Mechanical Data Sheet for Treated Water Pump (3000-PU-003A/B)

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CENTRIFUGAL PUMP DATA SHEET

Note			Rev
	APPLICABLE TO: **PROPOSAL**	APPLICABLE NTL/INTNTL STANDARD:	
	FOR **NIOC**	UNIT **300**	
	SITE **Azar Oil Field Development**	SERVICE **TREATED WATER PUMP**	
	NO. REQ **2** PUMP SIZE	TYPE No. STAGES **1**	
	MANUFACTURER	MODEL SERIAL NO.	

LIQUID CHARACTERISTICS

	Units	Maximum	Minimum	Note
LIQUID TYPE OR NAME :	**TREATED WATER**			Max & min values refer only to the property listed
VAPOR PRESSURE :	bar a	**1.086**		
RELATIVE DENSITY :		**0.1**	**0.98**	
SPECIFIC HEAT :	kJ/(kg-K)			
VISCOSITY :	cP	**0.9**	**0.463**	

SERVICE : **CONTINUOUS**

PUMPS OPERATE IN:

CORROSION DUE TO : (6.12.1.9) **H2S**

EROSION DUE TO : (6.12.1.9)

H2S CONCENTRATION (ppm) : (6.12.1.: **(Note 1)**

CHLORIDE CONCENTRATION (ppm) :

PARTICULATE SIZE (DIA IN MICRONS)

PARTICULATE CONCENTRATION (PPM)

OPERATING CONDITIONS (6.1.2)

Note		Units	Maximum	Rated	Normal	Minimum
	NPSHa Datum:			**C.L. Impeller**		
	PUMPING TEMPERATURE :	°C		**60**	**55.2**	**-1**
21	FLOW :	m³/h		**51.4 +MSF**	**46.7 + MSF**	
	DISCHARGE PRESSURE:(6.3.2)	bar g		**5**		
	SUCTION PRESSURE :	bar g	**1.02**			**0.4**
	DIFFERENTIAL PRESSURE :	bar		**4.6**		
3	DIFFERENTIAL HEAD :	m		**47.40**		
31	$NPSH_A$:	m		**3.73**		
	HYDRAULIC POWER :	kW		**8.86**		

SITE AND UTILITY DATA

LOCATION:

8 **OUTDOOR** **UNHEATED** **UNDER ROOF**

MOUNTED AT : **GRADE** ● TROPICALISATION REQD

ELECTRIC AREA CLASSIFICATION 6.1.22 ZONE **Safe**

GROUP TEMP CLASS

SITE DATA :

ELEVATION (MSL) : **72** m **BAROMETER :** mmHg

RANGE OF AMBIENT TEMPS:MIN / MAX **-1** / **51.8** °C

RELATIVE HUMIDITY: MIN / MAX **37** / **81** %

UNUSUAL CONDITIONS: **DUST**

4 ● OTHER

UTILITY CONDITIONS :

	ELECTRICITY :	DRIVERS	HEATING	CONTROL	SHUTDOWN
29,30	VOLTAGE	**400**	**230**		
	PHASE	**3**	**1**		
	HERTZ	**50**	**50**		

COOLING WATER :

	INLET	RETURN	DESIGN	
TEMP °C		MAX		
PRESS psig		MIN		
SOURCE				

COOLING WATER CHLORIDE CONCENTRATION ppm

INSTRUMENT AIR : MAX bar g MIN bar g

STEAM

		DRIVERS	HEATING
TEMP °C	Max		
	Min		
PRESS. bar g	Max		
	Min		

PERFORMANCE

PROPOSAL CURVE NO. RPM

As Tested Curve No.

