARE PLUNGERS, QTY.
- ◈ SPARE COMPARTM'T W/OUT PLUNGERS
- ○ HEATERS: ○ ELECTRIC W/THERM.(S) ○ STEAM

☐ **ESTIMATED WEIGHTS AND NOMINAL DIMENSIONS**

☐ TOTAL COMPR. WT, LESS DRIVER & GEAR		1300	kg
◇ WT, OF COMPLETE UNIT, (LESS CONSOLES)		5200	kg
◇ MAXIMUM ERECTION WEIGHT		5200	kg
◇ MAXIMUM MAINTENANCE WEIGHT		420	kg
◇ DRIVER WEIGHT/GEAR WEIGHT	420 /	NA	kg
◇ LUBE OIL/COOLING H_2O CONS.	NA /	NA	kg
◇ FREE STANDING PANEL			

SPACE REQUIREMENTS-mm: (NOTE 8)	LENGTH	WIDTH	HEIGHT
◇ COMPLETE UNIT	3200	2000	3039
◇ LUBE OIL CONSOLE			
◇ COOLING H_2O CONSOLE			
◇ FREE STANDING PANEL			
☐ PISTON ROD REMOVAL DIST.			

OTHER EQUIPMENT SHIPPED LOOSE (DEFINE)

◇ PULSATION SUPP., WEIGHT	62	kg
◇ PIPING	100	kg
◇ INTERSTAGE EQUIPMENT		kg

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UTILITY CONSUMPTION

ELECTRIC MOTORS

	NAMEPLATE HP (kW)	LOCKED ROTOR AMPS	FULL LOAD AMPS	
◆ MAIN DRIVER	45	688	83	
◆ MAIN LUBE OIL PUMP		SHAFT DRIVEN		
◇ 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)	75	230	50
◇ COOLING WATER HEATER(S)			
◇ CYL. LUBRICATOR 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)	4,3	35	45	4,5	3,5	6
◆ AFTERCOOLER	1,4					
◇ FRAME LUBE OIL COOLER						
◇ ROD PRESSURE PACKING*						
◆ CYLINDER JACKETS COOLER	8,3	35	45	4,5	3,5	6
◇ TOTAL QUANTITY, m³/h	14					

OWNER:	BUSHEHR PETROCHEMICAL COMPANY MEG PLANT	CONTRACTOR:
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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 (3.7.2.7)

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	AS PER AVL		◇ OIL COOLER(S)	AS PER AVL	
◇ AUXILIARY PUMP	AS PER AVL		◇ TRANSFER VALVE(S)	AS PER AVL	
◇ MECHANICAL SEALS	AS PER AVL		◇ PUMP COUPLING(S)	AS PER AVL	
◇ ELECTRIC MOTORS	AS PER AVL		◇ SUCTION STRAINER(S)	AS PER AVL	
◇ STEAM TURBINES	NOT APPLICABLE	NOT APPLICABLE	◇ CHECK VALVE(S)	AS PER AVL	
◇ OIL FILTER(S)	AS PER AVL		◇		

OWNER:

CONTRACTOR:

BUSHEHR PETROCHEMICAL COMPANY
MEG PLANT

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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), 1 STAGE	●	○	○	4,3	4,5	35	45	○
CYLINDER(S), 2 STAGE	●	○	○		4,5	35	45	○
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 MEG PLANT	CONTRACTOR:
MC:	DATA SHEET FOR NITROGEN GAS BOOSTER COMPRESSOR (20-C-1002)	

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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 / 52 °C

COMPRESSOR SERVICE: NITROGEN COMPRESSOR — NUMBER OF COMPRESSORS: 1 SET

COMPRESSOR MFG.: Airpack — MODEL/TYPE:

SUPPRESSOR MFG.: TBC

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: 690

● 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

CYLINDER, GAS, OPERATING, AND SUPPRESSOR DESIGN DATA

SERVICE: NITROGEN COMPRESSOR — STAGE NO.: 1

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

	INLET SUPPRESSOR	DISCHARGE SUPPRESSOR
☐ LINE SIDE OPERATING PRESSURE	INLET, 7 to9 (BARA)	DISCHARGE, 14,5 (BARA)
☐ OPERATING TEMP. WITHIN SUPPRESSORS	INLET, 5 to 55 °C	DISCHARGE, 134 °C
○ ALLOWABLE PRESSURE DROP THROUGH SUPPRESSORS	Δ P 0,16 (BAR) / 2,23 %	Δ P 0,425 (BAR) / 2,3 %
● SUPRESSOR TAG NUMBER		
● COMBINATION INLET SUPP SEPARATOR/INTERNALS	○ YES ● NO / ○ YES ● NO	○ YES ● NO / ○ YES ● NO
◉ NO. (QTY) OF INLET & DISCH. SUPP. PER STAGE	1SET/EACH STAGE	1SET EACH STAGE
○ ALLOWABLE PEAK-PEAK PULSE @ LINE SIDE NOZZLE	(BAR) / %	(BAR) / %
○ ALLOWABLE PEAK-PEAK PULSE @ CYL FLANGE NOZZLE	(BAR) 0,29 / 4,3 %	(BAR) 1,4 / 7 %
● DESIGN FOR FULL VACUUM CAPABILITY	○ YES ● NO	○ YES ● NO
○ MIN. REQ'D WORKING PRESSURE & TEMPERATURE	(BARA) 13,5 @ 85 °C	(BARA) 25 @ 170 °C
● INITIAL SIZING VOLUME	0,3 m³	0,3 m³
◇ AS BUILT VOLUME (m³)	0,96 m³	0,96 m³

OWNER:	BUSHEHR PETROCHEMICAL COMPANY MEG PLANT	CONTRACTOR:
MC:	DATA SHEET FOR NITROGEN GAS BOOSTER COMPRESSOR (20-C-1002)	

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PULSATION SUPPRESSION DEVICES FOR RECIPROCATING COMPRESSORS (CONT'D) — SERVICE: NITROGEN COMPRESSOR

THESE SHEETS TO BE FILLED OUT FOR EACH SERVICE AND/OR STAGE OF COMPRESSION — STAGE NO.: 1

CONSTRUCTION REQUIREMENTS & DATA	INLET SUPPRESSOR	DISCHARGE SUPPRESSOR
○ SUPRESSOR TAG NUMBER		
● BASIC MATERIAL REQUIRED, CS, SS, ETC.	Carbon Steel	Carbon Steel
◇ ACTUAL MATERIAL DESIGNATION — SHELL/HEAD	SA106 gr B / SA234	SA106 gr B / SA234
○ SPECIAL HARDNESS LIMITATIONS, Rc — ○ YES ● NO	SHELL & HEADS — WELDS	SHELL & HEADS — WELDS
◉ CORROSION ALLOWANCE., mm — ● REQUIRED	3 mm	3 mm
◇ WALL THICKNESS, mm — SHELL/HEAD	9,52 mm/ 9,52 mm	9,52 mm 9,52 mm
□ NOM. SHELL DIA X OVERALL LGTH. (mm/m³)	12" X 1100 mm/ 96 mm³	12" x 1000 mm. 96 mm³
□ PIPE OR ROLLED PLATE CONSTRUCTION	■ PIPE □ ROLLED PLATE	■ PIPE □ ROLLED PLATE
◇ ACT. MAX ALLOW. WORKING PRESS. AND TEMPERATURE	(BAR) 18,15 @ 85 °C	(BAR) 33,46 @ 170 °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 0,018 (BAR) / 0,26 %	Δ P 0,15 (BAR)/ 0,76 %
◇ WEIGHT (EACH)	120 kg	116 kg
● INSUL CLIP	NA	NA
◇ EXPECTED P-P PULSE @ LINE SIDE/CYL FLG, % LINE PRESS BASED ON FINAL SUPPRESSOR DESIGN	%/ %	%/ %
◎ SUPPORTS, TYPE/QUANTITY	YES, saddle 2	YES, saddle 2
CONNECTION REQUIREMENTS & DATA		
● LINE SIDE FLANGE. SIZE/RATING/FACING/TYPE	2" 150# RF WNF	2" 300# RF WNF
○ COMP CYL FLANGE(S), QTY/SIZE/RATING/FACING/TYPE	2" 150# RF WNF	2" 300# RF WNF
● 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	NA	NA
◇ * QTY. SIZE, /FLG TYPE & RATING		
● VENT CONNECTIONS REQUIRED	○ YES ● NO	○ YES ● NO
○ SPEC. QTY. SIZE, /FLG TYPE & RATING	NA	NA
◇ * QTY. SIZE, /FLG TYPE & RATING		
● DRAIN CONNECTIONS REQUIRED	● YES ○ NO	● YES ○ NO
○ SPEC. QTY. SIZE, /FLG TYPE & RATING	1/2"NPT	1/2"NPT
◇ * QTY. SIZE, /FLG TYPE & RATING		
● PRESSURE CONNECTIONS REQUIRED	○ YES ● NO	○ YES ● NO
○ SPEC. QTY. SIZE, /FLG TYPE & RATING	NA	BA
◇ * QTY. SIZE, /FLG TYPE & RATING		
● TEMPERATURE CONNECTIONS REQUIRED	○ YES ● NO	○ YES ● NO
○ SPEC. QTY. SIZE, /FLG TYPE & RATING	NA	NA
○ CYL NOZZLE ○ MAIN BODY		
◇ * QTY. SIZE, /FLG TYPE & RATING		
OTHER DATA AND NOTES		
◇ COMPRESSOR MFG'S SUPP. OUTLINE OR DRAWING NO.		
◇ SUPP. MFG'S OUTLINE OR DRAWING NO.		

