

Annexure-Z

(Drawing and datasheet)

**BIDDERS SHALL TAKE INTO CONSIDERATION
THIS DOCUMENT DURING BIDDING**

**SUB:“PROCUREMENT OF BARE SHAFT GLYCOL RE-
CIRCULATION PUMP WITH CRANKCASE AT GDU
DULIAJAN”**

e-TENDER NO.: BCPL/C&P/DU22C007MB/5060

RECIPROCATING PUMP

Document No.
6907-012-PA-DS-0010
Rev. No. 0
Page 3 of 3

Format Rev.1 Issue Date-01/07/2009	REMARKS
123.	
124.	1) Pump Casing Design Pressure shall be equal to or higher than the downstream design pressure of 88 kg/cm ² G @ 100 °C
125.	and shall not be less than the PSV set pressure. Vendor shall indicate the Pump Casing Design Pressure @ at maximum
126.	allowable temperature is 88 kg/cm ² G @ 100 °C.
127.	2) The Value of NPSHA as indicated is without considering Acceleration losses. NPSHA shall be calculated by the vendor based on the
128.	suction piping arrangement i.e. Suction Pipe diameter 4" (100 mm) and equivalent length 3.0 m.
129.	Vendor shall furnish Calculation for acceleration head, NPSHA along with the offer and ensure that the difference between
130.	NPSHA - NPSHR - Acceleration Head shall be greater than 0.6 m.
131.	3) Pump manufacturer shall supply & mount Suction pulsation dampener so as to reduce NPSHR.
132.	4) Pump manufacturer shall supply & mount Discharge pulsation dampener to limit the pulsations within the range as prescribed in API 674.
133.	5) Pump manufacturer shall supply & mount Relief Valve alongwith necessary piping on Suction and Discharge sides of Pump as per
134.	P&ID no. 6907-05-45-012-1113
135.	6) Frame Rating of the offered pump at the rated speed shall be higher than the pump BkW at relief valve set pressure specified.
136.	7) Companion Flanges for both suction, discharge nozzles for pump and inlet, outlet companion flanges for the PRV for non-standard sizes
137.	alongwith nuts, bolts, gaskets etc. shall be furnished.
138.	8) Refer Process Datasheet No. 6907-012-05-DS-1601 and P&ID No. 6907-05-45-012-1113.
139.	9) Deleted
140.	a) Deleted
141.	b) Deleted
142.	
143.	10) The elevation of 012-V-004 shall be assumed as 0.4 m (minimum).
144.	11) Pump type shall be Single acting Plunger/Piston type. Double acting Pumps are not acceptable.
145.	12) Continuous supply of Cooling Water is not available at site. Service Water shall only be provided as make-up. Refer Site & Utility Data
146.	for details of the same. Vendor shall indicate requirement (if any) of the same. - Not Required.
147.	13) All Wetted parts of the Pumps shall be in SS316. All other parts of the Pump units shall be suitable for the specified service. Volume
148.	Bottle type Suction stabilizer shall be SS316. MOC of the Bladder shall be Perfluoroelastomer (VITON). Generic Metallurgy has been
149.	Indicated in the Datasheet. Bidder shall furnish ASTM grades of the same in his proposal.

25/06/2010	0	AS	SB	AKG
10/12/2009	A	AS	SB	AKG
DATE	REV.	PREPARED	CHECKED	APPROVED

1	M/S EIL Comment in Rev. 0 incorporated.	30-08-10	MIP 30/08/10	AKG 30/08
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Rev.	Description	Date	Prepared By	Approved By

RECIPROCATING PUMP

Document No.
6907-012-PA-DS-0010
Rev. No. 0
Page 1 of 3

Format Rev.1 Issue Date-01/07/2009

GENERAL				
1. Project:	BRAHMAPUTRA PETROCHEMICAL COMPLEX PROJECT		Job no.:	6907
2. Owner:	BRAHMAPUTRA CRACKER AND POLYMER LIMITED		Site:	DULIAJAN
3. Purchaser:	M/s EIL		Unit:	GDU Unit No.: 012
4. Item No.:	012-P-001 A/B		Service:	CIRCULATION PUMP
5. No. Required:	02 (TWO)	Working:	01	Std by: 01
6. Applicable to	☐ Proposals ☒ Purchase		Driver:	Working: E. MOTOR Std By: E. MOTOR
7. Scope option & Information specified by purchaser	☐ Information Req'd. from & option left to vendor. Vendor to cross ☒ the selected option.			
8. Manufacturer:	BPCL Naini Allahabad	Size & Type:	Plunger Dia. 2-5/8" x Stroke 4" Triplex type	Model: A-334(43-7)
OPERATING CONDITIONS (Also refer Process Datasheet)				
9. Liquid:	LEAN GLYCOL		Capacity at PT (m ³ /hr):	
10. Pumping Temperature (°C) (Nor/Max.):	84.33		Min:	Normal: 12.8 Rated: 15.36
11. Specific Gravity at PT:	1.087		Discharge Pressure (kg/cm ² .g):	
12. Vapour Pressure at PT (kg/cm ² .A):	0.002		Max:	Min: Rated: 77.9
13. Viscosity at PT (Cp/Gst):	5.23		Suction Pressure (kg/cm ² .g):	
14. Corrosion Erosion caused by:	NIL		Max: 2.5	Min: Rated: 0.18
15. Presence of Solids:	NIL		Differential Pressure (kg/cm ² .g):	
16. NPSH Available (w/o acceleration head) (m) (Rem-2):	8.0		Max:	Min: Rated: 77.7
SITE / INSTALLATION / UTILITY DATA (Refer Site & Utility Data)				
17. Location:	☐ Indoor ☒ Outdoor without roof ☐ Heated ☐ Unheated			
18. Site Temperature (°C):	☒ Max: 38 ☒ Min: 12		☐ Elect. Area Hazard:	Div: Class: Group:
19. Available Cooling Water Pr. (kg/cm ² .g)	☐ Min: ☐ Normal: ☐ Max:			
20. Temperature (°C)	☐ Min: ☐ Normal: ☐ Max:			
APPLICABLE CODES & STANDARDS				
21. API STANDARD 674 2 nd edition, EIL STANDARD SPECIFICATION 6-41-0020 Rev. 1				
PERFORMANCE				
22. At Rated Condition:	☒ Rated Cap. (m ³ /hr): 15.36		For direct acting pumps: (Not applicable)	
23. NPSH Required (incl. Accn. Head) (m):	6.25		☒ Driver Gas:	☐ Governor Type:
24. Rated (rpm):	256		Min.	Nor. Rated Design
25. Plunger Linear Speed (m/s):	0.86 average			
26. Piston speed (m/s):	Stroke Length (mm): 4"/101.6mm		☐ Inlet Pressure kg/cm ² .A	
27. Vol. efficiency (%):	94		☐ Inlet Temperature °C	
28. Hydraulic (kW):	32.57		☐ Exhaust Pressure	
29. BkW @ Rated condition:	38.82 kW		☐ Stall Pressure (kg/cm ² .a):	
30. Driver Rating (kW):	55		☐ Steam / Gas Consumption (kg / kW.hr):	
31. Plunger Load Allowable (lbs):	6600 Max. Allowable Speed (rpm): 400		☐ Pinion Shaft (rpm):	
32. Maximum Frame Rating	75 kW @ 400 rpm		Power End Lubrication:	
33. Maximum Pressure Rating (kg/cm ² .g):	≥ 223.5 (Fluid End)		Type ☐ Splash ☐ Positive Pressure ☐ Gravity	
34. R.V Set Pressure (kg/cm ² .g):	88.0		Oil pump Driven By: ☐ Main: ☐	
35. Type of main bearings:	ROLLER		☐ Oil Filter Type: ☐	
36. Internal gears	☐ Yes ☒ No		☐ Oil Cooler: ☐ Type: ☐ Size:	
37. Gear Ratio:	☐ Gear Service Factor: Refer GB Datasheet		☐ Oil Piping Material:	
CONSTRUCTION FEATURES				
38. Nozzles	Size	ANSI Rating	Facing	Position
39. Pump Suction	4"	150# ANSI B 16.5	RF	SIDE
40. Pump Discharge	3"	600# ANSI B 16.5	RF	SIDE
41. Suction Manifold (for Purchaser's interface)	4"	150# ANSI B 16.5	RF	SIDE
42. Discharge Manifold (for Purchaser's interface)	3"	600# ANSI B 16.5	RF	SIDE
43. Pulsation Dampener (Suction)	4"	150# ANSI B 16.5	RF	BOTTOM
44. Pulsation Dampener (Discharge)	3"	600# ANSI B 16.5	RF	BOTTOM
45. Relief valve (Inlet)	1"	ANSI B 16.5	RF	SIDE
46. Relief valve (Outlet)	1"	ANSI B 16.5	RF	SIDE
47. Gland Flush				
48. Drains				
49. Type:	☐ Simplex ☐ Duplex ☒ Multiplex (Triplex) type		VALVE	
50. No. of Cylinders:	03 (Three) ☒ Single Acting ☐ Double Acting		Number Area Velocity	
51. Horizontal ☐ Vertical ☒	Date		One =1548	
52. Plunger ☐ Piston ☒	Discharge		One =1548 1.83	
53. Removable Liners ☐ No ☒ Yes	Valve type ☐ Disc ☐ Wing ☐ Double Ported ☐ Ball			
54. Packing Lubrication: Yes ☒ No ☐	Lubricator make ZENITH		No. of Feeds: 03 (Three) Flush Source N/A	