IMPELLER DIA RATED MAX. MIN. mm

RATED POWER kW EFFICIENCY (%)

RATED CURVE BEP FLOW (at rated impeller dia) m³/h

MIN FLOW THERMAL m³/h STABLE m³/h

PREFERRED OPERATING REGION(6.1. to m³/h

ALLOWABLE OPERATING REGION to m³/h

MAX HEAD @ RATED IMPELLER m

MAX POWER @ RATED IMPELLER (6.8.9) kW

NPSHR AT RATED FLOW : m

CL PUMP TO U/S BASEPLATE m

NPSH MARGIN AT RATED FLOW : m

SPECIFIC SPEED (6.1.9) m3/h, rpm, m

SUCTION SPECIFIC SPEED LIMIT **13000 rpm, m3/hr, m**

SUCTION SPECIFIC SPEED m3/h, rpm, m

MAX. ALLOW. SOUND PRESS. LEVEL REQD (6.1.1 **85** (dBA)

EST MAX SOUND PRESS. LEVEL (dBA)

MAX. SOUND POWER LEVEL REQ'D (6.1.14)

EST MAX SOUND POWER LEVEL

DRIVER (7.1.5)

Driver Type **(Note 5)** **MOTOR**

GEAR **NO**

VARIABLE SPEED REQUIRED **NO**

SOURCE OF VARIABLE SPEED

OTHER

MANUFACTURER

NAMEPLATE POWER kW

Nominal RPM

RATED LOAD RPM

FRAME OR MODEL

ORIENTATION **HORIZONTAL**

LUBE

BEARING TYPE:

RADIAL **/**

THRUST **/**

STARTING METHOD **Closed-Valve (Unloaded) Start**

SEE DRIVER DATA SHEET **Data Sheet for LV Induction Motors ARCP-F000GG-ENEL-DSEL-0032**

CENTRIFUGAL PUMP DATA SHEET

Note	CONSTRUCTION	Rev

API PUMP TYPE: OH2 [Based on API 610 definitions]

NOZZLE CONNECTIONS: (6.5.5) 0

	Size	Facing	Rating	Position
SUCTION		RF	300	END
DISCHARGE		RF	300	TOP

PRESSURE CASING AUX. CONNECTIONS: (6.4.3.2)

	No.	Size	Type	Facing	Rating	Posn.
BALANCE/LEAK OF						
7 DRAIN						
7 VENT						
PRESSURE GAGE						
TEMP GAGE						
WARM-UP LINE						

Drain Valve Supplied By: SUPPLIER
DRAINS MANIFOLDED: YES
VENT Valve Supplied By: SUPPLIER
VENTS MANIFOLDED: NO
THREADED CONS FOR PIPELINE SERVICE & < 50°C (6.4.3.2)
SPECIAL FITTINGS FOR TRANSITIONING (6.4.3.3)
CYLINDRICAL THREADS REQUIRED (6.4.3.8)
GUSSET SUPPORT REQUIRED
MACHINED AND STUDDED CONNECTIONS (6.4.3.12)
VS 6 DRAIN
DRAIN TO SKID EDGE: YES

MATERIAL (6.12.1.1)

9 APPENDIX H CLASS
MIN DESIGN METAL TEMP (6.12.4.1): -1 °C
REDUCED-HARDNESS MATERIALS REQ'D (6.12.1.12.1): YES
Applicable Hardness Standard (6.12.1.12.3): MR0175
BARREL :
32 CASE : 6MO
DIFFUSERS
IMPELLER : 6MO
IMPELLER WEAR RING : 6MO- Hard Faced
CASE WEAR RING : 6MO- Hard Faced
SHAFT: A182 F44
Bowl (if VS-type)
Inspection Class: Level 3

BEARINGS AND LUBRICATION (6.10.1.1)

BEARING (TYPE / NUMBER): (6.11.4)
RADIAL /
THRUST /
REVIEW AND APPROVE THRUST BEARING SIZE : (9.2.5.2.4)

LUBRICATION : (6.10.2.2) (6.11.3) (9.6.1)
PRESSURE LUBE SYSTEM TO ISO 10438- (9.2.6.5
ISO 10438 DATA SHEETS ATTACHED
Pressurized Lube Oil System mtd on pump baseplate
Location of Pressurized Lube Oil System mounted on baseplate :
INTERCONNECTING PIPING PROVIDED BY
OIL VISC. ISO GRADE VG
CONSTANT LEVEL OILER : REQUIRED

