

OIL & GAS DEVELOPMENT COMPANY LIMITED
PROCUREMENT DEPARTMENT, ISLAMABAD
FOREIGN SECTION A

(To be completed, filled in, signed
and stamped by the principal)

ANNEXURE 'A'

PRODUCE WATER INJECTION PUMPS
 Enquiry No PROC-FA/CB/PROD/PUMP-4424/2019
 te 20-08-2019
 ion Criteria FULL

SCHEDULE OF REQUIREMENT

Description	Unit	Quantity	Unit Price (FOB)	Total Price (FOB)	Unit Price C & F BY SEA	Total Price C & F BY SEA	Deviated From Tender Spec. If Any
PRODUCED WATER INJECTION PUMPS, DETAL SPECIFICATION ATTACHED.	Number	3					

- 1 **Bid bond and Bid Validity**:-Pursuant to tender clause # 2.2, 11.4, 13 & 35.3.2, bid(s) must be accompanied by an upfront bid bond in the form of pay order/ demand draft or bank guarantee issued by scheduled bank of Pakistan or a branch of foreign bank operating in Pakistan, for an amount of **US\$ 10,500/-** (US\$ Ten thousand five hundred only) or equivalent Pak Rupees, with technical bid and valid for 150 days from the date of opening of the bids. The bank guarantee must be issued in accordance with the format as per Annexure-C of the tender documents.
2. **Shipment from ACU member Countries**: In case of shipment from ACU member countries, the LC beneficiary should be of that particular country from where the consignment is being shipped.
3. **Terms and conditions**:-Bidders are advice to carefully read all the terms and conditions of the Tender Document available at OGDCL web site in the master tender document.
4. **Summary rejection criteria**: - The summary rejection criteria at clause 35 of the tender document may also be examined carefully. Any bid not meeting the criteria spelled in the clause # 35 shall be summarily rejected without any right of appeal. The detailed tender document is available on OGDCL website as " **Master set of tender document-Foreign**".
- 5 **Payment Terms**: Clause No: 3 of Section-III (Part-B) i.e. Conditions of Contract "Special" of Tender Document has been amended and following will be the payments methods.
 - i. **Tender value less than or equal to US\$ 200,000**:-Payment to the Contractor/ bidder in foreign currency shall be made by establishing in favor of the Contractor an irrevocable Letter of Credit (hereinafter called the L/C). 70 % Payment (s) under the L/C will be made for the FOB/ CFR / CPT (as the ca se may be) price of material of each shipment upon submission of the shipping documents. Balance 30% Payment will be released after receipt, inspection and acceptance of material.
 - ii. **Tender value more than US\$ 200,000**: Payment to the Contractor/ bidder in foreign currency shall be made by establishing in favor of the Contractor an irrevocable Letter of Credit (hereinafter called the L/C). 80 % Payment (s) under the L/C will be made for the FOB/ CFR / CPT (as the case may be) price of material of each shipment upon submission of the shipping documents. Balance 20% Payment will be released after receipt, inspection (in addition of pre-shipment inspection) and acceptance of material.

TERMS AND CONDITIONS:

Sr. #	Description	Bidder's compliance
1	Original Authority letter of the manufacturer of pumps in favor of packager mentioning OGDCL tender enquiry No.	
2	Original authority letter of manufacturer/packager in favor of bidder mentioning OGDCL tender enquiry No.	
3	Original authority letter of Bidder in favor of local agent (if any).	
4	Bidder to provide the following information of the manufacturers/packager. <ul style="list-style-type: none"> a- Company profile clearly mentioning the same type of goods for which bid is submitted. b- Establishment of company c- Manufacturing experience d- Website address: e- Postal address 	
5	Bidder has to provide the supply record for the last 05 years in following format. <ul style="list-style-type: none"> a- Name of the company to whom material supplied b- Year of supply c- Type of material supplied mentioning sizes and pressure ratings d- Amount of the consignment e- E-mail and contact No. of the purchaser. f- Provision of copies of at least 10 Nos. of purchase orders from the last 05 years projects as per provided supply record. g- Provision of copies of at least 10 Nos. of purchase orders from the last 05 years projects. 	
6	Bids of any manufacturer, whose material malfunctioned after installation against any previous contracts awarded by OGDCL, shall be rejected.	
7	Bidder has to provide the following valid certificates of packager/manufacturer. <ul style="list-style-type: none"> a- ISO 9001:20008, b- ISO 140001:2004, c- BS-OHSAS 18001:2007 certificates. 	
8	Bidder to provide the complete technical literature of pumps and motors.	
9	Delivery period shall be 180 days after L/c Establishment C & F by sea Karachi.	
10	Bidder has to clearly mention the Make and model of pump and motor.	
11	Bidder has to provide the financial audit report of last 03 years along with technical proposal.	
12	Bidder has to facilitate TPI company w.r.t. Scope of Work during inspection with all respect. Scope of work of TPI will be shared after award of contract. Cost of TPI shall be borne by OGDCL. OGDCL has the right either to carry out TPI or not.	
13	Bidder to confirm that all the material shall be brand new and not refurbished.	
14	Bidder has to confirm that any material shall not be shipped until unless Third Party Inspection report is submitted and approved by the OGDCL.	

TERMS AND CONDITIONS:

15	Bids inclusive of all the documents and correspondence shall be in English language. Other language shall be treated as irrelevant unless the certified English translation copies are provided.	
16	Bidder to confirm and provide all the information/documents mentioned in the data sheets of the material (attached here) in technical proposals.	
17	Bidder has to confirm that quoted Pumps, Motors, along with all the accessories shall be in accordance to the attached technical documents and data sheets.	
18	Bidder to submit the detail drawings of package. Accordingly all the technical specs and drawings of all the package along with equipments to be submitted in the technical bid for evaluation.	
19	Provision of complete details of drawings after award of Contract prior to delivery of package	
20	Bidder to comply all the terms and condition and TOR along with required docs in his technical proposal.	

DATASHEET FOR PRODUCE WATER INJECTION PUMPS


OIL AND GAS DEVELOPMENT COMPANY LTD.

OGDCL House, Plot No 3, Jinnah Avenue, Blue Area, Islamabad, Pakistan.
 Telephone: +92-51-9209811-18 + 92-51-2623101-02, 04-06
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PETROCHEMICAL ENGINEERING CONSULTANTS



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 PEC
 PROJECT NO.

