

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

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

ANNEXURE 'A'

Material FOR PROCUREMENT OF CPI SEPERATOR FOR PRODUCED WATER DISPOSAL SYSTEM AT KUNNAR
Tender Enquiry No PROC-FE/CB/PROD-4439/2019
Due Date
Evaluation Criteria FULL


SCHEDULE OF REQUIREMENT

Sr No	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
1	CPI SEPARATOR TANK WITH ALL ACCESSORIES, DETAIL SPECIFICATION ATTACHED AT ANNEXURE 'A'.	Number	1					

Note:


1. **Bid bond;** - Pursuant to tender clause # 2.2, 11.4, 13 & 35.3.2, bid bond amounting to USD 5,040/- (USD Five Thousand Forty only) or equivalent in Pak Rupees should be submitted with the technical bid.
2. **Evaluation Criteria:** FULL CONSIGNMENT WISE ON C&F BY SEA KARACHI BASIS.
3. **Delivery Period: 180**
4. **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.
5. **Terms and conditions:** -Bidders are advised to carefully read all the terms and conditions of the Tender Document available at OGDCL website in the master tender document and attached technical Terms & Conditions
6. **Foreign Procurement Payment Terms (Competitive Bidding)**
 Following payments methods will be applied;
 - 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 case 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.


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 3.7.19.

TERMS AND CONDITIONS:

Sr. #	Description	Bidder's compliance
1	Original Authority letter of the manufacturer of pumps, CPI Separator, filtration system etc. 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. 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 for the similar type of equipments. 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. a- ISO 9001:20008, b- ISO 140001:2004, c- BS-OHSAS 18001:2007 certificates.	
8	Bidder to provide the technical literature of completed package with respect to all equipments.	
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, CPI Separator and Filtrations System.	
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.	★




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TERMS AND CONDITIONS:

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.
15	In financial bid bidder has to provide cost of the complete package as per boundary limits of CPI separator and also individual cost of item which are part of the package e.g. pumps, mountings etc. etc.
16	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.
17	Bidder to confirm and provide all the information/documents mentioned in the data sheets of the material (attached here) in technical proposals.
18	Bidder has to confirm that quoted filters, along with all the accessories shall be in accordance to the attached technical documents and data sheets.
19	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.
20	Provision of complete details of drawings after award of Contract prior to delivery of package
21	Bidder to comply all the terms and condition and TOR along with required docs in his technical proposal.




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DATASHEET FOR CPI SEPARATOR

CLIENT		OIL & GAS DEVELOPMENT LIMITED OGDCL House, Plot No.3, Jinnah Avenue, Blue Area Islamabad, Pakistan. Telephone Nos +92-51-9209811-18 Fax Nos: +92-51-2623113-18 Email: info@ogdcl.com	CLIENT REFERENCE		
CONSULTANTS		PETROCHEMICAL ENGINEERING CONSULTANT C-2, BLOCK NO. 17, GULSHAN-E-IQBAL NEAR NATIONAL STADIUM KARACHI-75300, PAKISTAN TEL: +92 21 34961088 & 34827780. FAX : +92 21 34961089 E-MAIL: contact@pcec.com.pk WEBSITE : www.pcec.com.pk	PEC PROJECT NO. 0404177		
PROJECT	DETAILED ENGINEERING DESIGN OF KUNNAR PRODUCED WATER DISPOSAL SYSTEM				
TITLE	DATASHEET FOR CPI SEPARATOR				
PREPARED SHR	CHECKED ASK	APPROVED AJ	DATE 08-Mar-19	DOCUMENT NO. 0404177-PRO-DT-002	REV 0

CLIENT		DETAILED ENGINEERING DESIGN OF KUNNAR PRODUCED WATER DISPOSAL SYSTEM				CONSULTANT	
		DATASHEET FOR CPI SEPARATOR					
PROCESS DATA							
SERVICE	Produced Water						
TYPE	CORRUGATED PLATE INTERCEPTOR						
NO REQUIRED:	ONE						
INFLUENT							
TOTAL FLOW	USGPM	DESIGN	175	OPERATING	145		
OIL SPECIFIC GRAVITY @60°F			0.85		0.84		
PH RANGE			6-9		7.98		
TEMPERATURE	°C		20/50		30-40		
PRESSURE	psig		NOTE-1		ATM		
FREE OIL CONTENT	ppm		1000				
TOTAL DISSOLVED SOLIDS(TDS)	ppm		67200				
EFFLUENT							
FREE OIL CONTENT IN EFFLUENT	ppm		50				
PH RANGE			6.5-8.5				
TOTAL DISSOLVED SOLIDS IN EFFLUENT(TDS)	ppm		3500				
PLATE CHARACTERISTICS							
TYPE OF SEPARATOR	Corrugated Plate Interceptor						
NUMBER OF PLATE PACKS	NOTE-1						
TYPE OF PLATES	Corrugated						
ANGLE OF INCLINATION	Deg	NOTE-1					
PLATE SPACING	in	NOTE-1					
REYNOLDS NO	-						
TOTAL NO OF PLATES PER PACK	NOTE-1						
SURFACE AREA/PACK	m ²	NOTE-1					
TOTAL SURFACE AREA	m ²	NOTE-1					
OVERALL PLATE PACK DIMENSIONS	m	LENGTH	WIDTH	HEIGHT			
		NOTE-1	NOTE-1	NOTE-1			
MATERIALS OF CONSTRUCTION							
ITEM	NOTE-1						
SEPARATOR TANK							
TRASH WRACK							
TRASH PAN							
WEIRS							
BAFFLES(FIXED)							
BAFFLES(REMOVABLE)							
OIL SKIMMER							
PLATES							
PLATE SUPPORT FRAME							
PLATE TIE RODS							
PLATE SPACERS							
PLATE PACK LIFTING BEAM							
COVERS							
0	ISSUED FOR REVIEW	08-Mar-19	SHR	ASK	AJ		
REV	DESCRIPTION	DATE	BY	CHK	APPD		