CASING MOUNTING: CENTERLINE
CASING TYPE: (6.3.10)
OH3 BACKPULLOUT LIFTING DEVICE REQD. (9.1.2.6)
CASE PRESSURE RATING:
(Note 25) MAWP : (6.3.6) barg @ 96.00 °C
HYDROTEST : 1.5*MAWP barg @ °C

HYDROTEST OH PUMP AS ASSEMBLY: YES
SUCT'N PRESS. REGIONS DESIGNED FOR MAWP: YES
ROTATION: (VIEWED FROM COUPLING END)
- IMPELLERS INDIVIDUALLY SECURED :
- BOLT OH 3/4/5 PUMP TO PAD / FOUNDATION :
- PROVIDE SOLEPLATE FOR OH 3/4/5 PUMPS

ROTOR:
SHAFT FLEXIBILITY INDEX (SFI) (9.1.1.3)
First Critical Speed Wet (Multi stage pumps only)
COMPONENT BALANCE TO ISO 1940 G1.0: YES
SHRINK FIT -LIMITED MOVEMENT IMPELLERS (9.2.2.3)

COUPLING:(7.2.3) (7.2.13.f) (Note 10)
MANUFACTURER
MODEL
RATING (POWER/100 RPM)
SPACER LENGTH: Min. 140 mm
SERVICE FACTOR: Min.1.5
RIGID: NO
COUPLING WITH HYDRAULIC FIT (7.2.10)
COUPLING BALANCED TO ISO 1940-1 G 2.5 (7.2.3): YES
COUPLING WITH PROPRIETARY CLAMPING DEVICE (7.2.11)
COUPLING IN COMPLIANCE WITH (7.2.4): API 610 compliant
COUPLING GUARD STANDARD PER (7.2.13.a): API 671 Annex H(Note 11)
Window on Coupling Guard

BASEPLATE

API BASEPLATE NUMBER :
BASEPLATE CONSTRUCTION (7.3.1: FULL TOP DECKING
BASEPLATE DRAINAGE (7.3.1): Entire Baseplate Drain Pan
MOUNTING : (Note 12): GROUTED
NON-GROUT CONSTRUCTION : (7.3.: NOT REQUIRED
VERTICAL LEVELING SCREWS : REQUIRED
LONGITUDINAL DRIVER POSITIONING SCREW: REQUIRED
SUPPLIED WITH
- GROUT AND VENT HOLES: YES
- DRAIN CONNECTION: YES

MOUNTING PADS SIZED FOR BASEPLATE LEVELING (7.3.5): YES
MOUNTING PADS TO BE MACHINED (7.3.6): YES
PROVIDE SPACER PLATE UNDER ALL EQUIPMENT FEET
OTHER

REMARKS :

CENTRIFUGAL PUMP DATA SHEET

Note	INSTRUMENTATION		Rev
	SEE ATTACHED API-670 DATA SHEET	N / A	
	ACCELEROMETER (7.4.2.1)		
	Number of Accelerometers	0	
	Mounting Location of Accelerometers		
	PROVISION FOR MTG ONLY (6.10.2.10)		
	Number of Accelerometers		
	Mounting Location of Accelerometers		
	FLAT SURFACE REQUIRED (6.10.2.11)		
	Number of Accelerometers		
	Mounting Location of Accelerometers		
	VIBRATION PROBES (7.4.2.2)		
	PROVISIONS FOR VIB. PROBES	NO	
	NUMBER PER RADIAL BEARING		
	NUMBER PER AXIAL BEARING		
	MONITORS AND CABLES SUPPLIED BY (7.4.2.4)		
	TEMPERATURE (7.4.2.3)		
	PROVISIONS FOR TEMP PROBES	NO	
	RADIAL BEARING TEMP.	NO	
	NUMBER PER RADIAL BEARING		
	THRUST BEARING TEMP.	NO	
	NUMBER PER THRUST BEARING ACTIVE SIDE		
	NUMBER PER THRUST BEARING INACTIVE SID		
	TEMP. GAUGES (WITH THERMOWELLS) (9.1.3.6)		
	PRESSURE GAUGE TYP		
	Remarks		