0404177

PROJECT	DETAILED ENGINEERING DESIGN OF KUNNAR PRODUCED WATER DISPOSAL SYSTEM				
TITLE	DATASHEET FOR PRODUCE WATER INJECTION PUMPS				
DOCUMENT No.	0404177-PRO-DT-005				
PREPARED	CHECKED	APPROVED	DATE	REV.	DESCRIPTION
SHR	ASK	AJ	08-Mar-19	0	Issued for Review

CLIENT	DETAILED ENGINEERING DESIGN OF KUNNAR PRODUCED WATER DISPOSAL SYSTEM				CONSULTANT														
	DOC. TITLE	DATASHEET FOR PRODUCE WATER INJECTION PUMPS																	
	DOC. NO.	0404177-PRO-DT-005	Rev-0	SHEET 2 OF 3															
APPLICABLE TO: <input type="radio"/> PROPOSAL <input checked="" type="radio"/> PURCHASE <input type="radio"/> AS BUILT																			
FOR: OIL & GAS DEVELOPMENT COMPANY LIMITED		UNIT: INJECTION WELL AREA																	
SITE: KUNNAR GAS FIELD		NO. OF PUMPS REQUIRED: 3																	
SERVICE: PRODUCED WATER INJECTION		TYPE: POSITIVE DISPLACEMENT PLUNGER PUMPS																	
MANUFACTURER:		SERIAL NO.:																	
ITEM TAG NO: P-1003 A/B/C																			
NOTE: <input type="radio"/> INDICATES INFORMATION TO BE COMPLETED BY PURCHASER <input type="checkbox"/> BY MANUFACTURER																			
Motor Required: 3		Engine Required: N/A																	
OPERATING CONDITION			LIQUID PROPERTIES																
CAPACITY (USGPM) Maximum: 105 Normal: Minimum:			TYPE OR NAME OF LIQUID: Produced Water																
DISCHARGE PRESSURE (psig) Maximum: 1450 Normal: Minimum:			PUMPING TEMPERATURE, °F Minimum: 77 Maximum: 120																
SUCTION PRESSURE (psig) Maximum: 0 Normal: Minimum:			SPECIFIC GRAVITY Minimum: 0.9 Maximum: 1.05																
DIFFERENTIAL PRESSURE (psig) Maximum: 1450 Normal: Minimum:			VISCOSITY (cP) Minimum: 0.6 Maximum: 1																
NPSH AVAILABLE (ft) Without Accelerated Head: 31			CORROSIVE / EROSION AGENT Water OIL CONCENTRATION (PPM) 50 ppm																
			LIQUID: <input checked="" type="radio"/> TOXIC <input type="radio"/> FLAMMABLE <input type="radio"/> OTHER																
PROCESS DATA			SITE AND UTILITY DATA																
Fluid: Produced water			LOCATION: <input type="radio"/> INDOOR <input checked="" type="radio"/> OUTDOOR <input type="radio"/> HEATED <input type="radio"/> UNHEATED <input type="radio"/> UNDER ROOF																
Density: lbm/ft³: 62 Viscosity: cP: 0.65			AREA CLASSIFICATION: Zone 2, Group IIA & Temperature Class T6																
Pump Temperature: °F: 100 Suction Pressure: psig: 0.00			SITE DATA																
Discharge Pressure: psig: 1450 Differential Pressure: psi: 1450			RANGE OF AMBIENT TEMPERATURE: MIN/MAX: 0 / 50 °C																
Vapor Pressure: psi: 0.938 Design Temperature: °F: 122			UNUSUAL CONDITIONS: <input checked="" type="radio"/> DUST <input type="radio"/> SALT ATMOSPHERE <input type="radio"/> FUMES <input type="radio"/> OTHER																
NPSHr: ft: Vendor to provide			UTILITY CONDITIONS																
Corrosion Allowance: 3 mm			ELECTRICITY: DRIVERS: HEATING: CONTROL: SHUTDOWN:																
			VOLTAGE: 440																
			HERTZ: 40																
			PHASE: 3																
CONSTRUCTION			DRIVER																
CONNECTION SIZE ANSI RATING FACING POSITION			MOTOR MANUFACTURER:																
SUCTION 4" (Note-2) 150# RF bot (Note-2)			TYPE:																
DISCHARGE 3" (Note-2) 800# RF top (Note-2)			FRAME NO:																
TYPE: <input type="radio"/> DIAPHRAGM <input checked="" type="radio"/> PLUNGER			TYPE: <input checked="" type="radio"/> CONSTANT SPEED <input type="radio"/> VARIABLE SPEED																
Plunger Diameter (mm): Note-1 No Req. 3			Motor Power (min): 88.3 kW																
MATERIAL: CHROME PLATTED CARBON STEEL			VOLTS: 440 HERTZ: 50																
VALVE/FEED TYPE: Plate (Note-2)			RPM: VTS PHASE: 3																
NUMBER: Note-1			OTHER:																
			DISCHARGE Plate (Note-2): Note-1																
			APPLICABLE SPECIFICATIONS																
RATED CAPACITY (USGPM)			<input checked="" type="radio"/> API 675 POSITIVE DISPLACEMENT PUMPS - CONTROLLED VOLUME																
HYDRAULIC kW			<input type="radio"/> GOVERNING SPECIFICATION (IF DIFFERENT)																
EFFICIENCY, %			OTHER:																
ACTUAL HORSE POWER, kW			CONTROL TYPE: <input type="radio"/> MANUAL <input type="radio"/> REMOTE <input type="radio"/> PNEUMATIC <input checked="" type="radio"/> AUTOMATIC <input checked="" type="radio"/> LOCAL <input checked="" type="radio"/> ELECTRONIC																
MAXIMUM PRESSURE (BARG)			SHIPMENT: <input type="radio"/> DOMESTIC <input type="radio"/> EXPORT <input type="radio"/> EXPORT BOXING																
HYDRO TEST PRESSURE (BARG): Note-1			<input type="radio"/> OUTDOOR STORAGE MORE THAN 6 MONTHS																
PLUNGER SPEED (strokes/min): Note-1			LUBRICATION FLUID: <input checked="" type="radio"/> CRANKCASE <input type="radio"/> INTERMEDIATE																
DIAMETER (mm): Note-1 STROKE LENGTH (mm): Note-1			VENDOR FURNISHED RELIEF VALVE: <input checked="" type="radio"/> INTERNAL <input type="radio"/> EXTERNAL																
QA INSPECTION AND TEST																			
<input type="radio"/> COMPLIANCE WITH INSPECTORS CHECK LIST <input checked="" type="radio"/> CERTIFICATE OF MATERIALS <input type="radio"/> FINAL ASSEMBLY CLEARANCE																			
TESTS		REQ'D	WT	OBS															
HYDROSTATIC		<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>															
STEADY STATE ACCURACY		<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>															
LINEARITY		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>															
		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>															
		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>															
NAMEPLATE UNITS: <input checked="" type="radio"/> US CUSTOMARY <input type="radio"/> SI																			
<table border="1" style="width:100%; border-collapse: collapse; font-size: small;"> <tr> <td style="width:15%;">4-Mar-19</td> <td style="width:5%;">0</td> <td colspan="2" style="text-align:center;">ISSUED FOR REVIEW</td> <td style="width:15%;">SHR</td> <td style="width:15%;">ASK</td> <td style="width:15%;">AJ</td> </tr> <tr> <td>Date</td> <td>Rev</td> <td colspan="2">Description</td> <td>PREP</td> <td>CHK</td> <td>APPR</td> </tr> </table>						4-Mar-19	0	ISSUED FOR REVIEW		SHR	ASK	AJ	Date	Rev	Description		PREP	CHK	APPR
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Date	Rev	Description		PREP	CHK	APPR													