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CLIENT		DETAILED ENGINEERING DESIGN OF KUNNAR PRODUCED WATER DISPOSAL SYSTEM				CONSULTANT	
		DATASHEET FOR CPI SEPARATOR					
Doc. No.	0404177-PRO-DT-002	Rev - 0	SHEET 4 OF 4				
NOTES							
1	VENDOR TO SPECIFY						
2	THE OILY WATER TREATMENT PACKAGE BE DESIGNED IN ACCORDANCE WITH SPECIFICATION 0404177-PRO-SP-003						
3	THE UNIT IS TO BE DESIGNED FOR CONTINUOUS OPERATION.						
4	THE UNIT IS TO BE DESIGNED FOR START-UP, SHUTDOWN AND OPERATION AT ALL TEMPERATURES DOWN TO MINIMUM DESIGN TEMPERATURE OF 20°C						
5	SUPPLIER TO ADVISE TURNDOWN CAPABILITY						
6	THE CPI IS TO HAVE A MINIMUM OF THREE (PLATE PACK) BAYS.						
7	COMPLETE AND/OR CONFIRM ALL INFORMATION SHOWN AND TO SPECIFY ALL OTHER DATA. SUPPLIER TO CONFIRM ALL ACCESSORIES AND FITTINGS WITHIN HIS SCOPE OF SUPPLY						
8	SUPPLIER TO PROVIDE DETAILS EQUIPMENT LAYOUT INCLUDING PLOT SPACE REQUIREMENTS AND WEIGHTS						
9	SUPPLIER TO PROVIDE DETAILS OF ALL COMPONENT IN HIS BID						
10	SUPPLIER TO INCLUDE IN HIS DESIGN ALL ANCILLARY EQUIPMENT REQUIRED TO MEET THE SPECIFIED EFFLUENT LEVELS.						
11	THE SUPPLIER SHALL PROVIDE A GUARANTEE FOR THIS EFFLUENT OIL LEVEL						
12	SUPPLIER TO PROVIDE RECOVERED OIL PUMP AS PER ITS DATASHEET (0404177-PRO-DT-007)						
13	SUPPLIER TO PROVIDE PRODUCED WATER TRANSFER PUMP AS PER ITS DATASHEET (0404177-PRO-DT-006)						
14	SUPPLIER SHOULD PROVIDE ONE SPARE PLATE PACK WHICH IS TO BE USED DURING CLEANING OF OTHER PACKS.						
15	PROVISION FOR MANUAL CLEANING MUST ALSO BE PROVIDED FOR EACH COMPARTMENTS OF CPI SEPARATOR.						
0	ISSUED FOR REVIEW		08-Mar-19	SHR	ASK	AJ	
REV	DESCRIPTION		DATE	BY	CHK	APPD	

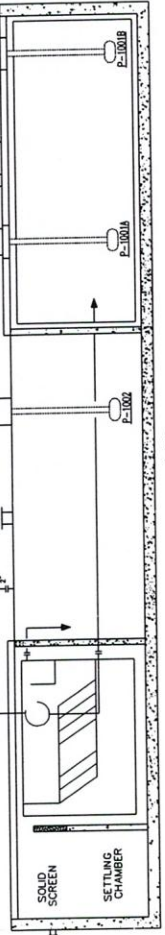

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CPI SEPARATOR (S-1001)	
OPERATING PRESSURE	100
OPERATING TEMPERATURE	30-40 °C

PRODUCED WATER TRANSFER PUMPS (P-1001 A/B)	
CAPACITY (USGPM)	145
DIFF. PRESSURE (PSI)	31
HYDRAULIC POWER (KW)	5

RECOVERED OIL TRANSFER PUMPS (P-1002)	
CAPACITY (USGPM)	25
DIFF. PRESSURE (PSI)	20-25
HYDRAULIC POWER (KW)	2.0

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NOTES:
 1. PROVISION FOR FUTURE CONNECTION.