SEAL SUPPORT SYSTEM MOUNTING	
SEAL SUPPORT SYSTEM MOUNTED ON PUMP BASEPLATE (7.5.1.4)	YES
IDENTIFY LOCATION ON BASEPLATE	
INTERCONNECTING PIPING BY	Supplier

MECHANICAL SEAL (6.8.1) (Note 13)	
SEE ATTACHED ISO 21049/API 682 DATA SHEET	(Note 19)
ADDITIONAL CENTRAL FLUSH POR (6.8.9)	
HEATING JACKET REQ'D. (6.8.11)	NO

HEATING AND COOLING (6.1.17)		
COOLING REQ'D		
COOLING WATER PIPING PLAN		
COOLING WATER PIPING FITTINGS		
COOLING WATER PIPING MATERIALS		
COOLING WATER REQUIREMENTS:		
BEARING HOUSING		m^3/h
HEAT EXCHANGER		m^3/h
TOTAL COOLING WATER		m^3/h
HEATING MEDIUM		
OTHER		
HEATING PIPING		

PIPING & APPURTENANCES	
MANIFOLD PIPING FOR PURCHASER CONNECTION (7.5.1.6)	
VENT	YES
DRAIN	YES
COOLING WATER	
TAG ALL ORIFICES (7.5.2.4)	YES
SOCKET WELD CONN ON SEAL GLAND (7.5.2.8	