OWNER:	BUSHEHR PETROCHEMICAL COMPANY MEG PLANT	CONTRACTOR:
MC:	DATA SHEET FOR NITROGEN GAS BOOSTER COMPRESSOR (20-C-1002)	

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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 / 52 °C

COMPRESSOR SERVICE: NITROGEN COMPRESSOR — NUMBER OF COMPRESSORS: 1 SET

COMPRESSOR MFG.: Airpack — MODEL/TYPE:

SUPPRESSOR MFG.: TBC

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: 690

● 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

CYLINDER, GAS, OPERATING, AND SUPPRESSOR DESIGN DATA

SERVICE: NITROGEN COMPRESSOR — STAGE NO.: 2

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

	INLET SUPPRESSOR	DISCHARGE SUPPRESSOR
☐ LINE SIDE OPERATING PRESSURE	INLET, 15,5 (BARA)	DISCHARGE, 23,5 (BARA)
☐ OPERATING TEMP. WITHIN SUPPRESSORS	INLET, 50 °C	DISCHARGE, 64 °C
○ ALLOWABLE PRESSURE DROP THROUGH SUPPRESSORS	Δ P 0,121 (BAR) / 0,62 %	Δ P 0,147 (BAR) / 0,62 %
● SUPRESSOR TAG NUMBER		
● COMBINATION INLET SUPP SEPARATOR/INTERNALS	○ YES ● NO / ○ YES ● NO	○ YES ● NO / ○ YES ● NO
◉ NO. (QTY) OF INLET & DISCH. SUPP. PER STAGE	1SET/EACH STAGE	1SET EACH STAGE
○ ALLOWABLE PEAK-PEAK PULSE @ LINE SIDE NOZZLE	(BAR) / %	(BAR) / %
○ ALLOWABLE PEAK-PEAK PULSE @ CYL FLANGE NOZZLE	(BAR) 0,739 / 3,8 %	(BAR) 0,9 / 3,8 %
● DESIGN FOR FULL VACUUM CAPABILITY	○ YES ● NO	○ YES ● NO
○ MIN. REQ'D WORKING PRESSURE & TEMPERATURE	(BARA) 25 @ 85 °C	(BARA) 26 @ 100 °C
● INITIAL SIZING VOLUME	0,3 m³	0,3 m³
◇ AS BUILT VOLUME (m³)	0,38 m³	0,48 m³

OWNER:	BUSHEHR PETROCHEMICAL COMPANY MEG PLANT	CONTRACTOR:
MC:	DATA SHEET FOR NITROGEN GAS BOOSTER COMPRESSOR (20-C-1002)	

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PULSATION SUPPRESSION DEVICES FOR RECIPROCATING COMPRESSORS (CONT'D) — SERVICE: NITROGEN COMPRESSOR