CLIENT	DETAILED ENGINEERING DESIGN OF KUNNAR PRODUCED WATER DISPOSAL SYSTEM			CONSULTANT	
	DATASHEET FOR PRODUCE WATER INJECTION PUMPS				
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Produced Water Analysis	
Parameters	Value
pH	6-9
Free Oil	50 ppm
Total Dissolved Solids	3500 ppm
Sulphates	164 ppm
Chlorides	49086 ppm

NOTES:

- 1) Vendor to Specify
- 2) Vendor to Confirm.



8-Mar-19	0	ISSUED FOR REVIEW	SHR	ASK	AJ
Date	Rev	Description	PREP.	CKD	APPR



OIL & GAS DEVELOPMENT COMPANY LIMITED



Specification for Produced Water Injection Pumps

0404177-PRO-SP-006

CONSULTANTS:

Mar, 2019



Petrochemical Engineering Consultants



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1.0 INTRODUCTION

OGDCL intends to set up Produced Water Treatment system at Kunnar Gas Field. The primary objective of this project is to treat produced water in CPI separator and dispose it in Injection well via PD pumps. Injection well is located 0.5km away from plant premises.



2.0 OBJECTIVE

This specification along with the data sheets covers the minimum requirements for the design, manufacture, inspection and testing, painting, packing and supply of Positive Displacement Pumps. Compliance with the requirements of this specification does not relieve the VENDOR of furnishing Positive Displacement Pumps along with its accessories of proper design, meeting all the specified rated operating and service conditions. It is not the intent of COMPANY to deviate from good engineering practice. The absence of any specifications SHALL imply that the best engineering practices SHALL prevail, utilizing first quality workmanship and new materials where different standards are specified, the most stringent SHALL apply.

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3.0 DEFINITIONS

COMPANY	Oil and Gas Development Company Limited
CONTRACTOR/ PURCHASER	Party which carries out all or part of the design, Engineering and construction of the Project.
VENDOR/SUPPLIER	Successful bidders or Party/ies, which manufactures and/or supplies material, equipment and services to perform the duties as specified by CONTRACTOR in the scope of supply.
PROJECT	Detailed Engineering Design of Kunnar Produced Water Disposal
SHALL	Indicates a mandatory requirement.
SHOULD	Indicates a strong recommendation to comply with the requirements of this document.

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4.0 ABBREVIATIONS

EPCC	Engineering Procurement Construction and Commissioning
TPIA	Third party inspection agency, as appointed by PURCHASER
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
RFQ	Request for Quotation
PWHT	Post Weld Heat Treatment
QA	Quality Assurance
QC	Quality Control
NDT	Non Destructive Testing
DDSR	Document Data Submittal Requirements
MTC	Mill Test Certificate

5.0 CODES AND STANDARDS

5.1 General

- All specifications and publications SHALL be the current issue on the date of purchase order and it SHALL be the VENDOR'S responsibility to comply with the same.
- Positive Displacement Pumps SHALL be designed and manufactured in conformity with the codes, specification listed below and with the equipment data sheets.

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5.2 International Codes & Standards (Latest editions shall apply)

- **API**

API 674	Positive Displacement Pumps- Reciprocating.
API 675	Positive Displacement Pumps – Controlled Volume
API 670	Machinery Protection Systems.
API RP 520/521	Sizing, Selection and Installation of Pressure Relieving Devices in Refineries.
API 615	Sound Control of Mechanical Equipment for Refinery Services.

- **ASME**

ASME B1.1	Unified Inch Screw Threads.
ASME B1.20.1	Pipe Threads, General Purpose, Inch.
ASME Sec. VIII Div. I	Rules for Construction of Pressure Vessels.
ASME Sec. II	Materials.
ASME Sec. V	Non Destructive Examination.
ASME Sec. IX	Welding, Brazing and Fusing Qualifications.
ASME B31.3	Process Piping.
ASME B16.5	Pipe Flanges and Flanged Fittings.
ASME B16.20	Metallic Gaskets for Pipe Flanges-Ring Joint, Spiral Wound, and Jacketed.

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- **ASTM** American Society for Testing and Materials.



- **ISO**
 - ISO 10474 Steel and steel products – Inspection documents.
 - ISO 15664 Acoustic – Noise Control Design Procedures for Open Plant.
 - ISO 9001:2008 Quality Management System.

- **NACE**
 - NACE MR0175/ISO15156 Petroleum & Natural Gas Industries - Material for use in H2S Containing Environment in Oil & Gas Production.
 - TM0284 Evaluation of Pipeline and Pressure Vessel Steel for Resistance to Hydrogen-Induced Cracking.

- **AWS**
 - AWS A2.4 Standard Symbols for Welding, Brazing and Nondestructive Examination.
 - AWS A3.0 Standard Welding Terms and Definitions.
 - AWS D1.1 Structural Welding Code.

- **WRC**
 - WRC 107 Local Stresses in Spherical and Cylindrical Shells Due to External Loadings.
 - WRC 297 Local Stresses in Cylindrical Shells Due to External loadings on Nozzles-Supplement to WRC Bulletin No. 107

- **AISC** American Institute of Steel Construction.

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5.3 Error or Omission



The review and comments by COMPANY / COMPANY Representative on SUPPLIER's or its manufacturer's drawings procedures or documents SHALL only indicate acceptance of general requirements and SHALL not relieve the SUPPLIER of its obligations to comply with the requirements of this document and other referred documents. All deviations to this document, other referred document or attachments SHALL be brought to the knowledge of the COMPANY / COMPANY Representative in the bid. All deviations made during the design, procurement, manufacturing, testing and inspection SHALL be with written approval by the COMPANY / COMPANY Representative prior to execution of work. Such deviations SHALL be shown in the documentation prepared by the SUPPLIER.

5.4 Conflicting Requirements

In the event of any conflict, inconsistency or ambiguity between these documents, referred documents, codes & standards referenced in the documents the SUPPLIER SHALL refer to the COMPANY / COMPANY Representative whose decision SHALL prevail.