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MATERIALS					
Part	Liquid end	ASTM GRADES	Part	Liquid End	ASTM GRADES
65. ☒ Cylinder (Fluid End)	SS316	ASTM A 473 Tp. 316	☒ Packing	HNBR	—
66. ☒ Stuffing Box	SS316	ASTM A 473 Tp. 316	☒ Bushing, follower & Lantern ring	BRONZE	ASTM B 584 Bronze C-93200
67. ☒ Plunger/Piston	SS316	ASTM A 276 TP. 316	☐ Bolting		ASTM A 193 GR. B7 OR Eq. IS Std.
68. ☒ Extension Rod	SS316	AISI 4140 Chrome-Plated	☒ Suction Pulsation Damp.	St. Steel	—
69. ☒ Valve Seat/Disc	SS316	ASTMA743CF8M/AISI316	☒ Discharge Pulsation Damp.	St. Steel	—
70. ☒ Gland-Stuffing Box	SS316	ASTM A-743CF8M(SS)	☒ Pipe, fittings and flanges	SS	ASTM A 312, TP 316 & ASTM A 182, TP 316
INSPECTION & TESTING					
Description	Required	Witnessed	Description	Required	Witnessed
73. ☒ Shop Inspection	☒	☐	☒ NPSH (Refer to spec sheet)	☒	☒
74. ☒ Material test Cert.	☒	☐	☒ Dismantle & Insp. after test	☒	☒
75. ☒ Hydrostatic	☒	☒	☒ R.V. Set Functional Test	☒	☒
76. ☒ Mechanical Run Test	☒	☒	☒ Mechanical Run (Gear Box)	☒	☒
77. ☒ Complete Unit Test	☒	☒	☒ Final inspection/Dimensional check	☒	☒
78. ☒ Performance	☒	☒			
79. Remarks:					
80. PACKING					
Liquid End		Valve Rod		Pressure Rating at 100°C Temperature	
81. ☒ No. of Rings/Plunger: 9 (Nine)				☒ Max. Allowable Pressure Rating of Fluid End (kg/cm2G):	
82. ☒ Size of Rings: 2-5/8" ID x 3-3/8" OD				Suction Chamber: 88.0 Discharge Chamber: 88.0	
83. ☐ Other				Stuffing Box Max. Allowable Pressure Rating (kg/cm2G): 88.0	
				Stuffing Box Hydro-test Pressure (kg/cm2G): 132	
85. REMARKS: Plunger Packing leakage rate shall be 30 to 60 drops per plunger per minute max during pump performance test at BPC.				☒ Hydro-test Pr. of Fluid End, Suction & Discharge Piping (kg/cm2G):	
				F/E Suction Chamber: 132 F/E Discharge Chamber: 132	
				Suct. Accessories & Piping: 15 Disch. Accessories & Piping: 132	
88. DRIVERS (Refer Electrical Specification)					
89. ☒ Electric Motor: ☒ Manufacturer: MARATHON ELECTRIC ☒ Size: E 250 M (Refer Separate Data Sheet)					
90. ☒ Driver Supplied & mounted by: ☒ Pump Vendor ☐ Driver Supplied & mounted by others ☒ Starting: No Load					
91. ☒ Driver kW: 55 @ 1470 RPM ☐ Variable Speed: ☒ Constant Speed:					
92. ☐ Steam Turbine: ☐ Furnished by: Vendor ☐ Mounted by: Vendor Item No.: NA					
93. ☐ Diesel Engine: ☐ Furnished by: Vendor ☐ Mounted by: Vendor Item No.: NA					
94. ACCESSORIES					
95. GEAR REDUCER			V - BELT DRIVE (Not required)		
96. ☒ Required: ☒ Manufacturer: M/S TEW ☒ Also refer GB D/sheet			☐ Required: ☐ No. of Belts:		
97. ☒ Type: Single Helical, Shaft, foot mounted ☒ Model: LSG-250			☐ Size of Belts:		
98. ☒ Service Factor: ≥2 ☒ Rating: ≥ 110.0 kW			☐ Totally Enclosed Guard:		
99. ☒ Supplied & Mounted by: Pump Vendor			☐ Slide Rails for Adjustment:		
100. COUPLINGS					
101. Low Speed: (between Pump & Gearbox Output Shaft)			High Speed: (between Gear Box Input Shaft & Motor Shaft)		
102. ☒ Manufacturer: M/S UNIQUE ☒ Service Factor: 1.96			☒ Manufacturer: M/S UNIQUE ☒ Service Factor: 1.79		
103. ☒ Type: Flexi-metallic with Spacer			☒ Type: Flexi-metallic Spacer		
104. ☒ Supplied & Mounted By: Pump Vendor			☒ Supplied & Mounted By: Pump Vendor		
105. MOUNTING PLATE					
106. ☒ Base Plate: ☐ Sole Plate: ☐ Skid Plate:			☐ Open Ream Support: ☒ Drain collection under Liquid End		
107. ☒ Supplied By Pump Manufacturer:			☒ Fully Grouted: ☒ Overall Size (lxbxh): 3050x1260x200		
108. ☒ Common for Pump, Gear, Driver & Auxiliaries			☒ Supply Base plate mounted with piping		
109. PULSATION SUPPRESSION DEVICES					
110. Suction:			Discharge:		
111. ☒ Supplied By Pump Manufacturer: (Rem 3)			☒ Supplied By Pump Manufacturer: (Rem 4)		
112. ☒ Type: Volume Bottle ☒ Capacity: 40 Lit.			☒ Type: Gas Charged/Bladder type (N2 Charging) ☒ Capacity: 5 Lit.		
113. ☒ Manufacturing Standard: ASME Sec. VIII Div. 1			☒ Manufacturing Standard: ASME Sec. VIII Div. 1		
114. ☒ Material of Construction: SS316			☒ Material of Construction: Shell: SS Bladder: Viton		
115. ☐ Loose supply ☒ Skid Mounted with Piping			☐ Loose supply ☒ Skid Mounted with Piping		
116. RELIEF VALVE (Refer Instrumentation Specification)					
117. ☒ Relief Valve Type: Flanged, Spring Loaded			☒ Set Pressure kg/cm ² (g): 88.0 kg/cm ² G		
118. ☐ Loose supply by Vendor			☒ Mounted with Skid (mounted by Vendor):		
119. WEIGHT					
120. ☒ Bare Pump (Kg): 765.0 ☒ Gear Reducer (Kg): 502.0 ☐ Coupling (Kg): 50.0 ☒ Driver (Kg): 500 ☐ Pulsation Dampeners: 200.0					
121. ☒ Baseplate (Kg): 600.0 ☒ Complete Unit (Kg): 2900.0					
122.					

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GENERAL			
2 Project :	BRAHMAPUTRA PETROCHEMICAL COMPLEX PROJECT		
3 Owner :	BRAHMAPUTRA CRACKER AND POLYMER LIMITED		
4 Purchaser :	M/s EIL Kolkata R1	Unit :	Unit No.:
5 Item No. :	012-P-001 A/B(Gear box) R1		
6 No. reqd. :	Two	Working: One	Standby: One
7 Applicable to :	☐ Proposals ☒ Purchase ☐ As Built		
8 Scope, Option & Information specified by Purchaser. ☐ Information required from and options left to vendor. Vendor to cross (X) the selected option.			
9 Manufacturer:	TRIVENI ENGG. & INDS. LTD., MYSORE		
10	Model : LSG 250		
☒ RATING REQUIREMENTS		☒ BASIC GEAR DATA	
11 Driven Eqpt. Power (kW):	Nor.: Max.: 43.86 kW	Mechanical rating : 121 kW @ 1470/256.89 rpm	
12 Driver Power (kW):	Rated: 55 kW Max.:	Thermal rating : 138.6 kW @ 1470/256.89 rpm	
13 Gear rated power (kW):	60.5 kW	Full load power loss (kW): 0.907 Mech. efficiency: 98.5 %	
14 Torque @ Max. Cont. Speed (kg-m):	40.06 Kg-m @ 1470 rpm	Pitch line velocity (m/s): 5.73	
15 Max. Torque : 229.25 kg-m @ 256.89 rpm		Tooth pitting index, "K" : Actual: 1.45 Allowable : 1.52	
16 Rated speed (rpm) :		Tangential load, "Wt" (kg): 1077.5	
17 - Input : 1470 ☒ Specified ☐ Nominal		Bending stress number St "Wt" (MPa)	
18 - Output : 256.89 ☐ Specified ☒ Nominal		Actual : 142.6 143.28	
19 Allow variation in gear ratio :	1.47 %	Allowable : 266 266	
20 Max continuous speed (rpm):	1470	Material index no. : 3.03 MPa R1	
21 Trip speed (rpm) :	1470	Anticipated SPL : 85 dBA @ 1 m	
22 Gear service factor (Min.) :	2	Journal static weight loads :	
23 Pinion/Gear Hardness :	58 HRC	Pinion : 6 kg Gear: 73 kg	
24 Shaft assembly designation :	L - R	WR ² referred to LS shaft (kg-m ²): 3.19	
25 - HS shaft rot. facing coupling end ☐ CW ☒ CCW		Breakaway Torque (kgf -m) @ LS shaft : 2.98	
26 - LS shaft rot. facing coupling end ☐ CW ☒ CCW		Overhung Load Factor : --	
27 HS shaft end : ☒ Cylindrical ☐ Taper ☒ 1-Key		☐ CONSTRUCTION FEATURES	
28 ☐ 2-Keys ☐ Hydraulic taper ☐ Integral flange		Type of Gear ☒ Reducer ☐ Increaser	
29 LS shaft end : ☒ Cylindrical ☐ Taper ☒ 1-Key		☒ Single stage ☐ Double stage	
30 ☐ 2-Keys ☐ Hydraulic taper ☐ Integral flange		☒ Single helical ☐ Double helical	
31 External loads :	NIL	☐ Other :	
32 Other operating conditions :		Teeth	
33 ☐ INSTALLATION DATA		Number of teeth: Pinion: 18 Gear: 103	
34 ☐ Indoor ☐ Heated ☐ Under roof		Gear ratio : 5.722:1 Center Distance (mm): 250	
35 ☒ Outdoor ☐ Unheated ☐ Partial sides		Pitch Dia: Pinion (mm): 74.37 Gear (mm): 425.63	
36 ☐ Grade ☐ Mezzanine ☐		Finish (RA): 0.8	
37 ☐ Winterisation Required ☐ Tropicalization Required		AGMA Geometry factor "J" :	
38 Electrical Area Class:	Grp: Div.:	Pinion: 0.5673 Gear : 0.5647	
39 Max. allow. SPL : 85	dBA @ 1.0 m	Helix angle (°): 12.0 Normal Pressure angle (°): 20	
40 Elevation (m):	Barometer (kg/cm ² A):	Net face width, "Fw" (mm) : 115 Pinion L/D: 1.55	
41 Range of ambient temperatures: R1		Normal Diametrical Pitch: 6.350 Backlash (mm): 0.15/0.43	
42	Dry Bulb Wet Bulb		
43 Minimum	12°C R1 °C	Manufacturing methods: Pinion Gear	
44 Normal	°C °C	Teeth generating process : HOBBING	
45 Maximum	38°C R1 °C	Teeth Hardening process: R1 CARBURISING	
46 Unusual Conditions: ☐ Dust ☐ Fumes ☐ Others:		Teeth finishing process : PRECISION GRINDING	
47 ☐ ADDITIONAL REQUIREMENTS			
48 MOUNTING PLATES (NOT IN TRIVENI SCOPE)		Pinion to shaft : ☒ Integral ☐ Shrunk-on	
49 ☒ Gear furnished with :		Gear to shaft : ☐ Integral ☒ Shrunk-on	
50 ☐ Baseplate ☐ Soleplate(s)		☒ RADIAL BEARINGS	
51 ☐ Baseplate suitable for column mounting :			
52 ☐ Grout type : ☐ Epoxy ☐ Other:		Pinion Gear	
53 ☒ Base plate common for Pump, Gearbox / Motor R1		Manufacturer SKF / FAG / EQV SKF / FAG / EQV	
54 PAINTING : ☒ Mr. Std. ☐		Type SPH ROLLER SPH ROLLER	
55 APPLICABLE SPECIFICATIONS		Diameter mm 65 100	
56 API Std. 677		Length mm 48 47	
57 ☐ Other:		Journal Velocity m/s 5.0 1.34	
58 * Code-1:- Subjective to comments as marked.		Loading kg/cm ² -- --	
59		Clearance (min max) mm -- --	
60		Span mm 226 227	
		Life (B10 life) hrs 50000 50000	