REV.	DATE	ISSUED FOR REVIEW	MAH	SHR	PREP'D	CHECK	APPR.
0	19-02-2019						

PG PETROCHEMICAL ENGINEERING CONSULTANTS
 C-2, BLOCK NO. 11, GULSHAN-E-CORAL, NEAR NATIONAL STADIUM, KARACHI-75000, PAKISTAN
 TEL: +92 (21) 4677961, 4677962, 4677963, 4677964, 4677965, 4677966, 4677967, 4677968, 4677969, 4677970, 4677971, 4677972, 4677973, 4677974, 4677975, 4677976, 4677977, 4677978, 4677979, 4677980, 4677981, 4677982, 4677983, 4677984, 4677985, 4677986, 4677987, 4677988, 4677989, 4677990, 4677991, 4677992, 4677993, 4677994, 4677995, 4677996, 4677997, 4677998, 4677999, 4678000

CLIENT: **OIL & GAS DEVELOPMENT COMPANY LIMITED**

PROJECT: **DETAILED ENGINEERING DESIGN FOR KUNNAR PRODUCED WATER DISPOSAL SYSTEM**

TITLE: **PIPING & INSTRUMENTATION DIAGRAM FOR OIL/WATER SEPARATION SYSTEM**

JOB NO.	DRAWING NO.	SHEET NO.	SCALE	SHEET SIZE	REV.
0404177	0404177-PI-002	1 OF 1	1/8"	A3	0

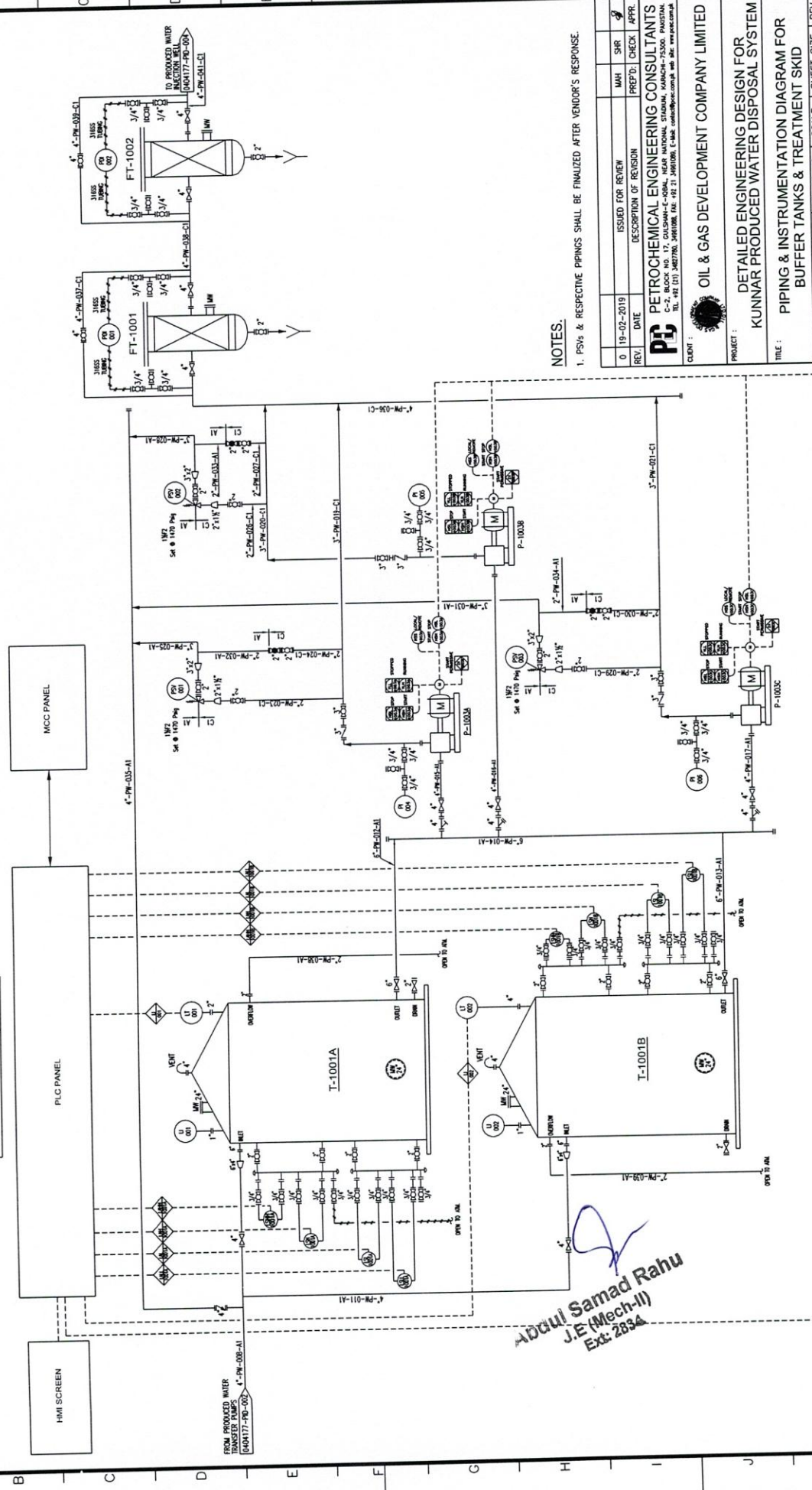
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PRODUCED WATER BUFFER TANK(T-1001A/B)	
DESIGN PRESSURE	ATM
OPERATING PRESSURE	ATM
DESIGN TEMPERATURE	200 °F
OPERATING TEMPERATURE	AMB
INTERNAL DIAMETER, ft	39.37
HEIGHT, ft	26.25