5.5 Order of Precedence

In case of conflict between these specifications, its associated specifications, data sheets and the codes and standards, the VENDOR SHALL bring the matter to the PURCHASER's attention for resolution and approval in writing. Should any conflict occur as a result of the application of these regulations, data sheets, specifications and standards, the order of precedence SHALL be as follows:

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- Government Legislation
- Data Sheets/ Drawings
- Project Specifications
- Industry Standards



All deviations from the requirements of this specification, its attachments and the referenced codes and standards SHALL be stated in the quotation. In the absence of such a statement, full compliance SHALL be assumed. Compliance by the VENDOR with the provisions of this specification does not relieve him of his responsibility to furnish equipment and accessories of a proper mechanical design suited to meet the specified service conditions and / or local codes governing health and safety.

5.6 Reporting Procedure

A reporting and documentation system SHALL be agreed between the COMPANY and the SUPPLIER for the status of procurement, design, manufacturing, inspection, testing and shipment of the Positive Displacement Pumps to be supplied under this specification. SUPPLIER SHALL provide reports and summaries for production performance and testing operations in conformance with a manufacturing schedule approved by COMPANY.

5.7 Company's Intention

It is intention of the COMPANY to procure the Positive Displacement Pumps based on Data Sheets, P&IDs, and this specification document and referenced document as mentioned in section 5.0. SUPPLIER SHALL be responsible to supply Positive Displacement Pumps, in view of the requirements as detailed in relevant Data sheets and specifications, procure material, perform mechanical design (SUPPLIER SHALL submit the package general arrangement drawings for COMPANY's approval prior to finalization of design), fabricate, paint, test and

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prepare for shipment. SUPPLIER SHALL also obtain approval from COMPANY to buy any component of the package. SUPPLIER SHALL also be responsible for all sub-SUPPLIER's coordination, data and other documents, provision of guarantees, provision of equipment and personnel for the trial assembly, and functional testing of complete package at SUPPLIER's works and packaging and delivery as specified in this document.

5.8 Supplier Responsibility

The SUPPLIER SHALL be responsible for the complete design, manufacturing, supply, inspection and testing of Positive Displacement Pumps including full compliance with all applicable design codes and standards listed in Section 4.2, of this document, and with the requirements of the certifying authority, if applicable.



Any work or material found to be defective or which doesn't meet the requirement of this specification, datasheets, P&ID and other reference specifications SHALL be replaced by the SUPPLIER at his own expense.

5.9 Language and Units of Measurements

The governing language SHALL be English language. All other referred quantities (temperature, pressure, flow rate, etc.) shall be expressed as per datasheet.

6.0 REFERENCE DOCUMENTS

1. Specification for Painting and Surface preparation
2. Specification for Motor
3. Specification for Corrosion Inhibitor system

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7.0 SITE DATA

The following table gives the site and environmental conditions applicable to the location and specific to design and sizing of equipment.

<p align="center">DESIGN AND AMBIENT CONDITIONS</p>	
<p>Design Maximum Ambient Temperature (°C)</p>	<p align="center">50</p>
<p>Design Minimum Ambient Temperature (°C)</p>	<p align="center">0</p>

<p align="center">CLIMATIC CONDITION (As per data by Pakistan Metrological Department)</p>	
<p>Relative Humidity (minimum monthly average)</p>	<p align="center">40</p>
<p>Relative Humidity (maximum monthly average)</p>	<p align="center">80</p>

<p align="center">AREA CLASSIFICATION</p>
<p align="center">Zone 2, Group IIA & Temperature Class T6</p>



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8.0 VENDOR'S SCOPE OF SUPPLY

8.1 General

For scope of Positive Displacement Pumps, reference is made to the Pump Data Sheet giving the details of Pump operating conditions and design requirements. VENDOR'S scope of supply includes engineering, design, procurement, manufacture, painting, inspection & testing and performance guarantee of pumps. The scope of supply for each pump package SHALL include, but not necessarily be limited to, the following:

- Positive Displacement Pumps as specified in the equipment data sheets.
- Electrical Motor with terminal boxes as specified.
- Flexible coupling & coupling guard (non -sparking type).
- Lubrication system as per API 674, API 675 with all skid mounted accessories.
- Common base frame with lifting lugs.
- All "On Base" pipe work, electrical & instrument cabling.
- Stainless Steel SS 316 Nameplate.
- All necessary instrumentation such as vibration and temperature monitoring equipment (if required) with junction box.
- Holding down bolts for mounting of the pump & motor.
- Anchor bolts.
- Inspection and testing.
- Painting and coating.
- Packing, marking, preservation, and transportation.
- VENDOR documentation.
- Special tools (if required).
- Earthing lugs (2 nos. located diagonally opposite).
- Start-up and commissioning spares.
- Recommended spares for 2 years operation.
- Inspection & testing operation manual (which includes trouble shoot & maintenance manual) and performance guarantee of pumps.
- All relevant drawings and documents soft copies (CD's) and two sets of hard copies.
- Equipment dossier which includes all test results MTC etc.

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The requirements set out in this document SHALL not be construed to eliminate consideration of the manufacturer's standard design. The manufacturer's standard design may be accepted, if found to be equivalent or superior to the requirements of these specifications. The VENDOR SHALL provide material, equipment, instrumentation and any other accessory items, over and above that specified herein, which is required to provide a safe, workable and efficient unit. The VENDOR is also required to provide a Mechanical Guarantee.



8.2 Exclusions

- Commissioning.
- Pump foundation.
- Local start / stop push button.
- Motor starters.
- Power cabling to motor.

8.3 Interfaces

VENDOR SHALL provide a detailed schedule and description of all termination points including:



- Suction & Discharge flange connection size and rating.
- Motor terminal box, power terminal.
- Earthing bosses.

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9.0 DESIGN

9.1 General

Positive Displacement Pumps SHALL be designed, constructed, inspected and tested in accordance with API 674, API 675, equipment data sheets and this specification. The most stringent requirement SHALL apply. The equipment (including auxiliaries) SHALL be designed for a minimum service life of Twenty (20) years & 5-6 years of uninterrupted continuous operation. Pump shall be selected for speeds not exceeding those recommended by API Standards. Pump size shall be based on the full load rated speed of the driver. All pumps shall be designed to permit rapid and economical maintenance, particularly regarding packing and valves for reciprocating pump. Pumps shall be fitted to a structural steel skid with driver, coupling and non-sparking guard. All necessary auxiliary piping (for lubrication, sealing and flushing, etc.) shall be supplied and shall always be within the skid area. Piping shall comply with ASME B31.3. All piping terminations shall be valved and terminate with a flange connection at the skid edge. Pump and motor mounting surfaces on base plate supports and mounting pads shall be machined flat and in the same plane. Vendors to advise/confirm the maximum allowable nozzle loadings for the equipment in their bid.