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6907 012-GB-DS-0020	A		
Page 1 of 4			

For Approval

04/09/10

Bharat Pumps & Compressors Ltd.
Naini, Allahabad

SIGNATURE

Signature & Name

Date

Signature

Signature

21/09/2010

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61 MISCELLANEOUS NA			☒ THRUST BEARING(S) NA		
62 ☐ Torsional analysis by (2.6.1.8) ☐ Gear Vendor ☐ Other			Pinion		Gear
63 ☐ Lateral analysis by ☐ Gear Vendor ☐ Other					
64 ☐ Spare set of gear rotors	Location				
65 ☐ Orientation of oil inlet and drain connection	Manufacturer				
66	Type				
67	Size				
68	Area mm ²				
69 ☐ VIBRATION DETECTORS NA	Loading kg/cm ²				
70 Radial : NA	Rating kg/cm ²				
71 ☐ Manufacturer Type :	L10 Life (Roller Elements) hrs				
72 ☐ No. at each shaft bearing Total No.:	Int. thrust load N (")				
73 ☐ Oscillator-Demodulators supplied by	Ext. thrust load N (")				
74 ☐ Manufacturer	R1 ☐ COUPLING & GUARDS : REFER COUPLING DRG.				
75 ☐ Monitor supplied by			High Speed	Low Speed	
76 ☐ Location Enclosure	Coupling Manufacturer				
77 ☐ Manufacturer	Coupling Furnished by				
78 ☐ Alarm ☐ Shutdown	Coupling Type				
79 ☐ Shutdown time delay seconds	Coupling Model				
80 Axial : NA	Coupling Rating kW/100 rpm				
81 ☐ Manufacturer No. Reqd.:	Coupling Lubrication				
82 ☐ Location	Taper mm/m				
83 ☐ Oscillator-Demodulators supplied by	Taper gauge furnished by				
84 ☐ Manufacturer	Limited end float				
85 ☐ Shutdown time delay seconds	Mount coupling halves				
86 ☐ Monitor supplied by	Cylindrical / 1-key		☐	☐	
87 ☐ Location Enclosure	Cylindrical / 2-keys		☐	☐	
88 ☐ Manufacturer Tapered	/ 1-key		☐	☐	
89 ☐ Alarm ☐ Shutdown	Tapered / 2-keys		☐	☐	
90 ☐ Shutdown time delay seconds	Tapered / keyless		☐	☐	
91 Accelerometer : NA	Coupling Guard Type				
92 Manufacturer No. Required	Cplg Guard furnished by				
93 Location	☒ PIPING CONNECTIONS NA				
94 Monitor supplied by	No.	Size	Type		
95 ☒ INSTRUMENTS	Service				
96 ☐ Low Oil Pressure Alarm Switch:	Lube oil inlet				
97 ☐ High Oil Temperature Alarm Switch:	Lube oil outlet				
98 ☐ Temperature Measuring Devices: (Rem.2)	Casing drain	1	3/4" BSP	TAPPED	
99 ☒ Thermometers ☐ Thermocouples / RTD's	Vent	1	3/4" BSP	TAPPED	
100 ☐ Liquid Filled Pressure Gauges:	Casing purge				
101 ☐ Thermal Relief Valves:	☒ LUBRICATION REQUIREMENTS				
102 ☐ CONTRACT DATA	☐ Oil system furnished by: ☐ Gear Vendor ☐ Other:				
103 ☐ Test data prior to shipment	☒ Oil Visc 320 cSt @ 40°C 59 cSt @ 100°C				
104 ☐ Progress reports	☐ Lubrication Requirements: NA				
105 ☒ SHIPMENTS	☐ Main Oil Pump : ☐ Shaft Driven ☐ Motor Driven				
106 Contract unit Spares	☐ Standby Oil Pump : ☐ Yes ☐ No				
107 Export boxing	☐ Oil Pump Casing : ☐ Cast Iron ☐ Steel				
108 Domestic boxing	☐ Oil Cooler : ☐ Water Cooled ☐ Air Cooled				
109 Outdoor strg. over 6 months	☒ R1 ☐ Heaters Required : ☐ Yes ☐ No				
110 Fit-up & Assy. of mtd. acc. Acc	Type : ☐ Electric with Thermostat ☐ Steam				
111 ☒ MATERIALS	☐ Duplex Filters : ☐ Yes ☐ No				
112 Gear Casing : Casting FG:300 IS:210 Oil Seals: NITRILE RUBBER	System Type : ☒ Self-Contained Splash ☐ Circulating ☐ Pressurised				
113 Radial Bearings : STEEL	☐ Filters, Micron Rating :				
114 Thrust Bearing(s) : NA	☒ Minimum Startup Oil Temperature (°C): 21				
115 HS Shaft : 17CrNiMo6/18CrNiMo7-6 LS Shaft : 42CrMo4	☐ Oil Flow (m ³ /hr):				
116 Pinion(s) : 17CrNiMo6/18CrNiMo7-6 Hardness : 58 RC	☐ Oil Pressure (kg/cm ² , A):				
117 Gear Rim(s) : NA Hardness : 58 RC	☐ Unit Power Loss (kW): 0.907				
118 Low Temp. Operation : NA	Reservoir: ☒ Gear Casing ☐ Separate				
119 REMARKS:					
120					



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GENERAL PURPOSE
GEAR UNIT

DATA SHEET NO

6907-012-GB-DS-0020

REV.

A

Page 2 of 4

* Code - 1 - Subjective to comments as needed.

Data Sheet for Medium Voltage Squirrel Cage Induction Motor

1	Motor tag no.:	as per sheet 1	012-PM-001 A/B
2	Voltage(V):	415V±6%, Phase: 3,	Freq.(Hz.): 50Hz ± 3%
3	Fault level (kA):	Not applicable	
4	Method of starting:	D.O.L.	
5	Phase:	THREE	Connection: DELTA No. of terminals: SIX
6	Design Ambient temp (°C)	40°C	Temp. rise(°C): 80°C for Ex'n'
7	Cable size(mm²):	Later * 3CXL50	Type Cu / Al. cond., PVC insulated, armoured
8	Enclosure type	IP-55	Cooling: TEFC
9	Insulation class	Class F (temp. rise limited to class B)	
10	Haz. Area classification/Gas Group, Tempr. Class	: Zone 2, Gas Gr. IIA/IIB, T3	
11	Type of explosion protection: Ex(n) / Ex(d),	Applicable Standards: IS, 6-51-0032 Rev. 4	

Technical particulars from Driven equipment manufacturer

12	Suggested Motor Rating in kW / Manufacturer:	* 55 kW / BPC
13	Shaft kW / kW at end of curve:	* 38.92 kW / 49.246 kW
14	Speed/rotation of equipment from Coupling End:	* 256 RPM / C.W.
15	Starting/max. Torque required (m.kg):	* 15% OF FLT / 100% OF FLT
16	WK² of equipment Including/excluding flywheel (kg-m²):	GEAR BOX 4.5 kg-m²
17	Thrust up/down (kg):	COUPLING * NO AXIAL THRUST
18	Equipment/coupling type:	* RECIPROCATING PUMP / THRU GEAR
19	Starting Condition -On no load/Under loaded Condition:	* NO LOAD

Technical particulars from Motor Manufacturer

20	Manufacturer (Indigenous)	MARATHON ELECTRIC
21	kW Rating:	* 55 No. of poles: * 4 P
22	Frame designation:	* F 250 M Mounting: * B3
23	Full load speed (rpm):	* 1470 Full load Torque (m.kg): * 36.4
24	Starting torque as % of full load torque:	* 240%
25	Full load current (A):	* 96A
26	Starting current at 100% Voltage (A):	* 600% (≤ 600% + Tolerance)
27	Break down or pull out torque%:	* 270%
28	Rotation viewed from motor NDE:	* C.C.W.
29	Starting time at 75%V (sec.):	* < 1 sec Starting time at 100%V (sec): * < 1 sec
30	Time (Te) for increased safety motors at 100% Voltage (sec):	* N.A.
31	Locked rotor with stand time cold/hot at 75% V (sec):	* 45 * 34 At 100% V (sec): 29 * 22
32	WK² of motor (kg-m²):	* 2.252 kg-m²
33	Power factor at 100%load:	* 0.86
34	Efficiency at 100% load:	* 93%
35	Space heater watts/volts:	* 240V AC
36	Bearing type/no. DE:	* Ball * 631A Bearing type/no. NDE: * Ball/6313
37	Type of Lubrication:	* Lithium based Grease
38	Weight of motor (kg):	* 450 Kg Approx
39	Motor Canopy	Required, to be supplied with motor (Not in our scope)

NOTES:

- Motor Terminal Box must be suitable for the cable size, to be informed later.
- Bidder shall submit motor data sheets after filling up the details.