THESE SHEETS TO BE FILLED OUT FOR EACH SERVICE AND/OR STAGE OF COMPRESSION — STAGE NO.: 2

CONSTRUCTION REQUIREMENTS & DATA	INLET SUPPRESSOR	DISCHARGE SUPPRESSOR
○ SUPRESSOR TAG NUMBER		
● BASIC MATERIAL REQUIRED, CS, SS, ETC.	Carbon Steel	Carbon Steel
◇ ACTUAL MATERIAL DESIGNATION — SHELL/HEAD	SA106 gr B / SA234	SA106 gr B / SA234
○ SPECIAL HARDNESS LIMITATIONS, Rc — ○ YES ● NO	SHELL & HEADS — WELDS	SHELL & HEADS — WELDS
● CORROSION ALLOWANCE., mm — ● REQUIRED	3 mm	3 mm
◇ WALL THICKNESS, mm — SHELL/HEAD	9,27 mm/ 9,27 mm	9,27 mm 9,27 mm
□ NOM. SHELL DIA X OVERALL LGTH. (mm/m³)	10" X 665 mm/ 38 mm³	10" x 863 mm. 48 mm³
□ PIPE OR ROLLED PLATE CONSTRUCTION	■ PIPE □ ROLLED PLATE	■ PIPE □ ROLLED PLATE
◇ ACT. MAX ALLOW. WORKING PRESS. AND TEMPERATURE	(BAR) 38,12 @ 85 °C	(BAR) 38,12 @ 100 °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 0,0636 (BAR) / 0,32 %	Δ P 0,0603 (BAR)/ 0,25 %
◇ WEIGHT (EACH)	71 kg	80 kg
● INSUL CLIP	NA	NA
◇ EXPECTED P-P PULSE @ LINE SIDE/CYL FLG, % LINE PRESS BASED ON FINAL SUPPRESSOR DESIGN	%/ %	%/ %
◎ SUPPORTS, TYPE/QUANTITY	YES, saddle 2	YES, saddle 2
CONNECTION REQUIREMENTS & DATA		
● LINE SIDE FLANGE. SIZE/RATING/FACING/TYPE	2" 300# RF WNF	2" 300# RF WNF
○ COMP CYL FLANGE(S), QTY/SIZE/RATING/FACING/TYPE	2" 300# RF WNF	2" 300# RF WNF
● 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	NA	NA
◇ * QTY. SIZE, /FLG TYPE & RATING		
● VENT CONNECTIONS REQUIRED	○ YES ● NO	○ YES ● NO
○ SPEC. QTY. SIZE, /FLG TYPE & RATING	NA	NA
◇ * QTY. SIZE, /FLG TYPE & RATING		
● DRAIN CONNECTIONS REQUIRED	● YES ○ NO	● YES ○ NO
○ SPEC. QTY. SIZE, /FLG TYPE & RATING	1/2"NPT	1/2"NPT
◇ * QTY. SIZE, /FLG TYPE & RATING		
● PRESSURE CONNECTIONS REQUIRED	○ YES ● NO	○ YES ● NO
○ SPEC. QTY. SIZE, /FLG TYPE & RATING	NA	BA
◇ * QTY. SIZE, /FLG TYPE & RATING		
● TEMPERATURE CONNECTIONS REQUIRED	○ YES ● NO	○ YES ● NO
○ SPEC. QTY. SIZE, /FLG TYPE & RATING	NA	NA
○ CYL NOZZLE ○ MAIN BODY		
◇ * QTY. SIZE, /FLG TYPE & RATING		
OTHER DATA AND NOTES		
◇ COMPRESSOR MFG'S SUPP. OUTLINE OR DRAWING NO.		
◇ SUPP. MFG'S OUTLINE OR DRAWING NO.		

OWNER:	BUSHEHR PETROCHEMICAL COMPANY MEG PLANT	CONTRACTOR:
MC:	DATA SHEET FOR NITROGEN GAS BOOSTER COMPRESSOR (20-C-1002)	

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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 _____, DIVISION _____ ○ INTRINSICALLY SAFE (Exi)
- ○ I/S BARRIERS (■ ○ ⬡)
- ○ NEMA 4, WATERTIGHT & DUSTTIGHT ○ PURGED TO NFPA 496 TYPE ○ X ○ Y ○ Z
- ● OTHER NEMA IP42 LOW PURGE PRESS. ○ ALARM ○ SHUTDOWN
- ○ VIB, ISOLATORS ○ STRIP HEATERS ○ PURGE CONN. ○ EXTRA CUTOUTS
- ● ANNUNCIATOR W/FIRST-OUT INDICATION LOCATED ON CONTROL PANEL
- ● PURCHASER'S CONN. BROUGHT OUT TO TERMINAL BOX BY VENDOR
- ● IP PROTECTION : IP 42 FOR INDOOR CONTROL PANEL

○ 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 MEG PLANT	CONTRACTOR:
MC:	DATA SHEET FOR NITROGEN GAS BOOSTER COMPRESSOR (20-C-1002)	

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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