CENTRIFUGAL PUMP DATA SHEET

Note	SURFACE PREPARATION AND PAINT		TEST (Note 16)		Rev
	MANUFACTURER'S STANDARD	NO	SHOP INSPECTION (8.1.1)	YES	
	OTHER (SEE BELOW)	YES	PERFORMANCE CURVE		
	SPECIFICATION NO. ARCP-G000GG-ENPI-SPPA-0001		& DATA APPROVAL PRIOR TO SHIPMENT.	YES	
			TEST WITH SUBSTITUTE SEAL (8.3.3.2.b)	NO	
	PUMP:		MATERIAL CERTIFICATION REQUIRED CASING	YES	
	PUMP SURFACE PREPARATION	YES	(6.12.1.8) IMPELLER	YES	
	PRIMER	YES	SHAFT	YES	
	FINISH COAT	YES	(Note 17) OTHER	YES	
			CASTING REPAIR WELD PROCEDURE APPR REQD (6.12.2.5) (6.12.3.1)	YES	
	BASEPLATE:		INSPECTION REQUIRED FOR CONNECTION WELDS (6.12.3.4.d)		
	BASEPLATE SURFACE PREPARATION	YES	(6.12.3.4.e) MAG PARTICLE	YES	
	PRIMER:	YES	RADIOGRAPHY		
	FINISH COAT	YES	LIQUID PENETRANT	YES	
	DETAILS OF LIFTING DEVICES	YES	ULTRASONIC		
			INSPECTION REQUIRED FOR CASTINGS		
	SHIPMENT: (8.4.1)	EXPORT	MAG PARTICLE	YES	
	EXPORT BOXING REQUIRED	YES	RADIOGRAPHY		
	OUTDOOR STORAGE MORE THAN 12 MONTHS	YES	LIQUID PENETRANT	YES	
			ULTRASONIC		
	SPARE ROTOR ASSEMBLY PACKAGED FOR:		HARDNESS TEST REQUIRED (8.2.2.7)	YES	
	ROTOR STORAGE ORIENTATION (9.2.8.2)		ADDNL SUBSURFACE EXAMINATION (6.12.1.5) (8.2.1.3)	YES	
	SHIPPING & STORAGE CONTAINER FOR VERT STORAGE (9.2.8.3)		FOR	UT for SHAFT	
	N2 PURGE (9.2.8.4)		METHOD		
14	**SPARE PARTS**		PMI TESTING REQUIRED (8.2.2.8)	YES	
	START-UP	YES	COMPONENTS TO BE TESTED		
	NORMAL MAINTENANCE	YES	INCLUDING ALL ALLOY STEEL PARTS		
			RESIDUAL UNBALANCE TEST (J.4.1.2)	YES	
	WEIGHTS Kg		NOTIFICATION OF SUCCESSFUL SHOP		
	ITEM No / PUMP / DRIVER / GEAR / BASE / TOTAL		PERFORMANCE TEST (8.1.1.c) (8.3.3.5)	YES	
			BASEPLATE TEST (7.3.21)		
			HYDROSTATIC	WIT	
			HYDROSTATIC TEST OF BOWLS & COLUMN (9.3.13.2		
	OTHER PURCHASER REQUIREMENTS		PERFORMANCE TEST	WIT	
	COORDINATION MEETING REQUIRED (10.1.3)	YES	TEST IN COMPLIANCE WITH (8.3.3.2)	8.3.3.2	
	MAXIMUM DISCHARGE PRESSURE TO INCLUDE		TEST DATA POINTS TO (8.3.3.3)	8.3.3.3	
	MAX RELATIVE DENSITY	YES	TEST TOLERANCES TO (8.3.3.4)	TABLE 16	
	OPERATION TO TRIP SPEED		NPSH (8.3.4.3.1) (8.3.4.3.4) (Note 18)	WIT	
	MAX DIA. IMPELLERS AND/OR NO OF STAGES	YES	NPSH-1ST STG ONLY (8.3.4.3.2)		
	CONNECTION DESIGN APPROVAL (9.2.1.4)		NPSH TESTING TO HI 1.6 OR ISO 9906 (8.3.4.3.3)		
	TORSIONAL ANAL 12 Mar. 2019	NO	TEST NPSHA LIMITED TO 110% SITE NPSHA (8.3.3.6)		
	PROGRESS REPORTS	YES	RETEST ON SEAL LEAKAGE (8.3.3.2.d)	OBSERVE	
	OUTLINE OF PROC FOR OPTIONAL TESTS (10.2.5)		RETEST REQUIRED AFTER FINAL HEAD ADJ (8.3.3.7		
	ADDITIONNAL DATA REQUIRING 20 YEARS RETENTION (8.2.1.1)		COMPLETE UNIT TEST (8.3.4.4.1)	WIT	
			SOUND LEVEL TEST (8.3.4.5)	WIT	
	LATERAL ANALYSIS REQUIRED (9.1.3.4) (9.2.4.1.3)		CLEANLINESS PRIOR TO FINAL ASSEMBLY (8.2.2.6)	NON-WIT	
	MODAL ANALYSIS REQUIRED (9.3.9.2)		LOCATION OF CLEANLINESS INSPECTION		
	DYNAMIC BALANCE ROTOR (6.9.4.4)	YES	NOZZLE LOAD TEST		
	INSTALLATION LIST IN PROPOSAL (10.2.3.l)		CHECK FOR CO-PLANAR MOUNTING PAD SURFACI		
	VFD STEADY STATE DAMPED RESPONSE ANALYSIS (6.9.2.3)		MECHANICAL RUN TEST UNTIL OIL TEMP STABLE		
			4 HR. MECH RUN AFTER OIL TEMP STABLE (8.3.4.2.	WIT	
	TRANSIENT TORSIONAL RESPONS (6.9.2.4)		4 HR. MECH RUN TEST (8.3.4.2.2)		
	BEARING LIFE CALCULATIONS REQUIRED (6.10.1.6	YES			
	IGNITION HAZARD ASSMT TO EN 13463-1 (7.2.13.e)		BRG HSG RESONANCE TEST (8.3.4.7)		
	CASING RETIREMENT THICKNESS DRAWING (10.3.		STRUCTURAL RESONANCE TEST (9.3.9.2)		
	FLANGES RQD IN PLACE OF SKT WELD UNIONS (7	YES	REMOVE / INSPECT HYDRODYNAMIC BEARINGS AFTER TEST (9.2.7.5)	WIT	
	INCLUDE PLOTTED VIBRATION SPECTRA (6.9.3.3)	YES			
15	CONNECTION BOLTING (7.5.1.7)		AUXILIARY EQUIPMENT TEST (8.3.4.6)	WIT	
	CADMIUM PLATED BOLTS PROHIBITED		EQUIPMENT TO BE INCLUDED IN AUXILLIARY TESTS		
	VENDOR TO KEEP REPAIR AND HT RCDS (8.2.1.1.c	YES			
	VENDOR SUBMIT TEST PROCEDURES (8.3.1.1)	YES	LOCATION OF AUXILIARY EQUIPENT TEST		
	SUBMIT INSPECTION CHECK LIST (8.1.5)	YES			
			IMPACT TEST (6.12.4.3) PER EN 13445		
			PER ASME SECTION VIII		
			REMOVE CASING AFTER TEST		