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9.2 Mechanical

9.2.1 General

- **Drain Connection**

All auxiliary connections to the pressure casing SHALL be fitted with flanged stubs, full penetration welded to the casing. No socket welds SHALL be provided. Pump casing drains SHALL be provided.



- **Lubrication**

Pump lubrication systems shall be manufacturer's standard with proven experience for the type, rating and application. Pump design shall ensure adequate lubrication of the crosshead pin and bearings for all operating conditions. An oil level sight glass shall be furnished as well as a calibrated oil dipstick on gear boxes. As a minimum, the following auxiliaries shall be furnished for the crank case lubrication system of pumps rated above 75 kW (100 hp) and 7000 kPa (70 barg): an oil filter, startup pump, low oil pressure trip out feature, pressure gage on each side of the oil filter, thermometer, visible level gage on the oil sump, oil flow indicator and surge protection devices. Vendor shall provide lubrication systems required to protect the pump and shall clearly detail the lubrication system requirements in his bid proposal.

- **Nozzles, Flanges and Miscellaneous Connections**

Suction flanges shall be rated for discharge pressure. All necessary drains, cocks, special fittings and accessories shall be furnished and shall be steel. Inlet and outlet connections shall be flanged to ASME B16.5 unless approved otherwise by PURCHASER.

The Pump Vendor shall be responsible for providing acceptable method for venting, bleeding, draining and cooling the pump and its related equipment.

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- **Base frame / Mounting Plates**

The material for base frames / mounting plates SHALL be as specified in the Pump data sheet. Mounting plates SHALL be circular and sufficiently rigid to support the pump and motor without distortion. Mounting plates will be supplied with the necessary bolts and gaskets. The circular mounting plate SHALL be drilled to ASME B16.5.

- **Drivers**

Electrical Motor Drivers

The electric motor SHALL be designed in accordance with the LV Motor specification and data sheet.

- **Coupling and Coupling Guards**



The pump VENDOR SHALL supply pump coupling. Flexible all-steel couplings SHALL be provided for pump. Rigid all steel, axially adjustable, couplings SHALL be supplied for vertical pump with bearings integral with driver. Any exposed shaft and coupling SHALL be provided with removable metallic non-sparking guards for protection against injury to personnel. Aluminum is not acceptable as non-sparking material.

- **Nameplates**

VENDOR'S SHALL furnish a permanently attached corrosion resistant nameplate with the equipment.

- **Earthing boss, lifting lugs.**

The skid base frame SHALL be provided with 2 nos. earthing boss located diagonally opposite and lifting lugs for single lift.

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9.2.2 Selection of Types

When a direct-acting pump is used, a low clearance volume type shall be considered for any application where the liquid is near its boiling point and for any service where the entrained gas is likely to enter the liquid cylinder. Where a wide range of capacity control is required, the following types of controls and/or pumps shall be supplied:

Use of variable stroke or variable speed pumps. Provisions in the pump design shall be such that the stroke adjustment can be carried on while the pump is in operation.

9.2.3 Cylinder

The maximum allowable working pressure of the cylinder shall be at least 110% of the rated discharge pressure. Piston type liquid end cylinders shall be provided with liners. For piston diameters larger than 100 mm, the liner shall be flange and bolted to the cylinder, held in place by jack bolts, clamped or held in place by followers and set screws. Non-pressured liners shall seal against the cylinder with a gasket O-ring. Corrosion allowance for "liquid end pressure casing" shall not be less than 3 mm. Flanges that are not forged or cast integral with the cylinder shall be socket welded to the pump cylinder. Screwed and seal welded flanges are not acceptable. Connections shall be studded. Jackscrews, lifting lugs, eyebolts, guide dowels and alignment dowels shall be provided. When jackscrews are used as a means of parting contacting forces, one of the faces shall be relieved (counter bound or recessed) to prevent a leaking point or improper fit caused by marring. A clearance shall be provided at bolting locations to permit the use of sockets or box type wrenches. No tapped or flanged openings shall be furnished in

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the pumping chambers of the liquid end or in other highly stressed areas subject to cyclic loading, unless they are essential for pumping operation.

9.2.4 Pistons, Plungers and Piston Rods

A lantern ring shall be provided in the stuffing box for flushing or adding lubricant to the packing. Provision shall be made between the drive mechanism and the plunger liquid end to contain stuffing box leakage or to provide special liquid-end conditioning. Liquid end pistons shall be designed to meet the following requirements:

- Piston packing of the Snap ring type is preferred, but sectional rings with expander
- spring tempered to hold tension under maximum operating temperature will be considered.
- Design of pistons shall permit repacking without removing piston from the cylinder.
- Body and follower type pistons shall contain at least 3 rings of packing.
- Cast hollow pistons are not acceptable.
- If specified, 5 digit stroke counters of the non-resetting type shall be fitted.

Surfaces of plungers and rods in contact with packing shall be hardened or coated and shall have a minimum hardness of Rockwell C35. Plungers shall be secured to the rods or crossheads with nuts locked with cotter pins or with other fastening and locking methods suitable for the specified service conditions.



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9.2.5 Stuffing Boxes, Glands and Packing

Glands shall bolt to the stuffing box unless otherwise approved by PURCHASER. Gland studs shall pass through the holes (not slots) in the gland. If threaded glands are approved by PURCHASER, they shall be provided with gland pawls or equivalent devices to ensure positive locking. For fluid temperatures over 148 °C, stuffing boxes shall be extra deep, and shall be arranged for water cooling. Stuffing boxes shall be furnished with Lantern rings. Packing materials shall be provided and installed by the pump manufacturer. Unless the pump construction provides for alternate means of removal, all stuffing box lantern rings shall be drilled and tapped at two points to facilitate removal with threaded rods. All packing glands shall have non sparking metal bushings, positively secured.

9.2.6 Valves

Valve areas shall be resistant to the working fluid for maximum service life. Valve shall be ample to ensure velocities through the valves and parts consistent with the best practice for the particular service. Valve seats shall be re-machine able. Valves may be disc, ball, or wing guided as recommended by manufacture for each specific service. Recommendation shall be based on pressure, NPSH requirement, velocities, viscosity of fluid, and subject to purchaser's approval. Liquid velocities through discharge valves shall not exceed twice the velocity of liquid through the suction valves. In general wing guided valves are preferred, valves shall be arranged to eliminate gas pockets. Coil springs, if used on valves, shall be squared and ground to protect the plate against damage by the spring ends. The design shall provide sufficient free area through suction valves so that liquid

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velocities (obtained by dividing design capacity by free area) will not exceed the following:



- 1.07 m/s for pumping temperature 170°C or below, and maximum viscosity 57 cSt
- or below with more than 0.9 m excess NPSH available.
- 0.7 m/s for pumping temperature above 175°C or maximum viscosity above 57
- cSt, or less than 0.9 m excess NPSH available.