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	(□ ○ ⬡)	(■ ○ ⬡)	○	○	●	●	
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)	(□ ○ ⬡)	(□ ○ ⬡)	○	○	○	○	
	(□ ○ ⬡)	(□ ○ ⬡)	○	○	○	○	
					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: 3.6.5.1 FOR MINIMUM RECOMMENDED PROTECTION REQUIREMENTS

OWNER:	BUSHEHR PETROCHEMICAL COMPANY MEG PLANT	CONTRACTOR:
MC:	DATA SHEET FOR NITROGEN GAS BOOSTER COMPRESSOR (20-C-1002)	

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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:	
GAUGE GLASS(ES)	(■ ○ ⬡)	FOR: oil	
TACHOMETER	(□ ○ ⬡)		SPEED RANGE ____ TO ____ RPM
CRANKSHAFT KEY PHASER AND TRANSDUCER	(□ ○ ⬡)	FOR:	
	(□ ○ ⬡)		
	(□ ○ ⬡)		

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	(□ ○ ⬡)				
COOLING WATER OUTLET	(□ ○ ⬡)				
	(□ ○ ⬡)				
	(□ ○ ⬡)				
	(□ ○ ⬡)				
	(□ ○ ⬡)				
	(□ ○ ⬡)				
	(□ ○ ⬡)				
	(□ ○ ⬡)				
	(□ ○ ⬡)				