PRODUCED WATER INJECTION PUMP(P-1003A/B)	
CAPACITY (USGPM)	105
DIFF. PRESSURE psi	1450
HYDRAULIC POWER (MW)	88.3

PRODUCED WATER CHARCOAL FILTER (FT-1001)	
CAPACITY (BPD)	7200
PRESSURE DROP psi	5-10

PRODUCED WATER PARTICULATE FILTER (FT-1002)	
CAPACITY (BPD)	7200
PRESSURE DROP psi	5-10



NOTES:
 1. PVS & RESPECTIVE PIPINGS SHALL BE FINALIZED AFTER VENDOR'S RESPONSE.

REV.	DATE	DESCRIPTION OF REVISION	MADE BY	SHR	CHECK	APPR.
0	19-02-2019	ISSUED FOR REVIEW				

CLIENT: OIL & GAS DEVELOPMENT COMPANY LIMITED

PROJECT: DETAILED ENGINEERING DESIGN FOR KUNNAR PRODUCED WATER DISPOSAL SYSTEM

TITLE: PIPING & INSTRUMENTATION DIAGRAM FOR BUFFER TANKS & TREATMENT SKID

JOB NO.	DRAWING NO.	SHEET NO.	SCALE	SHEET SIZE	REV.
0404177	0404177-PID-003	1 OF 1	N.T.S.	A3	0

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OIL & GAS DEVELOPMENT COMPANY LIMITED



Specification for CPI Separator

0404177-PRO-SP-003


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CONSULTANTS:

Mar, 2019



Petrochemical Engineering Consultants



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	DETAILED ENGINEERING DESIGN OF KUNNAR PRODUCED WATER DISPOSAL SYSTEM			
	Document Title:	SPECIFICATION FOR CPI SEPARATOR		
Document No:	0404177-PRO-SP-003	Rev-0	Page 1 of 10	

1 INTRODUCTION

This specification covers basic design, manufacture, supply, testing, inspection and supply of all items of mechanical, electrical and instrument for packaged oil water separator.

2 PROCESS DESCRIPTION

The oily effluent treatment plant shall consist of collection of oily effluent, separation of oil from oily water and recovery of water prior to discharge off plot.

The oily effluent from tank farm area shall flow through underground oily water drain channel. The oil effluent flows by gravity to CPI, which removes free oil and suspended solids from oily effluent, the recovered oil shall be pumped out by recovered oil pump to condensate tank.

Produced water from CPI will be directed to water treatment plant through centrifugal vertical sump pump. The oil content of final effluent must not exceed 10 mg/L max.

3 REFERENCE DOCUMENTS



3.1 Piping and Instrumentation Diagram

- 0404177-PID-001 Tank Farm
- 0404177-PID-002 Produced Water Treatment Skid.
- 0404177-PID-003 Produced Water Storage Tank.
- 0404177-PID-004 Produced Water Injection Wellhead
- 0404177-PID-005 Corrosion Inhibitor Skid

3.2 Datasheet

- 0404177-PRO-DT-002 Datasheet for CPI Separator


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4 SCOPE OF SUPPLY

Supplier's scope of supply shall essentially consist of, but not limited to, the following items:

4.1 Oily Water CPI Separator

- ✓ An included, down flow type CPI is required for separation of free oil, water and solids at atmospheric pressure.
- ✓ Floating skimmer with accessories for oily water separator.
- ✓ The CPI is to have a minimum of three plate pack bays.
- ✓ Inlet trash rack, trash pan and rake, flow distribution baffles for each bay, inlet bell -mouths (two per bay) and included corrugated plate assemblies.
- ✓ Outlet weir and skimmer assemblies (one per bay), integral skimmed oil sump, oil and effluent sump.
- ✓ All necessary flooring platforms and handrails and a hoisting beam for maintenance of the plate.
- ✓ Electrical items with accessories within battery limit which includes electric motors with motor starters Lighting and respectable (including lighting fixtures, cables, wires and cable ways), earthing and lightning material.