* EIL TO INFORM EXACT CABLE SIZE:

minor comments

Form No EIL 1641-1924 Rev. 1

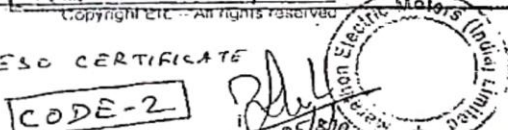
MARATHON TO FURNISH CIMER, DGMS & PESO CERTIFICATE

FOR APPLICABLE AREA FOR OUR REVIEW.

Bharat Pumps & Compressor Ltd.
Mumbai, Maharashtra

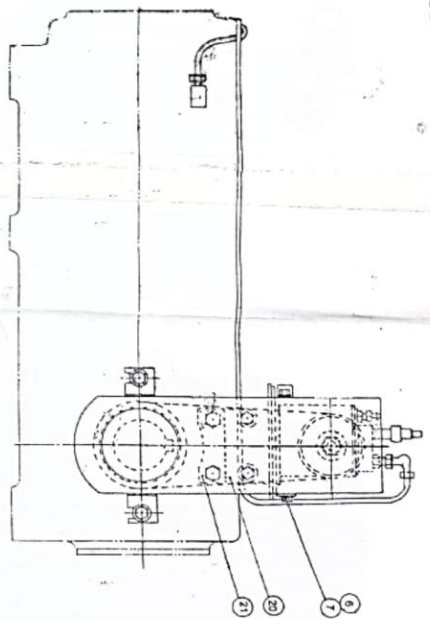
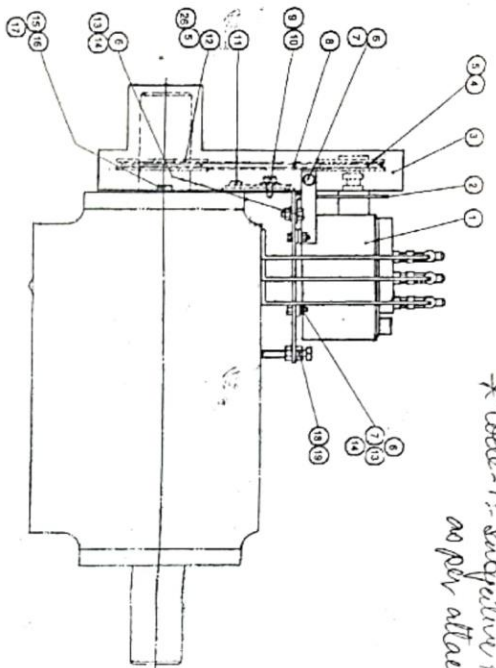
FORWARDING TO EIL FOR INFORMATION & MARATHON
TO PROCEED MANUFACTURING. MARATHON TO PROCEED

Signature & Name	July 08.09.10
Date	05/8/10
U.A.D.	6907/156 Pictal

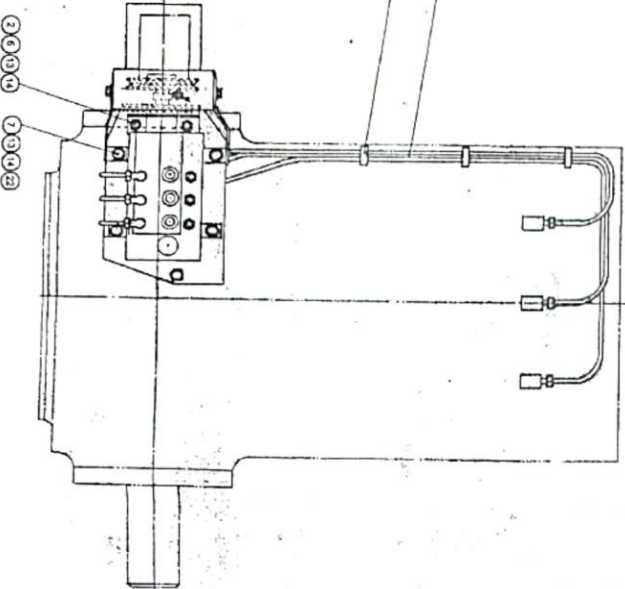


CODE-2

* Code-1: Subjective to minor comments as per attached sheet.



BHARAT PUMPS & CO. PAGES NO. 2
 Noida, Allahabad 211010
 B.P. U.S.O. No. 1234567890
 Cst. met. No. 1234567890
 Purch. No. 1234567890
 6307/MR-5008/100-1101, D.P. 100/200/200
 Job No. 6307
 Project: BHARAT PUMPS & CO. PROJECT
 Pump Model: 6307 (H-7.2) QV2 No. 6
 Plunger Size: 1-5/8"
 Issued on: 12/12/2010
 Approved by: [Signature]



NOTE: TO BE MADE ON PUMP ASSEMBLY FOR LOCKING

NO.	REV.	DATE	BY	CHKD.	DESCRIPTION
1	1	12/12/2010	[Signature]	[Signature]	ISSUED FOR LOCKING

NO.	REV.	DATE	BY	CHKD.	DESCRIPTION
1	1	12/12/2010	[Signature]	[Signature]	ISSUED FOR LOCKING

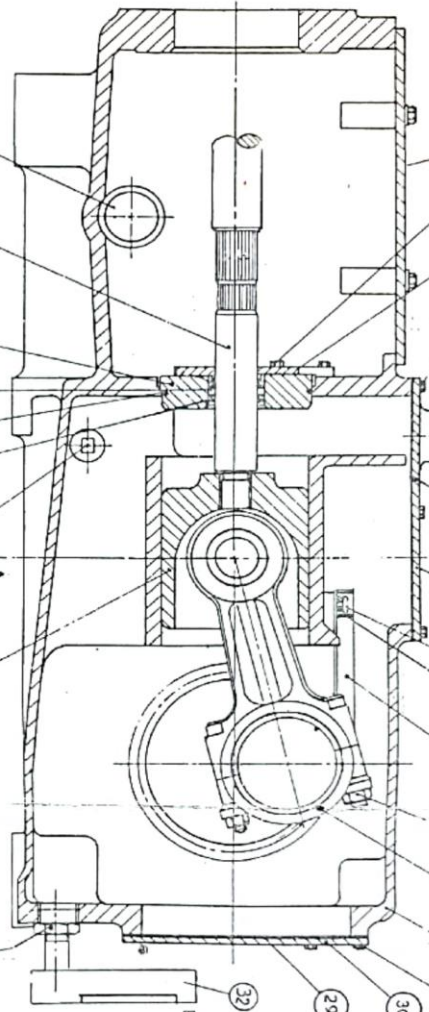
For Approval
 M.L.
 21/01/11
 Bharat Pumps & Compressors Ltd.
 Noida, Allahabad

Approved by: [Signature]
 14/01/10

NO.	REV.	DATE	BY	CHKD.	DESCRIPTION
1	1	12/12/2010	[Signature]	[Signature]	ISSUED FOR LOCKING