9.3 Process

Refer to equipment data sheets for rated operating conditions and the properties of liquid to be handled. The pumps SHALL be suitable for continuous operation and outdoor installation.

9.4 Piping

The supply, fabrication and erection of all pipe work SHALL comply with Specification for Piping Material Classes FS1403-SP-000-L-001 and ASME B31.3. All piping butt welds SHALL be 100% Radiographed. The suction & discharge, drain connection SHALL conform to ASME B16.5. Seal flush plans SHALL be as stated in the data sheets. Allowable Loads and moments SHALL be as defined in the API 674 and API 675. Screwed fittings are not allowed. All seal and lube oil piping fitting SHALL be butt weld type. All stainless steel lines SHALL be pickled and passivated. The arrangement of the equipment, including piping and auxiliaries, shall provide adequate clearance areas and safe access for operation and maintenance. All pumps shall be provided with separate vent connections unless the pump is of the self-venting design. Pulsation dampeners shall have flanged connections and

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shall be provided where necessary to smooth out pulsations. Preferred type is bladder type dampener

9.5 Instrumentation

Instrument selection, design and installation SHALL be provided if required

9.6 Electrical

Electrical selection, design and installation SHALL be provided if required

9.7 Civil



9.7.1 General

All pumps SHALL be placed on concrete block foundation. VENDOR SHALL furnish loading data along with hold down bolts location plan & details of the complete package for foundation design.

9.7.2 Structural Steel Skid

The structural design of the skid(s) SHALL include the following minimum general requirements:

- Steel design SHALL be in accordance with BS 5950 or AISC.
- Bi-directional moment resistant frames SHALL be avoided.
- The minimum thickness of any structural steel plate SHALL be 6mm.
- The thickness of gusset and stiffener plates SHALL be 8mm minimum.

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- The skid SHALL be designed to minimize field assembly and installation. All shop connections to be designed as fully welded. Field welds SHALL be avoided, and field connections SHALL be designed as bolted connections.
- The lifting lugs SHALL be located on the outside of the longitudinal perimeter beams in order to minimize deflections. A transverse beam must be provided at lifting lug locations.
- Tie down lugs or brackets SHALL be welded to structural members of the skid(s) to allow tie down during transportation.
- Spreader bar, if required for lifting / handling of skid / Unit SHALL be supplied by VENDOR.



9.8 Noise

The noise levels from each skid SHALL comply with the requirements of API 615 but SHALL not exceed 85 dBA at 1 m unless stated or otherwise approved by the COMPANY.

9.9 Nameplates



Nameplates shall be of Stainless steel. Nameplates shall be as per vendor standard.

The nameplate shall include the item number, process data, manufacturer data, rotation arrows, and year of build.

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10.0 MATERIAL

- a) Materials used SHALL be in accordance with data sheets, this specification. Materials test certificates for ISO 10474 - 3.1b SHALL be submitted for all pressure parts and 2.2 for non-pressure parts, structural parts and spare parts.
- b) All pressure part materials SHALL be normalized and all plate materials SHALL have an under tolerance of "zero" millimeter.
- c) The VENDOR SHALL propose material specifications for Company Review and Approval.
- d) Cast iron shall not be used for liquid end pressure containing parts handling flammable liquids or toxic materials.
- e) External parts subject to rotary or sliding motions (such as control linkage joints and adjusting mechanisms) shall be of corrosion-resistant materials suitable for the site environment.
- f) Sulphur content of all pressure part materials SHALL be kept less than 0.003%.
- g) Seals SHALL prevent the ingress of moisture and particulates.
- h) Gaskets SHALL be asbestos free.
- i) The use of sealing materials that can result in blockages / seizure of hydraulic components are strictly prohibited.
- j) The VENDOR SHALL ensure maximum standardization and interchangeability of Components.
- k) Unless otherwise required, all the internal parts in contact with the contained fluid SHALL be made of the same quality of material.
- l) All metallic materials exposed to hydrogen sulfide, including trace quantities, shall conform to but not be limited by the provisions of the latest edition of NACE Std. MR-01-75. Exceptions to this requirement may be:
 - The surface of piston rods or plungers in the packing contact area.

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- The valve components, where greater hardness has proven necessary. Vendor's proposals to use ceramic materials and coatings shall be submitted to Client for approval.

11.0 FABRICATION AND ASSEMBLY

Approval of all VENDOR drawings, weld procedures, calculations, etc. is required by the COMPANY and the certifying authority, where applicable, prior to the commencement of fabrication.

12.0 SURFACE PREPARATION AND PAINTING



Surface preparation and Painting & Coating of the Positive Displacement Pumps and all the accessories SHALL be in accordance with Specification for Painting and Surface preparation (0404177-PRO-SP-014).

13.0 INSPECTION AND TESTING REQUIREMENT

13.1 Quality Assurance

The VENDOR SHALL demonstrate that he operates a quality system in accordance with an internationally recognized standard such as ISO 9001:2008 or agreed equivalent standard, commensurate with the goods and services provided. The effectiveness of the quality system and the VENDOR'S compliance with it SHALL be subject to monitoring by COMPANY and in addition, may be audited by an agreed period of notice.

The format and outline content of the quality plan SHALL be agreed between VENDOR and PURCHASER, prior to order placement. The VENDOR SHALL submit with his tender an Inspection and Test plan specific to this scope of

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supply. Detailed quality plan, the scope of testing and the "hold points" SHALL be mutually agreed between the PURCHASER and the VENDOR during the technical bid submission. The VENDOR SHALL submit a quality control program for COMPANY'S review at the time of proposal. The VENDOR SHALL provide facilities for and cooperate with COMPANY and its designated authorized inspectors during manufacturing, assembly and testing. The VENDOR SHALL inform the COMPANY four (4) weeks in advance for preproduction meeting.

13.2 Pre-Inspection Meeting

The COMPANY or Third Party Inspection Agency (TPIA) appointed by the PURCHASER and approved by COMPANY will initiate this meeting as required. The specification, inspection, testing and packing will be reviewed with VENDOR'S manufacturing and quality control personnel. The VENDOR SHALL provide a Quality Plan/ Inspection and Testing Plan for manufacturing. The plan SHALL cover all quality related aspects of each piece of equipment in the specification and SHALL indicate inspection points, review points and milestones where the inspector will examine the equipment. From this quality plan, COMPANY will establish an Inspection Schedule. At no time will inspection by VENDOR and/or his Third Party Inspector relieve the VENDOR of his quality control responsibilities.