CENTRIFUGAL PUMP DATA SHEET

Note	PRESSURE VESSEL DESIGN CODE REFERENCES	Rev
	THESE REFERENCES MUST BE LISTED BY THE MANUFACTURER	
	CASTING FACTORS USED IN DESIGN (TABLE 3)	
	SOURCE OF MATERIAL PROPE 0	

WELDING AND REPAIRS

THESE REFERENCES MUST BE LISTED BY THE PURCHASER. (DEFAULT TO TABLE 11 IF NO PURCHASER PREFERENCE IS STATED)

ALTERNATE WELDING CODES AND STANDARDS	
WELDING REQUIREMENT (APPLICABLE CODE OR STANDARD)	**DEFAULT PER TABLE 11**
WELDER/OPERATOR QUALIFICATION	
WELDING PROCEDURE QUALIFICATION	
NON-PRESSURE RETAINING STRUCTURAL WELDING SUCH AS BASEPLATES OR SUPPORTS	
MAGNETIC PARTICLE OR LIQUID PENETRANT EXAMINATION OF PLATE EDGES	
POSTWELD HEAT TREATMENT	
POSTWELD HEAT TREATMENT OF CASING FABRICATION WELDS	

MATERIAL INSPECTION

THESE REFERENCES MUST BE LISTED BY THE PURCHASER DEFAULT TO TABLE 15

ALTERNATIVE MATERIAL INSPECTIONS AND ACCEPTANCE CRITERIA (SEE TABLE 15) (8.2.2.5)

TYPE OF INSPECTION	METHOD	FOR FABRICATIONS	FOR CASTINGS
RADIOGRAPHY			
ULTRASONIC INSPECTION			
MAGNETIC PARTICLE INSPECTION			
LIQUID PENETRANT INSPECTION			
VISUAL INSPECTION (all surfaces)			

REMARKS :