4.2 Recovered Oil Transfer Pumps

- ✓ Supplier shall provide 1 x 100% capacity recovered Oil Pump.
- ✓ The recovered oil pump is to have a capacity of 25 USGPM .
- ✓ Recovered oil compartment shall be size on the basis that it can be emptied out in one (01) hr by 25 USGPM capacity pump.
- ✓ Supplier shall provide pump mountings.

4.3 Produced Water Pumps

- ✓ Produced water is transferred from CPI through produced water pump to produced water storage tanks.
- ✓ Storage plant approximately at a distance of 0.5km from CPI separator.
- ✓ Supplier shall provide 1 x 100% of design flow rate recovered water pumps.


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- ✓ The Produced water pump is to have a capacity of 145 USgpm.
- ✓ Produced water compartment shall have a capacity suitable to empty compartment by 66.6% pump in 6 minutes.
- ✓ Supplier shall provide pump mountings.

5 DESIGN CONDITIONS

The CPI separator will be designed for treating the polluted water having the following characteristics:

Design Flow Rate(USgpm)	175
pH Range	6-9
Free oil specific gravity	0.85
Influent Free oil content(ppm)	1000
TDS(ppm)	67200

The section will be designed for laminar flow at all the specified conditions.

6 PROCESS GUARANTEES

The CPI section will be designed in order to guarantee the following characteristics of the treated de oiled water at the design conditions:



Free oil (ppm)	50
TDS(ppm)	<3500

The CPI is to be designed to remove 100% of oil droplets larger than 60 micron diameter at normal temperature.

7 INSTRUMENTATION

Instrumentation scope of services includes supply of all Instruments as depicted from 0404177-PID-002. It mainly includes supply of Level transmitter and level gauges for condensate and Water-condensate interface level measurement.


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Level transmitter shall employ one of the following field proven level-measuring techniques such as displacer, capacitance, magnetic or magnostriptive.

Transmitter shall be certified for use in hazardous environment. Method of protection shall be Ex"d" flame proof. Instrument shall be certified by recognized body such as ATEX, Cenelec or equivalent.

Signal transmission between field instrument and plant control system shall be 2-wire loop powered 4-20 mA supporting HART protocol. Accuracy of level transmitter shall be better than 5% of adjustable span.

Transmitter shall have integrated local field indication. Pressure and temperature rating of provided instrument shall be in strict accordance with process service conditions.



Method of protection shall be Ex"d" flame proof. Instrument shall be certified by recognized body such as ATEX, Cenelec or equivalent. Switch unit shall contain SPDT min 5A rating potential free for signal transmission between field instrument and plant control system.

Pressure and temperature rating of provided instrument shall be in strict accordance with process service conditions

8 ELECTRICAL

- ✓ Motors shall operate at 460V 60Hz
- ✓ Motors shall be continuously rated, and shall be suitable for direct-on-line starting
- ✓ Motors shall at minimum have class F insulation, and be rated for operation having a class B temperature rise, adjusted for the site ambient design temperature of 60 °C.
- ✓ The minimum degree of protection for motor enclosures will be IP55 to IEC60529, and for motor terminal boxes will be IP56.
- ✓ Motors will have TEFC enclosures.
- ✓ Motor certification for operation in hazardous areas shall be of type Ex "de'.
- ✓ Motors greater than 90kW rating will have anti-condensation heaters. Motors greater than 200kW rating will also have winding temperature monitoring devices fitted. The temperature devices will be connected to a protection relay in the motor starter.


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- ✓ The supplier shall retain full responsibility for motor sizing, mounting and alignment and ensure compatibility with driven equipment. All inspection and testing requirements, drawings and data requirements, etc, shall be the responsibility of the supplier, who shall ensure that the motor sub-supplier meets all requirements as specified.
- ✓ Local panel of the package shall employ with the motor starter units.
- ✓ Solid –state logic circuits will be used for solenoid units.

9 INSPECTION AND TESTING

- ✓ All equipment and other items supplied under this requisition shall be subjected to inspection by the purchaser or third party.
- ✓ Acceptance of shop tests does not constitute a waiver of requirements to meet the field tests under specified operating conditions, nor does inspection relieve the supplier of his responsibility, in anyway whatsoever.



10 PROTECTION AND MARKING

- ✓ The oily water separator package shall be furnished with an SS nameplate bearing the following information:
 - Manufacturer's name
 - Purchaser's order number
 - Purchaser's plant item number
 - Unit name (i.e. Oily water separator)
 - Design capacity

11 GUARANTEE

- ✓ All equipment, machinery and component parts along with auxiliaries electrical and instrumentation shall be guaranteed by the supplier against defective material, design and workmanship.
- ✓ The supplier shall fully guarantee the mechanical performance of the equipment
- ✓ If any defects are discovered in any equipment during the guarantee period, the supplier shall make necessary repairs, modification or replacements as required under mechanical warranty.