13.3 Inspection and Testing of Positive Displacement Pumps

Inspection & testing of all the components of Positive Displacement Pumps SHALL be performed by a third party inspection agency appointed by PURCHASER. VENDOR SHALL provide a complete Inspection & Testing Plan for review by COMPANY/ TPIA. Inspection, testing and material

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certification SHALL be in accordance with the requirements of API 674 and API 675 codes and standards and also the requirements of the certification/ Approval Authority. In order to enable a proper scheduling of the inspection visits, VENDOR is requested to notify COMPANY'S Third Party Inspector at least two (2) weeks prior to the date of inspection. When components or services are obtained from Sub-VENDOR'S the COMPANY'S inspector and/or his agent reserves the right to inspect these items at the point of manufacture. It is the VENDOR'S responsibility to include COMPANY'S inspection and notification requirements in all sub-orders. VENDOR SHALL provide free access to his works and that of Sub-VENDOR'S for the authorized representative of COMPANY. All certification on the materials, shop test data, etc., SHALL be made available to verify that the requirements of the purchase order are being met. The VENDOR SHALL provide test certificates for all tests carried out on component equipment, as detailed in the Document and Data Submittal Requirements (DDSR) attached with Material Requisition. Test certificates SHALL be approved by TPIA or COMPANY'S Representative prior to dispatch and official certificates SHALL be forwarded within one week of test completion. If a pump fails to meet the specified duty, the number of tests SHALL be adjusted and agreed with COMPANY. Any increase in the scope of the test program either due to the failure of the equipment to perform satisfactorily or its design SHALL be at the VENDOR'S expense. The pump performance testing SHALL be completed in accordance with API 674 and API 675 latest edition. A witnessed full functional test, simulating site operating conditions and including a noise test, SHALL be carried out on complete pump package.

If a pump fails to meet the specified duty, the number of test SHALL be adjusted and agreed with COMPANY. Any increase in the scope of the test program either due to the failure of the equipment to perform satisfactorily or its design SHALL be at the VENDOR'S expense.

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Prior to the test specified above, VENDOR SHALL perform individual component test in all package auxiliaries and components and the record SHALL be made available to COMPANY. The acceptable Test Tolerances SHALL be as per API 674 and API 675. COMPANY reserves the right to witness further tests like hydrostatic test, running test, performance test, etc. in line with applicable codes and standards.

13.4 Factory Acceptance Test

The PURCHASER reserves the right to visit the VENDOR'S premises to witness an acceptance test of the equipment and SHALL be given twenty working days' notice in writing of readiness for this Testing. The equipment will be thoroughly tested by the VENDOR prior to the acceptance test. Prior to the start of the VENDOR'S testing, a detailed schedule of the tests SHALL be supplied to the PURCHASER. The acceptance test will check compliance with the specification and the VENDOR is to make available all necessary equipment and services for this test. Notwithstanding the above notice periods the VENDOR SHALL, following receipt of the purchase order submit to the PURCHASER a schedule identifying details of timing of design, construction and testing activities.

13.5 Third Party Inspecting Authority

The Third Party Inspection Authority (TPIA) SHALL be appointed by Purchaser and SHALL be approved by COMPANY. TPIA SHALL be responsible for verifying that the Pump is designed, manufactured, inspected and tested in accordance with the requirements of this specification and all relevant applicable codes. TPIA SHALL verify that the Unit is manufactured, inspected and tested in accordance with specified requirements. TPIA SHALL

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resolve all technical queries raised by manufacturers, if necessary by reference to COMPANY. TPIA SHALL witness the performance of quality related activities, inspection and tests. TPIA SHALL review and approve specified quality verifying documentation before release of the Unit from the VENDOR'S work premises.

13.6 General Requirement

The VENDOR SHALL provide COMPANY and TPIA Inspector with at least 14 days' notice to witness tests run in both his shop and his sub-VENDOR'S shops. The VENDOR SHALL provide COMPANY and TPIA with reasonable access to his and his sub-VENDOR'S plant facilities in order to verify that equipment is manufactured and tested as specified. The VENDOR SHALL provide calibration certificates of testing instrumentation for review by the inspector prior to each test. The VENDOR SHALL provide weekly reports during procurement and fabrication phases indicating progress status.

13.7 Site Acceptance Test / Final Acceptance Criteria

After the mechanical completion and commissioning of the Positive Displacement Pumps, a site Acceptance Test SHALL be conducted at site in VENDOR'S presence to verify the performance of the unit. The final acceptance criteria for the package SHALL be in accordance with scope of supply in Section 7.0 and data sheets, applicable codes, standards and regulations as per Section 4.0.



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13.8 Technical Integrity

The VENDOR SHALL be responsible for the technical integrity of the pumps, including: mechanical design, supply of material, manufacture, quality assurance, assembly, testing, performance and specified engineering services. All of these activities SHALL be in accordance with the scope of supply, this functional specification and data / interface information supplied by the PURCHASER. The VENDOR SHALL have single point responsibility for all aspects of the works, inclusive of all components subcontracted or purchased from other parties.

13.9 Deviation / Concessions

Weld repair of plate surface defects will not be permitted without COMPANY approval and SHALL be subject to an agreed repair procedure prior to work being carried out. Additionally COMPANY approval for any distortion correction procedure prior to applying the proposed corrective treatment is required. The Third Party Inspecting Authority SHALL not approves any deviations/ concessions from the requirements of the specification, codes without the specific approval of the COMPANY. The Third Party Inspecting Authority SHALL immediately notify the COMPANY of any deviation/ concession request from the manufacturer which contravenes the requirements of the design code or which, in the Third Party Inspecting Authority's opinion, makes the Unit unfit for its intended purpose.

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13.10 Material Testing & Certification Requirement

Unless otherwise specified, materials SHALL be subject to the following requirements:

All welding of pressure retaining parts SHALL receive 100% NDT. This SHALL be carried out after stress relieving, if required. Magnetic particle or dye penetrant methods SHALL be used for surface inspection. Ultrasonic or radiographic inspection methods SHALL be used for sub-surface inspection.



Certification requirements SHALL be as follows:

- Pressure containing parts such casing, impeller, wear rings, shaft and all bolting used for lifting SHALL be certified in accordance with ISO 10474, 3.1b.
- Non-pressure containing parts SHALL be certified in accordance with ISO 10474,2.2.

The appointed TPIA SHALL review material test certificate during examination of items at VENDOR works as applicable Certificate SHALL be provided in accordance with material requisition Document and Data Submittal Requirements (DDSR) covering each item supplied. All certificates SHOULD be fully traceable to the item covered and SHALL be marked with the PURCHASER order number, item number and tag/part number. They SHALL be clearly legible, in the English language.