ted Water Pum

NOTES

Note		Rev
1	MAXIMUM H2S: 800 ppmWt, CO2:200 ppmWt. Chloride concentration: 152650 PPMW.	
2	Lethal service shall be considered.	
3	DISOLVED GAS IS INCLUDED.	
4	PUMP SHUT-OFF HEAD SHALL NOT EXCEED 120 % OF RATED POINT HEAD.	
5	REFER TO "PROCESS DESIGN BASIS", DOC.NO. ARCP-F000GG-ENPU-DBDS-0001.	
6	ELECTRIC MOTORS SHALL BE GOVERNED BY "SPECIFICATION FOR MEDIUM & HIGH VOLTAGE INDUCTION MOTOR"	
	DOC. NO. ARCP-G000GG-ENEL-SPEL-0012	
6	ALLOWABLE LOADS ON FLANGES SHALL BE TWICE AS PER API 610 ELEVENTH EDITION, TABLE 5.	
	FLANGED & VALVED.	
8	PUMPS WILL BE INSTALLED UNDER SHELTER.	
	PARTS MUST BE CONSIDERED BY VENDOR	
9	TO BE SPECIFIED BY VENDOR ACCORDING TO ANNEX H OF API 610, ELEVENTH EDITION; WITH CONSIDERING	
	THE MINIMUM REQUIREMENT OF CAST 6MO.	
10	DRY, METAL FLEXIBLE, SPACER TYPE COUPLING SHALL BE USED.	
11	COUPLING GUARDS SHALL BE CONSTRUCTED OF AGREED SPARK-RESISTANT MATERIAL	
12	GROUT TYPE SHALL BE SPECIFIED BY VENDOR COMPLETELY.	
13	MECHANICAL SEAL SHALL BE SELECTED AS PER API 682. DOUBLE MECHANICAL SEAL, PLAN 31+53B IS PROPOSED.	
	NO COOLING WATER IS AVAILABLE.	
14	SPARE PARTS FOR COMMISSIONING AND START UP AS WELL AS FOR 2 YEARS MUST BE CONSIDERED.	
	ALSO CAPITAL SPARE PART TO BE OFFERED AS OPTION.	
15	MATERIAL OF CONNECTION BOLTING SHALL BE IN ACCORDANCE WITH PUMP MATERIAL CLASS.	
16	FOR TEST AND INSPECTION, REFER TO "ITP FOR CENTRIFUGAL PUMPS", DOC. NO. ARCP-F000GG-HSQC-PLIT-0005	
17	OTHER REFERS TO AUXILIARY FLUID PROCESS PIPING, SLEEVE, WEAR RING, DISCHARGE BEND AND DIFFUSER. ALL	
	PRESSURE PART MATERIAL SHALL BE CERTIFIED AS EN10204 3.1	
18	NPSHR FOR THE SELECTED PUMP SHALL BE ONE METER LESS THAN THE AVAILABLE NPSH. FOR NPSH MARGIN LESS	
	THAN 1.5 METER, NPSH TEST SHALL BE PERFORMED. MOREOVER, NPSH LESS THAN 1 METER IS NOT ACCEPTABLE.	
19	VENDOR SHALL FURNISH FILLED IN API 682 SEAL DATA SHEET FOR THE PROPOSED PLAN FOR THE PUMP	
20	VENDOR SHALL FURNISH FILLED IN MOTOR DATA SHEET ALONG WITH PROPOSAL.	
21	TURN DOWN RATIO MUST BE 40% MINIMUM FLOW AT LEAST.	
22	DELETED	
23	VENDOR SHALL CONSIDER A DESIGN LIFE OF 30 YEARS AS A MINIMUM.	
24	CONSIDERING MINIMUM TEMPERATURE OF THE JOB SITE AND PUMPING FLUID TEMPERATURE, VENDOR SHALL	
	STUDY AND INFORM REQUIREMENT FOR INSULATION OF PUMPS' COMPONENTS.	
25	MAWP SHALL BE 40 BAR AT LEAST. HYDROSTATIC TEST PRESSURE MUST BE 1.5 TIMES OF MAWP.	
	TEMPERATURE WITH MAXIMUM IMPELLER INSTALLED.	
26	DELETED	
27	DELETED	
28	GENERAL SPECIFICATION FOR INSTRUMENTATION WITH DOC. NUMBER :ARCP-G000GG-ENIN-SPDI-0001 & SPECIFICATION	
	FOR INSTRUMENTATION OF PACKAGES WITH DOC. NUMBER :ARCP-G000GG-ENIN-SPDI-0002 SHALL BE CONSIDERED BY	
	VENDOR.	
29	HEATER VOLTAGE AND PHASE SHALL BE FINALIZED BY VENDOR BASE ON MOTOR RATE AND DIMENSIONS	
30	DELETED.	
31	SUCTION NOZZLE AXIS LEVEL HAS BEEN CONSIDERED FOR NPSHa CALCULATION AT MAX. 0.6 M FROM GROUND	
	LEVEL. VENDOR TO CONFIRM.	
32	THERE IS POSSIBILITY OF EXISTING SOLID PARTICLES INTO PROCESS FLUID.	
33	INLET LINE COMPOSITION WILL BE DIFFERENT IN CASE OF BYPASSING WASTE WATER PACKAGE AS BELLOW:	
	OIL : 800ppm, TDS: 200000ppm WITH SOLID PARTICLE.	