SECTION A-A

26
4
31
11
10



WILL NOT BE IN CONTACT WITH THE LIQUID HANDLED

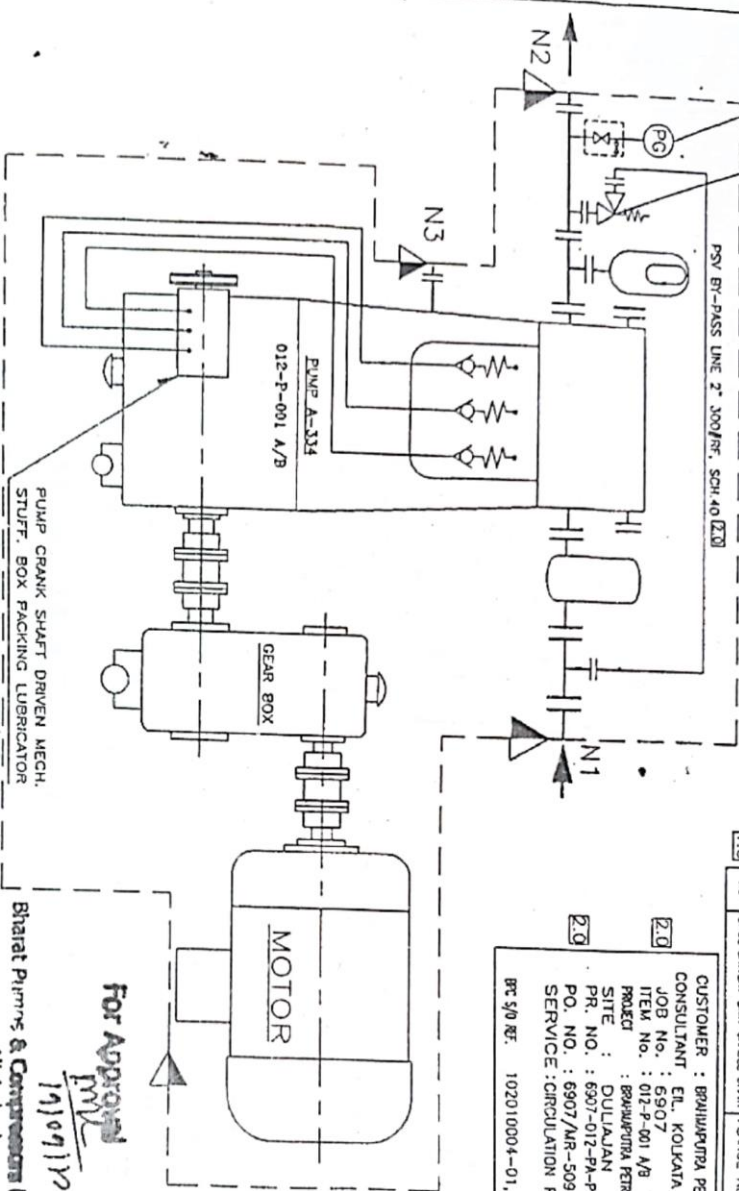
QTY	MATERIAL	DESCRIPTION	DESIGNATION	S.NC
1	ASTM A193 GR B7	HEX. SCREW MOX25 L.G. 15:13:64	HEX. BUSHING 3/4" - 1/2" NPT	33 S-721 962 112
1	CA F GR 10	OIL LEVEL GAUGE	OIL LEVEL GAUGE	32 991 719 009
6	CAD 15 1370	CIRCLIP B7OX 25 .15: 3075	CIRCLIP B7OX 25 .15: 3075	31 716 704 270
1	ST 425 IS 226	FRAME DOOR REAR	FRAME DOOR REAR	30 981 118 003
1	ASTM A105	6X5KET REAR FRAME DOOR	6X5KET REAR FRAME DOOR	29 991 119 023
1	ASTM A105	SO HD PLUG 1-1/2" NPT	SO HD PLUG 1-1/2" NPT	28 S-721 742 113
3	ASTM A105	HEX. HD. PLUG 2" NPT	HEX. HD. PLUG 2" NPT	27 S-721 742 114
3	CART IRON GR 30 IS 210	CROSS HEAD	CROSS HEAD	26 931 141 004
3	ASTM A105	SO. HD. PLUG 3/4" NPT	SO. HD. PLUG 3/4" NPT	25 S-721 742 129
3	ST 425 IS 202	DIAPHRAGM	DIAPHRAGM	24 931 151 003
3	BULKY	O-RING ID 5 1/2 X 1/4 CHORD DIA *	O-RING ID 5 1/2 X 1/4 CHORD DIA *	23 S-741 201 305
3	*BRONZE GR 3.15 318	RING LANTERN *	RING LANTERN *	22 961 349 012
3	O R RUBBER	ROD WIPER	ROD WIPER	21 S-591 154 001
9	ASTM A105	ROD EXTENSION	ROD EXTENSION	20 981 333 013
1	CHROME PLATED	CRADLE COVER	CRADLE COVER	19 991 118 015
1	ASTM A193 GR B7	HEX. SCREW MOX25 L.G. 15:13:64	HEX. SCREW MOX25 L.G. 15:13:64	17 S-712 111 832
3	ST 425 IS 226	COVER DIAPHRAGM	COVER DIAPHRAGM	16 981 152 001
1	CARBON STEEL	BREATHER 1 1/2" NPT.	BREATHER 1 1/2" NPT.	15 S-733 120 001
1	CA F GR 10	GASKET FRAME COVER TOP	GASKET FRAME COVER TOP	14 991 119 024
1	ST 425 IS 226	FRAME COVER TOP	FRAME COVER TOP	13 991 118 004
4	C-20; IS 2071	PIN	PIN	12 981 119 002
3	ASTM A105 ALLOY STEEL	PIN CROSS HEAD	PIN CROSS HEAD	10 981 144 007
3	ASTM A105 ALLOY STEEL	BUSHING-CONNECTING ROD	BUSHING-CONNECTING ROD	10 961 149 008
26	ASTM A105	MAGNET	MAGNET	9 921 119 001
4	WLD STEEL TO IS 2018	HEX. SCREW MOX20 L.G.	HEX. SCREW MOX20 L.G.	8 S-712 111 831
4	SPRING STEEL	PUNCHED WASHER	PUNCHED WASHER	7 S-716 000 71
2	ASTM A105	LOCK WASHER	LOCK WASHER	6 S-716 003 70
6	STEEL TAPPING	OIL SCRAPER INCL. SNO. 9842	OIL SCRAPER INCL. SNO. 9842	5 961 117 001
6	ASTM A105	NYLOCK NUT M 18	NYLOCK NUT M 18	4 S-715 639 717
3	ASTM A105	BOLT CONNECTING ROD	BOLT CONNECTING ROD	3 981 179 004
1	ASTM A105	CONN. ROD COMP. INCL. SNO. 34 R10	CONN. ROD COMP. INCL. SNO. 34 R10	2 931 171 005
1	CA F GR 10	FRAME	FRAME	1A 931 111 002
1	CA F GR 30 IS 210	FRAME FOR FLUSHING UNIT	FRAME FOR FLUSHING UNIT	1 981 112 010

NO.	DATE 16-1-93	NO.	DATE 12-8-84	NO.	DATE 15.5.86	NO.	DATE 28-2-83	REVISIONS									
4	BY <u>APD</u>	3	BY <u>APD</u>	2	BY <u>APD</u>	1	BY <u>APD</u>	ISSUED BY UNSPECIFIED MACHINING TOLERANCES									
4.3	DATE 16-1-93	3	DATE 12-8-84	2	DATE 15.5.86	1	DATE 28-2-83	TO 30 ± 0.1 TO 150 ± 0.15 TO 1070 ± 0.3 TO 10750 ± 0.5 ANGULAR ± 0.3 CORNER RADIUS ESHAPE EDGES ± .2 SURFACE FINISH IN HUNDREDS THOUS									
NO	DATE 10-09-09	NO	DATE 16-1-23	20	MATL WAS STEEL	40	DRG NO WAS P-100-0083	PUMP DESIGN ENGG.									
5	BY <u>APD</u>	4	BY <u>APD</u>	11	DESIGNATION WAS 581-112-013	11	DESIGNATION WAS 581-112-013	SUPERSEEDS									
ORIGINALLY WAS [20] LESS ITEM AT S. NO 1A.		4.1	LESS ITEM AT S. NO 32	4.2	LESS ITEM AT S. NO 32	4.3	LESS ITEM AT S. NO 32	SUPERSEEDS BY									
		4.1	LESS ITEM AT S. NO 32	4.2	LESS ITEM AT S. NO 32	4.3	LESS ITEM AT S. NO 32	DATE									
		4.1	LESS ITEM AT S. NO 32	4.2	LESS ITEM AT S. NO 32	4.3	LESS ITEM AT S. NO 32	17-6-81									
		4.1	LESS ITEM AT S. NO 32	4.2	LESS ITEM AT S. NO 32	4.3	LESS ITEM AT S. NO 32	CHD.									
		4.1	LESS ITEM AT S. NO 32	4.2	LESS ITEM AT S. NO 32	4.3	LESS ITEM AT S. NO 32	APPD.									
		4.1	LESS ITEM AT S. NO 32	4.2	LESS ITEM AT S. NO 32	4.3	LESS ITEM AT S. NO 32	MATERIAL									
		4.1	LESS ITEM AT S. NO 32	4.2	LESS ITEM AT S. NO 32	4.3	LESS ITEM AT S. NO 32	A-324, A-334, A-344 TRIP. PLGR. PUMP.									
		4.1	LESS ITEM AT S. NO 32	4.2	LESS ITEM AT S. NO 32	4.3	LESS ITEM AT S. NO 32	WT									
		4.1	LESS ITEM AT S. NO 32	4.2	LESS ITEM AT S. NO 32	4.3	LESS ITEM AT S. NO 32	1-100-0083									
		4.1	LESS ITEM AT S. NO 32	4.2	LESS ITEM AT S. NO 32	4.3	LESS ITEM AT S. NO 32	REF. DRG NO. P 188-ANI-D									
		4.1	LESS ITEM AT S. NO 32	4.2	LESS ITEM AT S. NO 32	4.3	LESS ITEM AT S. NO 32	SCALE									
		4.1	LESS ITEM AT S. NO 32	4.2	LESS ITEM AT S. NO 32	4.3	LESS ITEM AT S. NO 32	N.T.S.									
		4.1	LESS ITEM AT S. NO 32	4.2	LESS ITEM AT S. NO 32	4.3	LESS ITEM AT S. NO 32	REV 5									

012-FC-1306/1307

012-FSV-1301/1302

PSV BY-PASS LINE 2" 300R/F, SCH 40 (20)



NOZZLE SCHEDULE	
NOZZLE	LOCATION
N1	BPC BATTERY UNIT SUCTION
N2	BPC BATTERY UNIT DISCHARGE
N3	BPC BATTERY UNIT COUPLER DOWN

CUSTOMER : BRAHMAPURA PERIODICAL COMPLEX PROJECT
CONSULTANT : E.L. KOLKATA
JOB NO. : 5907
ITEM NO. : 012-P-001 A/B
PROJECT : BRAHMAPURA PERIODICAL COMPLEX PROJECT
SITE : DULIAJAN
PR. NO. : 6307-012-PA-PR-5095/4107 DATE : 25-06-2010
PO. NO. : 6907/MR-5095/PO-4107 DATE : 25-06-2010
SERVICE : CIRCULATION PUMP
BR 5/0 REF. 102010004-01, DATED : 29-05-10

LEGENDS	
	PRESSURE GAUGE
	OIL LEVEL INDICATOR
	AIR BREAKER
	2-WAY VALVE
	ANGLE CHECK VALVE
	GAS CHARGED BLADDER TYPE DISCHARGE DAMPER
	VOLUME BOTTLE TYPE SUCTION STABILIZER
	PRESSURE RELIEF VALVE

CUSTOMER SCOPE BPC SCOPE

BPC SCOPE

TECHNICAL DATA	
PUMPING DIA	2-5/8"
STROKE LENGTH	4"
PUMP SPEED	256 RPM
DISCH. CAPACITY	15.36 M ³ /HR.
DISCH. PRESSURE	77.90 Kg/Cm ² (g)
SUCTION PRESSURE	0.18 Kg/Cm ² (g) (RATED)
R/V SET PRESSURE	88.00 Kg/Cm ² (g)
DRIVER	ELECT. MOTOR
	RATING 55 KW @ 1470 RPM

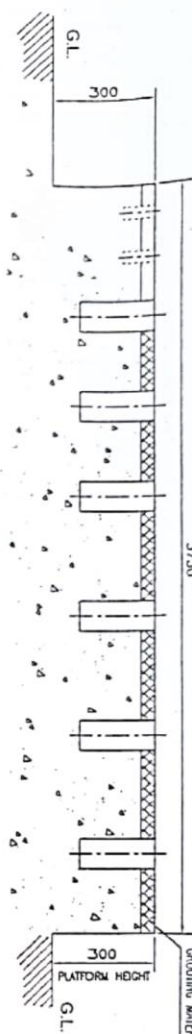
For Approval
19/09/10
Bharat Pumps & Compressors Ltd.
Alibabad

- NOTES:-
1. NO INTER-CONNECTING CONTROL AND POWER CABLE IS BEING CONSIDERED IN BPC SCOPE.
 2. THERE SHOULD BE NO OTHER VALVE IN BETWEEN PUMP AND RELIEF VALVE.
 3. STARTER PANEL FOR DRIVE MOTOR SHALL BE IN PURCHASER'S SCOPE.
 4. BY-PASS ARRANGEMENT FOR NO-LOAD STARTING OF THE PUMP SHALL BE IN PURCHASER'S SCOPE.
 5. THE INSTRUMENTS-TAG NOS. SHALL BE MARKED PUNCHED ON THE RESPECTIVE INSTRUMENT AT THE TIME OF SUPPLY.