14.0 SPARE PARTS

VENDOR to provide a comprehensive listing of spare parts, recommendations covering Start-Up, Commissioning and two (2) years of Continuous Plant Operation.



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15.0 GUARANTEE

VENDOR SHALL be fully responsible for all equipment supplied by him including bought out items. All the equipment SHALL be fully guaranteed for a period of twelve months after commissioning or eighteen months after date of supply, whichever comes first. The VENDOR SHALL provide all Certification for the equipment and SHALL ensure that, dimensional compatibility, shaft system critical speeds, vibration, noise levels and acceptability of pipe loads are within the relevant specification limits. Provision of all data necessary for the design of lifting equipment, support and structures is required. VENDOR SHALL guarantee all equipment as being suitable for the design conditions and service fluids stated on the data sheets. Guarantee from Bidder SHALL cover mechanical workmanship and performance of the complete pump package. VENDOR SHALL have the final and total responsibility for the design and performance of all equipment's supplied under this specification. VENDOR SHALL provide a performance guarantee for the pumps.

16.0 PREPARATION FOR SHIPMENT AND PACKING



All items SHALL be suitably protected against damage during shipment and storage. On completion of inspection and tests, equipment SHALL be thoroughly cleaned and dried internally and externally and prepared for shipment. The package SHALL be adequately protected against corrosion and mechanical damage during shipment to plant site and outdoor storage for period up to one year. VENDOR SHALL consider transit route to site and pack accordingly. If dispatched in pieces, VENDOR SHALL submit the procedure of assembling for PURCHASER'S information. VENDOR SHALL provide recommended procedures and checklists for commissioning, start-up.

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All special tools and calibration tools required for assembly and commissioning SHALL be in VENDOR'S scope of supply. All flanges SHALL be covered with metal covers, soft rubber gaskets and held by at least four (4) bolts. Other openings SHALL be taped closed. Threaded connections SHALL be capped or plugged for thread protection. Any external components, which may be subject to damage during transit and are not easily protected, SHALL be removed and packaged separately, to the equipment, for shipment with all openings plugged. Extent of loose supplied items to be marked on equipment drawings. The pumps SHALL be sealed closed and contain bags of desiccant to prevent rust. Auxiliary piping connections SHALL be tagged or marked for identification in the field. Each package SHALL contain lists of contents: one list inside and one list outside of the package. The package SHALL have external identification corresponding to the order number. All loose items shipped with the equipment SHALL be tagged with the order number and item identification. Startup / Commissioning spare parts SHALL be identified separately. The equipment SHALL be delivered with one copy of the Installation, operation and maintenance manuals.

17.0 SITE SUPERVISION AND COMMISSIONING REQUIREMENTS

The VENDOR SHALL include for the services of a competent and experienced field engineer/ supervisor for the installation/ modifications, testing and commissioning of the equipment covered by this specification. The PURCHASER reserves the right to determine the timing and amount of start-up assistance required.



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17.1 Start-up and Commissioning Support

The **VENDOR SHALL** also be responsible for providing Start-Up and Commissioning Support at site on a per diem basis plus expenses, which will be reimbursed at cost **VENDOR SHALL** provide a separate break-down for Start-Up and Commissioning Services and Operator Training costs in their quotation. This information **SHALL** include a list of personnel, required crew size, planned duration of in-services and a description of all work to be performed.

17.2 Availability / Reliability

The design life and overall availability / reliability of the equipment **SHALL** be demonstrated by the **VENDOR** with bid. This **SHALL** be by reference to the previous experience with proven designs which have operated in the field for at least three years with only planned outages for maintenance / replacement of normal wearing type components. **VENDOR SHALL** design the equipment for 20 years operating life. In making assessments of availability / reliability, the **VENDOR SHALL** estimate repair time. **VENDOR** may assume that the spares holdings are in accordance with his submitted recommendations unless otherwise stated. **VENDOR** may also neglect any delay caused by factor not directly related to the package in questions unless a basis for estimating such delays is provided. In cases of failure modes, which may have a significant contribution to the overall unavailability, the **VENDOR** may be required to demonstrate that the assumed repair time can be achieved.

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17.3 Operator Training



VENDOR SHALL be responsible for providing all necessary materials including any videos, if required, to adequately train the COMPANY'S operators for operations and maintenance of equipment supplied by the VENDOR. VENDOR SHALL also provide, if necessary, qualified personnel for operator training, to be reimbursed on per diem basis and all expenses at cost. The costs and duration for these training programs SHALL be separately identified in their quotation. Training SHALL cover basic theory equipment, construction operating procedures, maintenance procedures and control system training as a minimum.

18.0 DOCUMENTATION

18.1 Data Required with Bid

VENDOR SHALL provide the following along with the bid:



- Comments / Deviations / Exceptions taken by the VENDOR with respect to Codes, Standards and Regulations SHALL be explained with technical justification for PURCHASER'S evaluation.
- Functional description.
- Reliability / Availability information and figures.
- General Arrangement Drawings of the Pump with accessories.
- Performance curves for Pump & Drive system showing the selection criteria.
- Completed Data Sheets with Process Guarantee.
- Detailed scope of supply including detailed material.

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- Pump weight data. Erection weight operational weight, maximum weight.
- Foundation Loading Plan to indicate the critical loads at each support for all load cases.
- Schedule of Materials of Construction.
- Proposed manufacturing/ delivery schedule.
- Proposed Quality Assurance/ Safety Plan.
- Proposed Surface treatment.
- Typical Inspection and Test Plan.
- Certificates of conformity and declarations of compliance for equipment used in hazardous areas as specified.
- Recommended start-up and Commissioning spare list
- Recommended 2 years' operating spares.
- List of references.
- List of proposed major Sub-CONTRACTOR / VENDOR'S.
- Utility requirement and Consumption.
- VENDOR assistance, support facilities in Pakistan.

18.2 Drawings and Documents

The drawings and documents to be submitted after the Purchase Order SHALL be in accordance with applicable API Standard (i.e. API 674, API 675) and Document and Data Submittal Requirements (DDSR). The VENDOR drawings SHALL be reviewed and approved by COMPANY, against the Purchase Order. The approval by COMPANY does not signify compliance with the purchase order. It SHOULD be noted that review by the COMPANY is for quality assurance purpose only, assuming that VENDOR is technically responsible for all technical aspects of design checking. The VENDOR is responsible for checking of compliance with the relevant documents like this

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specification, applicable codes and COMPANY standards. Drawing detailing package envelope including installation and maintenance requirement and interface connections SHALL be supplied by VENDOR.

19.0 HEALTH SAFETY & ENVIRONMENT

The VENDOR SHALL be responsible for ensuring that the goods and services supplied meet all applicable national and international codes/ regulations on health, safety and environmental requirements.