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12 COMMISSIONING AND PERFORMANCE TEST


- ✓ After mechanical erection of the complete plant, the plant shall be commissioned as per commissioning procedure given by supplier, by commissioning team appointed by purchaser.
- ✓ After successful commissioning of the plant and sustain load for minimum 45 days, the plant shall be subjected to performance test as per details to be agreed between the purchaser and the supplier. The duration of the performance test shall be 72 hours of uninterrupted run.
- ✓ The supplier shall prove guarantee of individual equipment and unit as per design data given in the data sheets
- ✓ If plant or any equipment fails to meet the guaranteed parameters, the supplier shall perform required modifications for equipment as per guarantee requirement and repeat the performance test.



13 SUPERVISION

- ✓ Owner may require the supplier's representative to be present at the time of final performance test at site. Supplier shall quote a daily rate for servicemen. The client will provide economy air ticket, accommodation, meals and local transportation to and from job site.

14 PACKING AND SHIPPING

- ✓ The package shall be prepared for shipment in accordance with good packing practice. All exposed machined surfaces and delicate mechanical parts shall be protected with wood or plastic covers, to prevent mechanical damage during shipment. All machined surfaces shall be protected from corrosion by suitable anti-corrosion methods. Any coating so used shall be clean and easy to remove at job site. All equipment that may contain or may have been tested with water shall be drained and protected against corrosion during shipment
- ✓ All material shall be properly protected and so loaded as to prevent damage in transit. Items such as bolts, nuts and washers shall be packed in boxes or kegs.
- ✓ Each crate, box etc. shall, in addition to the address, be durably marked with the purchaser's complete requisition number and a listing of the contents and item numbers.
- ✓ Items purchased by the supplier shall be packaged and marked in a similar manner as described above.


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15 MANUFACTURER'S DRAWINGS & OTHER DATA

- ✓ The supplier shall furnish the number of copies specified on the requisition sheets of the drawing.
- ✓ These drawings shall include but not necessarily be limited to the following:
 - General arrangement drawings of the treatment plant showing full details of access and equipment handling facilities and terminal connections.
 - Foundation loading plan
 - Piping & instrumentation diagram
 - Electrical wiring diagram
 - Fully detailed outline drawing of the oily effluent treatment plant
 - All necessary arrangement and details drawings and all other schedules and information necessary for the procurement of materials, site manipulation and site installation of the package.
 - Recommended electrical power cable routes.

16 BIDS

- ✓ The bidder shall make one quotation in accordance with this specification.
- ✓ Alternate bids may also be submitted provided all divergences are indicated.
- ✓ The supplier shall submit separate prices on a per diem basis for the services of engineers to supervise all site construction work.
- ✓ The bidder shall submit with his tender the following information, including separate sets of information and data to accompany alternative offers (if any):
 - Prints of the purchaser's data sheets on which all the required information has been inserted.
 - A preliminary outline drawing showing all principal dimensions and the approximate location and size of all piping connections.
 - Total man-hours, time schedule and size of labour force required for complete erection. Where appropriate these man-hours shall be segregated into the respective trades.


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	DETAILED ENGINEERING DESIGN OF KUNNAR PRODUCED WATER DISPOSAL SYSTEM			
	Document Title:	SPECIFICATION FOR CPI SEPARATOR		
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- A reference list of similar air dryer package installations which have been in successful operation for a period of at least 12 months.

17 ERRORS OR OMISSIONS

The review and comment by the Owner of any Contractor's or its manufacturer's drawings, procedures or documents shall only indicate acceptance of general requirements and shall not relieve the Contractor of its obligations to comply with the requirements of this specification and other related parts of the contract documents. Any errors or omissions noted by the Contractor in this Specification shall be immediately brought to the attention of the Owner

18 DEVIATIONS

All deviations to this Specification, other related specifications or attachments shall be brought to the knowledge of the Owner in the bid. All deviations made during the procurement, design, manufacturing, testing and inspection of the oily water separator package shall be with written approval of the owner prior to execution of work. Such deviations shall be shown in the documentation prepared by the Contractor.



18.1 Conflicting Requirements

In the event of any conflict, inconsistency or ambiguity between the contract scopes of work, this specification, national codes & standards referenced in this specification or any other documents, the contractor shall refer to the owner whose decision shall prevail.

18.2 Reporting Procedure

A reporting and documentation system shall be agreed between the Owner and the contractor for the status of procurement, design, manufacturing, inspection, testing and shipment of the equipment/material to be supplied under this specification. Contractor's manufacturer shall provide reports and summaries for production, performance and testing operations in conformance with a manufacturing schedule approved by owner.