2	DATE 10-08-10	BY SHALINI	1	DATE 22-06-10	BY SHALINI	RP DESIGN	DATE 24-01-2010	BY SHALINI	3
APPD			APPD						
2.0 DRG. REVISED AS PER M/S ELS COMMENTS. 1.0 DRAIN			2.0 DRG. REVISED AS PER M/S ELS COMMENTS. 1.0 DRAIN						
DATE 09-09-10			DATE 09-09-10						
BY SHALINI			BY SHALINI						
APPD			APPD						
3.0 NOTE NO. 5 IS ADDED			3.0 NOTE NO. 5 IS ADDED						

BHARAT PUMPS & COMPRESSORS LTD.	
NAINI ALIABAD	
P&I DIAGRAM	
PUMP MODEL A-334 (43-7)	
SCALE - 1/1	WT. - KG.
4SK10988	3

24/09/2010
6907/157

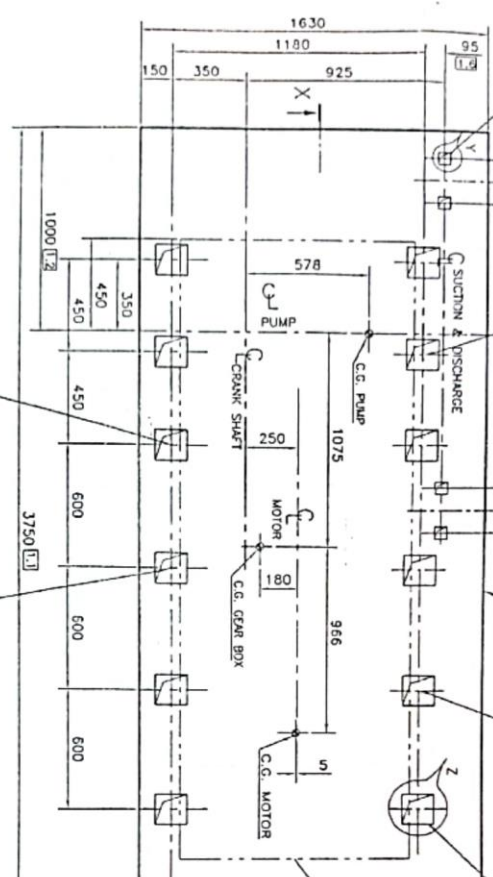


4 - POCKETS FOR FOUNDATION BOLTS

DYNAMIC LOAD OF 70 Kgf ACTING AT EACH FOUNDATION POCKET IN THIS SIDE IN DOWNWARD DIRECTION

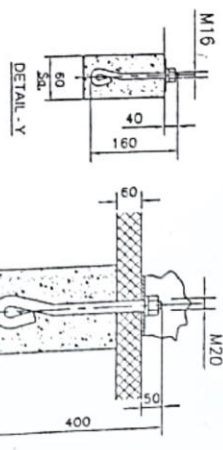
STATIC FORCE OF 212 Kgf ACTING AT EACH FOUNDATION POCKET IN THIS SIDE IN DOWNWARD DIRECTION

12 - POCKETS FOR FOUNDATION BOLTS



DYNAMIC LOAD OF 70 Kgf ACTING AT EACH FOUNDATION POCKET IN THIS SIDE IN UPWARD DIRECTION

STATIC FORCE OF 228 Kgf ACTING AT EACH FOUNDATION POCKET IN THIS SIDE IN DOWNWARD DIRECTION



NOTES:-

1. TOTAL HEIGHT OF FOUNDATION SHALL BE DECIDED BY PURCHASER.
2. FOUNDATION POCKET SHALL BE FULL GROUTED TYPE AND GROUTING SHALL BE IN PURCHASER'S SCOPE.
3. REFER GENERAL ARRANGEMENT DEC. No. 1-900-277/2

APPROVAL

CUSTOMER: M/S BRAHMAPUTRA CRACKER & POLYMER LTD., DULAIAN

PROJECT: BPCP

SITE: DULAIAN

SERVICE: ORCLATION PUMP

DATE: 29-05-2010

REVISIONS

DATE: 07/05/2010

BY: SHALINI

CHD: MR

APPD: D. S. S. S.

SCALE: 4SK10999

WT. KG.

REV. 1

For Approval

21/05/10

Bharat Pumps & Compressors Ltd.

Naini, Allahabad

ORIGINAL WAS:-

1.1 DIM. 3600

1.2 DIM. 850

1.3 DIM. 660

1.4 DIM. 571

1.5 POSITION OF FOUNDATION POCKETS CHANGED

1.6 M/S EL'S COMMENT INCORPORATED.

REVISIONS

BHARAT PUMPS & COMPRESSORS LTD.

NAINI ALLAHABAD

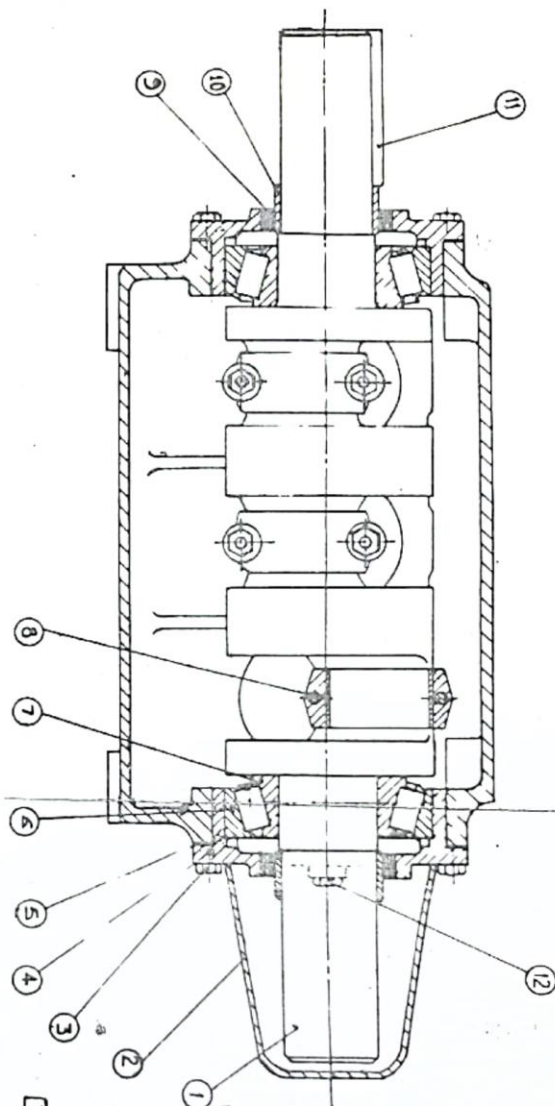
FOUNDATION DETAIL

(FOR PUMP TYPE A334 (43-7))

(S.O.No. 102010004-01)

APPROVED / REVIEWED
 APPROVED / REVIEWED CODE
 DATE
 NAME
 6/24/157

Customer : M/S Brahmputra Cracker
 and Polymer Limited
 Consultant : M/s EIL, Kolkata
 Job No. : 6907
 Item No. : 012-P-001 A/B
 PR No. : 6907-012-PA-PR-5095/4107
 PO. NO. : 25-06-10
 DTD. 25-06-10
 PO. NO. : 6907/MR-5095/PO-4107
 PROJECT : Brahmputra Petrochemical
 Complex Projects
 Site : Duliajan
 Service : Circulation Pump
 Pump Model: A334 (43-7)
 BPC S/O Ref.: 102010004-01



For Approval
 Bharat Pumps & Compressors Ltd.
 Main, Allahabad
 12/08/12

PARTS LIST

SL NO	DESIGNATION	DESCRIPTION	QTY	MAT
1	321 121 005	CRANK SHAFT	1	CASTAL TYPE A5 IS 613
2	964 156 002	COVER CRANK SHAFT	1	CASTAL TYPE A5 IS 613
3	5-7/2 111 063	HEX. SCREW M16 X 40	16	ASTM A193 GR B7
4	931 125 006	MAIN BRG. HOUSING	2	CASTAL TYPE A5 IS 613
5	931 139 017	SHIM SET BRG. HOUSING	2	CASTAL TYPE A5 IS 613
6	752 700 203	CUP MAIN BRG.	2	CASTAL TYPE A5 IS 613
7	752 700 110	CONE MAIN BRG.	2	CASTAL TYPE A5 IS 613
8	921 124 017	BEARING CRANK PIN	1 SET	SKF 6205
9	931 123 024	OIL SEAL	2	SKF 6205
10	981 137 004	SPACER	2	SKF 6205
11	743 301 504	PARALLEL KEY 28x16 x15	1	SKF 6205
12	5-7/2 111 861	HEX SCREW M16 X 30 LG.	2	ASTM A193 GR B7