GENERAL NOTES

NOTE 1: THE COMPRESSOR IS IN CONTINUSE SERVICE.
NOTE 2: DISCHARGE TEMPERATURE SHALL NOT EXCEED 150° C FROM EACH CYLINDER
NOTE 3: LUBE OIL SYSTEM SHALL BE INCORPORATED WITH COMPRESSOR SKID. LUBE OIL SYSTEM SHALL BE DESIGNED AS PER REQUIREMENTS OF CHAPTER 3 OF API STD 614. PIPE, FITTING AND OIL RESERVOIR USED IN LUBE OIL SYSTEM SHALL BE OF SS 316L.LUBE OIL PUMPS SHALL BE MANUFACTURER STANDARD AND EQUIPPED WITH MECHANICAL SEAL.
NOTE 4: PLAN D FOR COOLING WATER WILL APPLY. COOLING WATER ANALYSIS IS SHOWN IN BU-20-D-000-PR-SPC-101. IF COMPRESSOR IS ABLE TO OPERATE WITH SITE WATER, VENDOR CAN APPLY PLAN C INSTEAD.
NOTE 5: V-BELT DRIVE IS SUPPLIED.
NOTE 6: VENDOR SHALL SUPPLY TEMPORARY FILTERS FOR THE COMMISSIONING AND START-UP PHASE OF COMPRESSOR.
NOTE 7: AFTER COOLER IS REQUIRED. DISCHARGE TEMPERATURE AT THE BATTERY LIMIT OF PACKAGE SHALL NOT EXCEED FROM 52 C (AFTER AFTER COOLER).
NOTE 8: COMPRESSOR SHALL BE OF NON-LUBRICATED TYPE.
NOTE 9: 1 STEP VALVE UNLOADER AND RECYCLE VALVE ARE USED
NOTE 10: VENDOR SHALL DESIGN AND SUPPLY PULSATION DAMPENERS BEFORE AND AFTER OF EACH COMPRESSOR STAGE IN COMPLIANCE WITH APPROACH 2 OF API 618(5THEDITION). MECHANICAL DESIGN SHALL BE AS PER ASME SECVIII, DIVISON 1. HYDROTEST PRESSURE FOR ALL PRESSURE VESSELS INSIDE THE PACKAGE SHALL BE 1.3MAWP(MAXIMUM ALLOWABLE WORKING PRESSURE)
NOTE 11: SELECTION OF COMPRESSOR MATERIALS SHALL BE IN ACCORDANCE WITH API 618.
NOTE 12: VENDOR SHALL CONSIDER FOLLOWING ITEMS RELATED TO INSTRUMENTATION AND CONTROL:
1. INSTRUMENTATION INSIDE THE PACKAGE SHALL BE OF IP 65, EEXIA, IIB, T3.
2. VENDOR SHALL SUPPLY ALL INSTRUMENTS AND LOCAL PANEL(FULLY INSTALLED, PIPED AND WIRED ON SKID).
3. VENDOR SHALL SUPPLY ACCESSORIES INCLUDING IMPULSE LINES, FITTINGS, LABELS, CABLES, JUNCTION BOXES, LOCAL ROUTINGS, CABLE GLANDS, ETC.
4. CABLE GLANDS SHALL BE DOUBLE SEAL COMPRESSION TYPE.
5. COMPRESSORS ARE VERTICAL.
6.TERMINALS SHALL BE CERTIFIED EEX 'E' (FOR EEXI AND NON EEXI SIGNALS) IN ACCORDANCE WITH IEC/CENELEC STANDARDS IEC 60079.
7. TWENTY PERCENT(20%) SPARE IN WIRING(PAIR/CORE) SHALL BE CONSIDERED BY VENDOR.
8. DIGITAL, ANALOG, ESD, IS, RTD, SPEED AND VIBRATION SIGNALS SHALL HAVE JUNCTION BOXES DEDICATED.
9. JUNCTION BOXES SHALL BE EEXE IIB T3, IP65 WHICH ARE MADE OF STAINLESS STEEL.
10. ALL FITTING SHALL BE OF 316L SS, FRONT/BACK FERRULE TYPE.
11.VENDOR SHALL FORESEE THE PROVISION FOR:
-INTRINSICALLY SAFE EQUIPMENT GROUNDING
-INSTRUMENT CABLE SHIELD GROUNDING
-SAFETY EARTH INCLUDING GROUNDING OF CABINET FRAMES, POWER SUPPLIES, AND SYSTEM COMMON GUARDING.
12. ALL GAUGES DIAL SIZE SHALL BE 150MM AS MINIMUM.
13. VENDOR SHALL SUBMIT LATEST RELEASED AND USABLE LOGIC AND MONITORING SOFTWARE SOURCE.
NOTE 13:VENDOR SHALL CONSIDER FOLLOWING POINTS FOR ELECTRICAL ITEMS:
1. ALL ELECTRIC MOTORS INSIDE THE COMPRESSOR PACKAGE SHALL BE OF EEXD, IIB, T3 AND MINIMUM IP55.
2. GLAND TO BE USED FOR TERMINAL BOXES AND JUNCTION BOXES SHALL BE OF ARMORED TYPE SUITABLE TO SUPPORT THE CABLE WITH LEAD COVER.
3. FOR MV CONSUMERS, THE STARTING CURRENT SHALL NOT EXCEED 6 TIMES OF NOMINAL CURRENT.
4. FOR LV CONSUMERS, THE STARTING CURRENT SHALL NOT EXCEED 6.5 TIMES OF NOMINAL CURRENT.
NOTE 14: DELETED
NOTE 15: DELETED
NOTE 16: VENDOR SHALL SUPPLY UCP(PLC-BASED WITH THE MODEL OF SIEMENS S7-400 FH, IP 42) TO BE INSTALLED IN CONTROL ROOM
NOTE 17: As a minimum, Vendor shall supply following list as special tools. Vendor shall finalize this list before order placement:
1. slings and shackles
2. 1 set industrial work station(computer) with 21"(21 inch) LED
3. 1Set of HART hand held communicator for package transmitters
4. Deleted
5. BARRING DEVICE
6. Lap top for PLC programing
NOTE 18: VENDOR SHALL CONSIDER AND SUPPLY FOLLOWING POINTS AND ITEMS:
- ANCHOR BOLTS AND NUTS TO INSTALL COMPRESSOR PACKAGE ON FOUNDATION.
-BOLTS AND NUTS TO INSTALL THE EQUIPMENT OR ITEMS ON SKID ARE IN VENDOR'S SCOPE OF SUPPLY.
-FOR FLANGE CONNECTIONS, ONLY STUD BOLTS SHALL APPLY.
NOTE 19: VENDOR SHALL FORESEE AND SUPPLY GAUGE BOARD FOR COMPRESSOR PACKAGE.
NOTE 20:PURCHASER WILL GIVE ONLY ONE LV FEEDER (400V/50HZ/AC). DISTRIBUTION TO ANOTHER CONSUMER IS IN VENDOR RESPONSIBILITY.
NOTE 21:INSULATION FOR PERSONNEL PROTECTION(FOR LINE WITH THE TEMPERATURE HIGHER THAN 60C) IS IN VENDOR'S SCOPE OF WORK AND SUPPLY.
NOTE 22:KILLED CARBON STEEL SHALL BE USED FOR PROCESS LINES AND THE SHELL MATERIAL OF PRESSURE VESSELS AND HEAT EXCHANGERS INSIDE THE PACKAGE.
NOTE 23:DELETED
NOTE 24: MAXIMUM AVAILABLE SPACE FOR COMPRESSOR IS 3800X2800 MM.