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18.3 Governing Standards

1. National Fire Protection Assoc. (NFPA 30) Flammable and Combustible Liquids Code, (NFPA 30A) Automotive and Marine Service Station Code, [NFPA 70) National Electrical Code.
2. UL 58
3. API manual on disposal of refinery wastes
4. API bulletin no. 421
5. API bulletin no. 1630 first edition (replaced by API 421)
6. Coast Guard Specification 46 CFR 162.50 - 46 CFR Chapter 1
7. EPA Test Method 413. 1, Oil and Grease, Total Recoverable (Gravimetric, Separatory, Funnel Extraction)
8. EPA Test Method 413.2, Oil and Grease, Total Recoverable (Spectrophotometer, Infrared)
9. Steel Tank Institute

19 QUALITY ASSURANCE

1. Test Data: The manufacturer must provide test results showing that the oil/water separator product design is capable of producing effluent with no more than 10 ppm free oil and grease (not dissolved nor chemically emulsified with soaps or detergents) when tested using the Coast Guard test method 46 CFR 162.50. The test inlet oils include both 0.84 and 0.85 specific gravity (approximate) oils.
2. Oil/Water separator tank shall be constructed in accordance with UL58 governing standards.
3. All OWS tanks, equipment and piping materials shall be physically inspected and tested before being installed. Any defects observed shall be immediately brought to the attention of the Owner. It shall be the sole responsibility of the Contractor to correct any deficiencies, with the manufacturer in strict accordance with manufacturers' recommendations, at no additional cost to the Owner.
4. Contractor shall submit Two (02) copies of manufacturer's literature.


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5. Containment Solutions Oil/Water separators will not remove oils with specific gravities greater than 0.85, chemical or physical emulsions, dissolved hydrocarbons, or volatile organic compounds (VOC).
6. The contractor shall obtain and pay for all permits, tests, inspections, etc. required by the local boards that have jurisdiction over the project. All work shall be executed and inspected in accordance with all local and state codes, rules, ordinances, or regulations pertaining to the particular work involved. Should any changes in the contract drawings and specifications be required to conform to such ordinances, notify the owner at time of submitting bid? After entering into the contract the contractor shall be held responsible for the completion of all work necessary for a complete and approved installation without extra expense to the owner.


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DATASHEET OF PRODUCE WATER TRANSFER PUMPS**P-1001 A/B**

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
 Fax: +92-51-2623113-18; Website: www.ogdcl.com





PETROCHEMICAL ENGINEERING CONSULTANTS
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 E-MAIL: contact@pcec.com.pk WEBSITE: www.pcec.com.pk

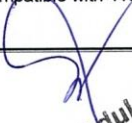
PEC
 PROJECT NO.



0404177

PROJECT	DETAILED ENGINEERING DESIGN OF KUNNAR PRODUCED WATER DISPOSAL SYSTEM				
TITLE	DATASHEET OF PRODUCE WATER TRANSFER PUMPS P-1001 A/B				
DOCUMENT No.	0404177-PRO-DT-006				
PREPARED	CHECKED	APPROVED	DATE	REV.	DESCRIPTION
SHR	ASK	AJ	08-Mar-19	0	Issued for Review