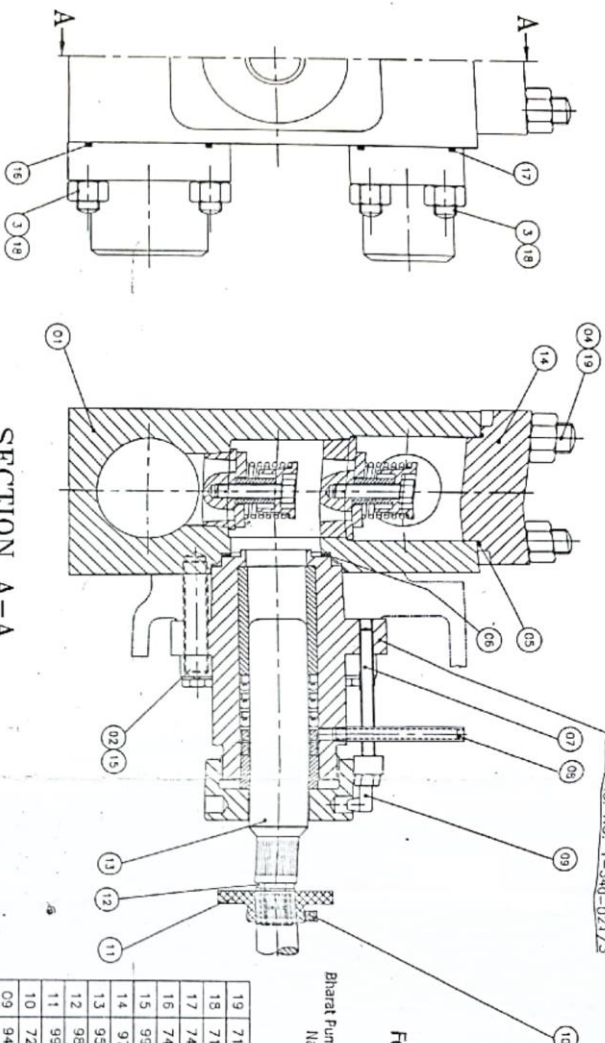
bpc BHARAT PUMPS & COMPRESSORS LTD.
 MAIN - ALLAHABAD

ASSEMBLY CRANK SHAFT
 A324, A334, A344, PLUNGER PUMPS

NO.	DATE	NO.	DATE	NO.	DATE
1	11-1-95	2	15-5-86	3	28-2-83
BY -		BY -		BY -	
APPRO.		APPRO.		APPRO.	
3	15-5-86	2	15-5-86	1	28-2-83
ORIGINAL WAS		ORIGINAL WAS		DRG NO. WAS	
3.1 DT. 10 AT SN. 3		2.0 MATERIAL STEEL		1-120-001/3	
3.2 DT. 2 AT SN. 8					

ISSUED BY	PUMP DESIGN ENGG.	DATE	CHD.	APPRO.
UNSPECIFIED	SUPERSEDED	25-6-81		
MACHINING	SUPERSEDED			
TOLERANCES				
1 TO 33.3 0.1				
33 TO 100 0.15				
100 TO 300 0.2				
300 TO 1000 0.3				
1000 TO 3000 0.4				
3000 TO 10000 0.5				
10000 TO 30000 0.6				
30000 TO 100000 0.8				
100000 TO 300000 1.0				
300000 TO 1000000 1.2				
1000000 TO 3000000 1.5				
3000000 TO 10000000 2.0				
10000000 TO 30000000 2.5				
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1000 TO 3000 42.5				
3000 TO 100 43.0				
100 TO 300 43.5				
300 TO 1000 44.0				
1000 TO 3000 44.5				
3000 TO 100 45.0				
100 TO 300 45.5				
300 TO 1000 46.0				
1000 TO 3000 46.5				
3000 TO 100 47.0				
100 TO 300 47.5				
300 TO 1000 48.0				
1000 TO 3000 48.5				
3000 TO 100 49.0				
100 TO 300 49.5				
300 TO 1000 50.0				

MATERIAL -
 FINISH IN BICROMET
 SURFACE
 0.8
 1-120-006/3 REV 3



SECTION A-A

* Code-1: Subjective to comment as per attached sheet.


 SPECIAL INFORMATION
 SPECIAL INFORMATION
 RECEIVED FOR THE
 Signature & Name John Brown
 Date 11/10/87
 Agency/Date WPA

ITEM NO.	PART NO.	DESCRIPTION	QTY	MATERIAL	REMARKS
19	715117014	HYV. HEX NUT M24	12	ASTM A194 GR. 2H	
18	715117013	HEAVY HEX. NUT M22	16	ASTM A194 GR. 2H	
17	741201540	O-RING ID B3 X CHORD DIA 5	2	VITON	
16	741201541	O-RING ID 114 X CHORD DIA 5	2	VITON	
15	993119002	RECESSED NUT #24	12	ASTM A140	
14	951314041	VALVE COVER	3	ASTM A471 TYPE 316	
13	951331191	PLUNGER CO-HAND 2-5/8"	3	ASTM A471 TYPE 316	
12	9813356001	PLUNGER ADAPTER	3	COLUMBIUM-5 CR-60	
11	991339015	WATER BATTLE	3	ASTM A140	
10	724205010	HOSE CLIP 70 A	3	CLAMUSED STEEL	
09	941349001	GLAND PAKL	3	ASTM A216 GR. WCB	
08	981349053	NPTF 1/4" NPT(M) 1/8" F(F) X 150 Lg.	3	ASTM A197 GR. 316	
07	711112065	BOLT HEX. HD. M36 X 125 Lg.	3	ASTM A140	
06	981319070	GASKET MOULDED	3	KEE205 RFR WITH BRGR	
05	741201507	O-RING ID 108 X CHORD DIA 3	3	VITON	
04	714111080	FULLY THD. STUD M24 X 110 Lg.	12	ASTM A193 GR. B7	
03	714111135	FULLY THD. STD. M22 X 90 Lg.	16	ASTM A193 GR. B7	
02	714111029	FULLY THD. STUD M24 X 130 Lg.	12	ASTM A193 GR. B7	
01	971311119	FLUD END STUDDED (Ref Item no. 2,3 & 4)	1	ASTM A471 TYPE 316	

BILL OF MATERIAL

BHARAT PUMPS & COMPRESSORS LTD
NAINI ALAHABAD

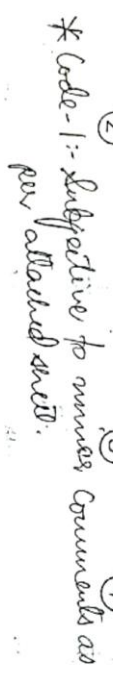
DATE BY		DATE BY		DATE BY		DATE BY	
APPD		APPD		APPD		APPD	
REVISIONS							
ISSUED BY		RP DESIGN		SUPERSEDES		SUPERSEDED BY	
DATE		08/06/2010		DRN		SHALINI	
CHD		JMP		APPD		Sd/	
PUMP A334 PLUNGER SIZE 2-5/8"				FLUID END ASSLY.			
MATL				SCALE - WT. - KG			
ASSLY.DRG.				REV			
REF.DRG.				0			

BHARAT PULP & COMPRESSIONS LTD.
Naini, Aliahbad 211010

A. P. C. S. U. No. 122291992-01
Customer M/S. BHIMMIPURAN BLOCKERS & POLYMER LTD.
Purchaser's Order - f
6901/MR.-5905/FOR-4407. DATE D. 28/05/2019

JOB NO. 5907
PROJECT BRHMIMPURAN BLOCKERS & POLYMER PROJECT
Item No. 012-P-001A/B
Pump No. 01. J34/G3-J2
Qty 2 NOS.

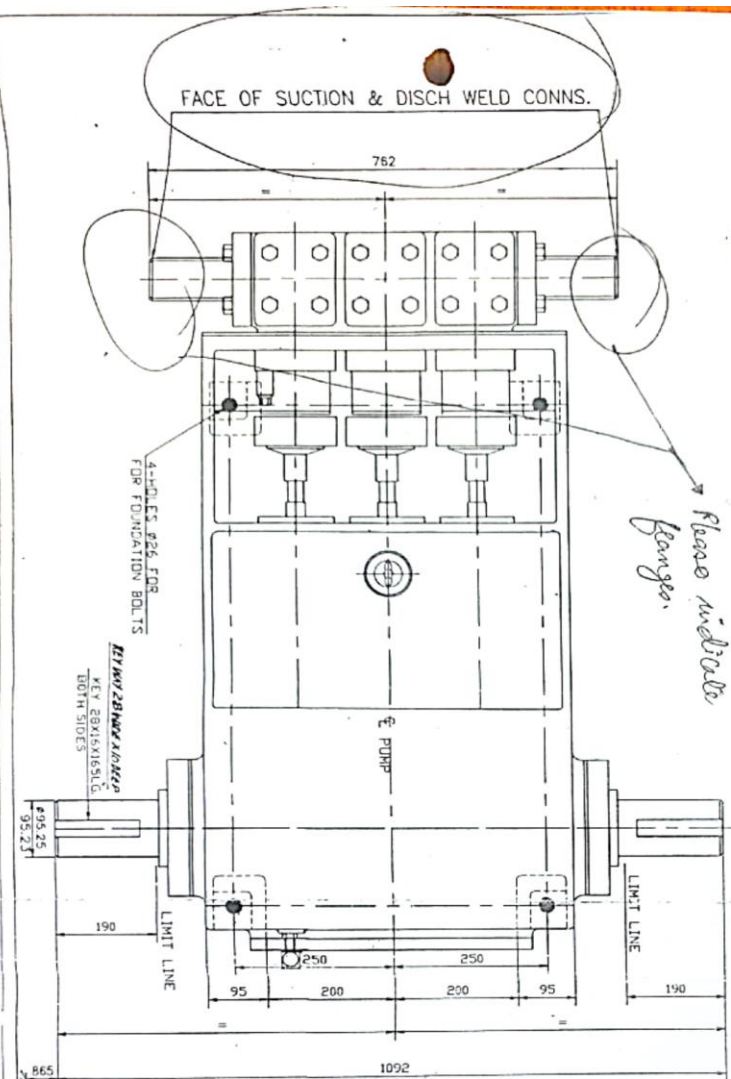
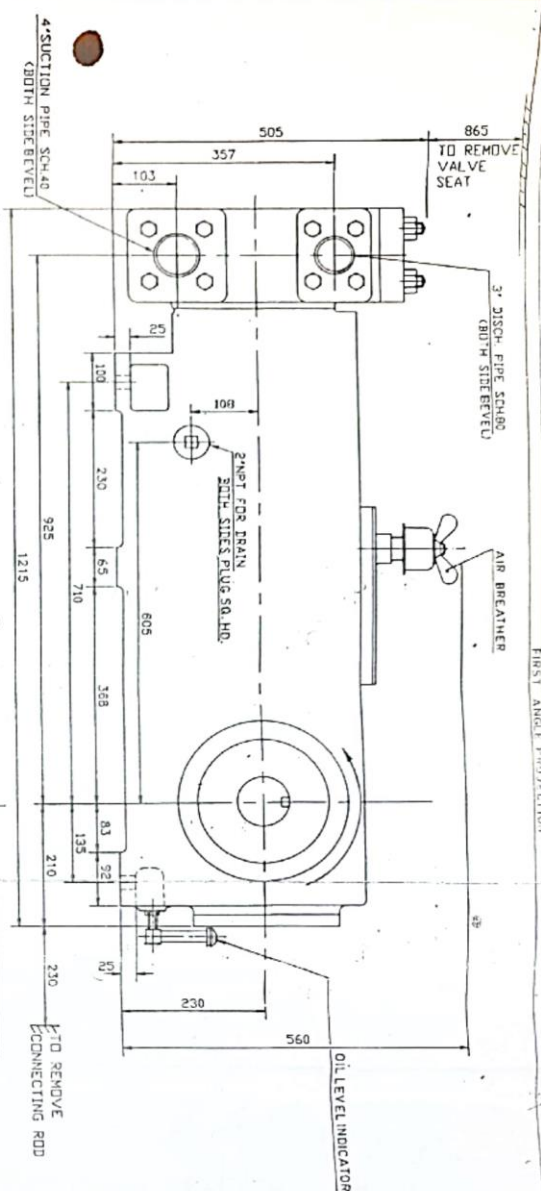
Pump No. 2-5/LB.D
Issued on _____
Approved by _____

For Approval

ITEM NO.	PART NO.	DESCRIPTION	QTY.	MATERIAL
6	941342066	GLAND STUFFING BOX (2-3/8" TO 2-5/8")	1	ASTM A414, CR. C-84
5	961347017	FOLLOWER GLAND 2-5/8"	1	ASTM B584, C93200
4	961349020	LANTERN RING 2-5/8" e	1	ASTM B584, C93200
3	921347214	PLUNGER PACKING SET 2-5/8" f	1 SETS	UTEX STYLE 858
2	961344021	BUSHING STUFFING BOX (2-5/8")	1	ASTM B584, C93200
1	971341125	STUFFING BOX (2-3/8" TO 2-5/8")	1	ASTM A414, TYPE 316

BIHARAT PUMPS & COMPRESSORS LTD.
NAINI ALAHABAD

DATE	DATE	ISSUED / BY	PDE / RP	 भारत पम्प & कंप्रेसर्स लि. BIHARAT PUMPS & COMPRESSORS LTD. NAINI ALLAHABAD	STUFFING BOX ASSLY. 4" STROKE PUMP	MATL. SEE TABLE ASSLY. DRG. - REF. DRG. -	SCALE - WT. - KG. - REV. 0			
BY	BY							SUPERSEDES	SUPERSEDED BY	DATE
APPROD	APPROD							-	-	
REVISIONS		1. UNOBSERVED MODIFICATIONS 0-730 4013 15-750 4013 APPROVED 40-80" DESIGN MARK 1. CHECK ERRORS 2. CHECK FINISH IN WORKS 3. DRAW 1 THIS								
		CHD	MD	APPROD						



*Please indicate
Ganges*

* Code - 1 :- Subjective to consultant as
indicated.

Customer : M/s Brahmputra Cracker
and Polymer Limited
Consultant : M/s EIL Kolkata
Job No. : 6907
Item No. : 012-P-001 A/B
PR. No. : 6907-012-PA-PR-5095/4107
25-06-10
PO. NO. : 6907/MR-5085/PO-4107
25-06-10
POJECT : Brahmputra Petrochemical
Complex Projects
Site : Duttajian
Service : Circulation Pump
Pump Model: A334 (43-7)
BPC S/O Ref.: 102010004-01

APPROVAL

DESIGNED BY: *[Signature]*
CHECKED BY: *[Signature]*
APPROVED BY: *[Signature]*
DATE: 10/09/2006

PROJECT & NAME: *[Signature]*
DRAWING NO: 6907/157

REVISIONS

NO.	DATE	BY	REASON
1	17-10-81	J.N. SANKAR	
2	14/12		

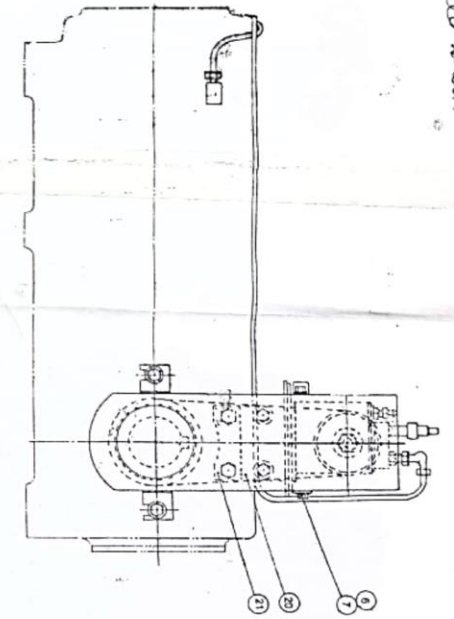
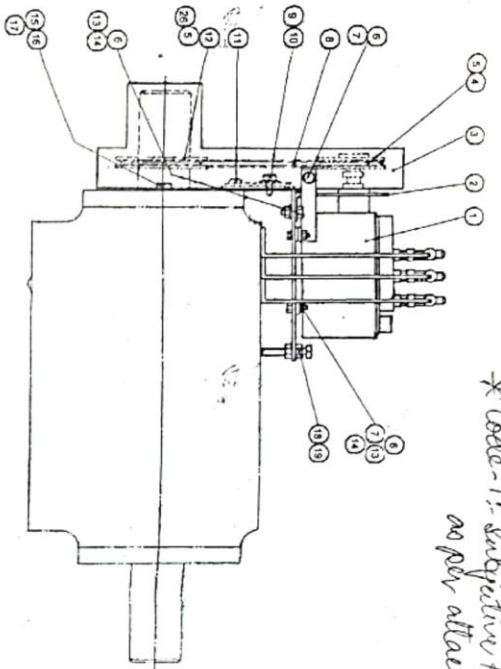
PUMP DESIGN ENGR: *[Signature]*
SUPERVISOR: *[Signature]*

OUT LINE OF A334 (43-7)
TRIPLEX PLGR. PUMP

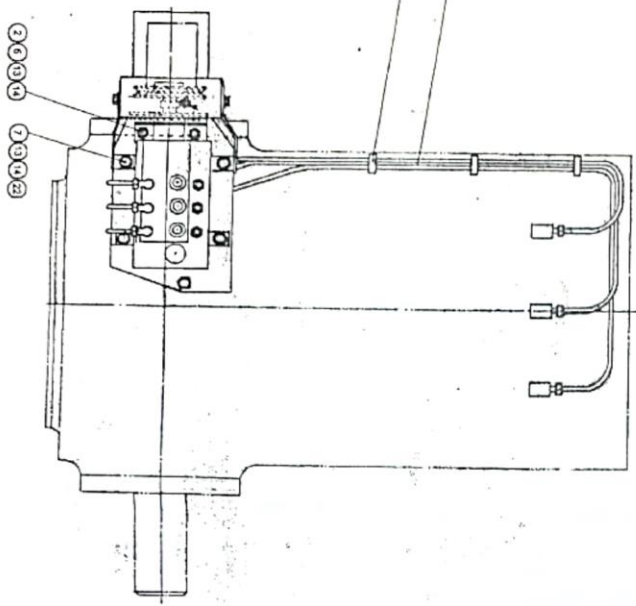
SCALE: 5
VT. - KG
REV. 0

PR. NO.: 6907-051-PA-PR-5095/4107

* Code-1: Subjective to minor omissions as per attached sheet.



BHARAT PUMPS & CO. (PAGES-0)
 Naini, Allahabad 211010
 G.P. U.S.O. No. 1020/2004-H-01
 C.I. METAL 2.30MM DIA 69.5mm x 69.5mm x 69.5mm
 PUMP NO. 6907/100-1001/1001, D.P. 100/200/200
 Job No. 6907
 Project: BHARAT PUMPS & CO. (PAGES-0)
 Item No. 6907/100-1001/1001, D.P. 100/200/200
 Pump Model: 6907/100-1001/1001, D.P. 100/200/200
 Plunger size: 100/200/200
 Issued on: 10/10/2004
 Approved by: [Signature]



For Approval
 M.L.
 24/10/11
 Bharat Pumps & Compressors Ltd.
 Naini, Allahabad

Approved: [Signature]
 14/10/10
 6907/88

Sl. No.	Description	Material	Qty
1	CAST IRON	ASTM A118	1
2	STEEL	ASTM A118	1
3	STEEL	ASTM A118	1
4	STEEL	ASTM A118	1
5	STEEL	ASTM A118	1
6	STEEL	ASTM A118	1
7	STEEL	ASTM A118	1
8	STEEL	ASTM A118	1
9	STEEL	ASTM A118	1
10	STEEL	ASTM A118	1
11	STEEL	ASTM A118	1
12	STEEL	ASTM A118	1
13	STEEL	ASTM A118	1
14	STEEL	ASTM A118	1
15	STEEL	ASTM A118	1
16	STEEL	ASTM A118	1
17	STEEL	ASTM A118	1
18	STEEL	ASTM A118	1
19	STEEL	ASTM A118	1
20	STEEL	ASTM A118	1
21	STEEL	ASTM A118	1
22	STEEL	ASTM A118	1
23	STEEL	ASTM A118	1
24	STEEL	ASTM A118	1
25	STEEL	ASTM A118	1

PART LIST

BHARAT PUMPS & COMPRESSORS LTD.
 NAINI, ALLAHABAD
 LUBRICATOR ASSEMBLY
 1-730-02611