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	DETAILED ENGINEERING DESIGN OF KUNNAR PRODUCED WATER DISPOSAL SYSTEM DATASHEET OF PRODUCE WATER TRANSFER PUMPS	
Document No. 0404177-PRO-DT-006		Sheet 2 of 2
For Oil & Gas Development Company Limited		Site Kunnar Gas Field
Unit -		Service Produce Water Transfer Pumps
No. Pumps Req'd 2	No. Motors Req'd 2	Provided By - Mtd By -
Item No. P-1001 A/B	Item Description Submersible Pumps	
No. Engines Req'd N/A	No. Turbines Req'd N/A	Provided By N/A Mtd By N/A
Item No. -	Item Description -	
Pump Mfr. -	Size and Type -	Manufacturer Std. - Serial No. -
OPERATING CONDITIONS, EACH PUMP		PERFORMANCE
Liquid Produced Water	Flowrate(Usqpm) 145	Rated 28
Sp. Gravity at P. T. 1.05	Disch. Press., psig 28	Proposal Curve No. X
P.T. °F, Nor. 100 Max. 120	Suct. Press., psig -3	Rated 28
Vap. Press. at P.T, Psig 0.9-1.0	Diff. Head (Psig) 31.0	NPSHR (Service) X
Vis. at P.T., cp 0.7	NPSHA (ft) 20	Eff. X BHP Rated X
Corr/Eros. Caused by Water	Hydraulic Power(kW) 3.85	Max. Head Rated IMP X
Location: <input type="radio"/> Indoor <input checked="" type="radio"/> Outdoor	Area: <input type="radio"/> Safe <input checked="" type="radio"/> Hazardous	Min. Continuous gpm X
Working: <input type="radio"/> Continuous <input checked="" type="radio"/> Intermittent	<input type="radio"/> Random	Rotation (Viewed from CPLG End) X
CONSTRUCTION		SHOP TESTS
Nozzles	Size 6"(VTC)	Rating 150#
Suction	Facing RF	Location VTS
Discharge	Size 4"(VTC)	Rating 150#
Case-mount:	<input type="radio"/> Centerline <input type="radio"/> Foot <input type="radio"/> Bracket <input type="radio"/> Vert. (Type)	<input type="radio"/> Non-Wit. Perf. <input type="radio"/> Wit. Perf.
- Split:	<input type="radio"/> Axial <input type="radio"/> Rad; Type Volute <input type="radio"/> SGL <input type="radio"/> DBL <input type="radio"/> Diffuser	<input type="radio"/> Non-Wit. Hydro <input type="radio"/> Wit. Hydro
- Press:	<input type="radio"/> Max. Allow, psig °F; <input type="radio"/> Hydro Test psig	<input type="radio"/> NPSH Req'd. <input type="radio"/> Wit. NPSH
- Connect:	<input checked="" type="radio"/> Vent <input checked="" type="radio"/> Drain <input type="radio"/> Gage <input type="radio"/> PSV	<input type="radio"/> Shop Inspection
Impeller Dia.:	<input type="radio"/> Rated <input type="radio"/> Max. <input type="radio"/> Type:	<input type="radio"/> Dismant. & Insp. After Test
Mount:	<input type="radio"/> Between Brgs <input type="radio"/> Overhung	<input type="radio"/> Other
Bearings-type:	<input type="radio"/> Radial <input type="radio"/> Thrust	MATERIALS
Lube:	<input type="radio"/> Ring Oil <input type="radio"/> Flood <input type="radio"/> Oil Mist <input type="radio"/> Flinger <input type="radio"/> Pressure	Chrome plated Carbon Steel
Coupling:	<input checked="" type="radio"/> Mfr. Metastream or Eq. <input checked="" type="radio"/> Model Sparkproof	
Driver Half Mtd By:	<input type="radio"/> Pump Mfr. <input type="radio"/> Driver Mfr. <input type="radio"/> Purchaser	
Packing:	<input type="radio"/> Mfr. & Type <input type="radio"/> Size/No. of Rings	
Mech. Seal:	<input checked="" type="radio"/> Mfr. & Model <input type="radio"/> YES <input type="radio"/> API Class. Code	
	<input type="radio"/> Mfr. Code (Note-2)	Baseplate: <input type="radio"/> Yes
AUXILIARY PIPING		
<input type="radio"/> C.W. Pipe Plan N/A <input type="radio"/> CU; <input type="radio"/> SS; <input type="radio"/> Tubing; <input type="radio"/> Pipe		
<input type="radio"/> Total Cooling Water Req'd, gpm <input type="radio"/> Sight F.I. Req'd		
<input type="radio"/> Packing Cooling Injection Req'd: <input type="radio"/> Total gpm <input type="radio"/> psig		
<input type="radio"/> Seal Flush Pipe Plan <input type="radio"/> CS <input type="radio"/> SS <input type="radio"/> Tubing <input type="radio"/> Pipe		
<input type="radio"/> External Seal Flush Fluid <input type="radio"/> gpm <input type="radio"/> psig		
<input type="radio"/> Auxiliary Seal Plan <input type="radio"/> CS <input type="radio"/> SS <input type="radio"/> Tubing <input type="radio"/> Pipe		
<input type="radio"/> Aux. Seal Quench Fluid		
MOTOR DRIVER		
Est. Power Req'd. 5 kW	Frame NOTE-5	Volts/Phase/Cycles NOTE-5
Type Explosion Proof	Bearings Lube	Approx. WT. Pump & Base VTS
Type TEFC	Insul. F	Full Load Amps Motor Turbine <input type="radio"/>
Enc IP 55	Temp. Rise, °C 80	Locked Rotor Amps
NOTES :		
1- X : means requirement O : Not Required.		
2- Mechanical Seals shall be in accordance with ASME B 73.1.		
3- Motor driver shall be in accordance with IEC 60034-1 and NEMA Standards and or other practice.		
4- Pump with Motor should be mounted on common base plate by pump manufacturer.		
5- Motor shall be Explosion Proof suitable for Zone-1, Group IIA, Class T6 and should compatible with 415V & 440 V / 50 Hz.		
6- VTS : Vendor to Specify ; VTC : Vendor to Confirm		


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	CLIENT DETAILED ENGINEERING DESIGN OF KUNNAR PRODUCED WATER DISPOSAL SYSTEM			CONSULTANT 			
	DOC. TITLE	DATASHEET OF PRODUCE WATER TRANSFER PUMPS					
	DOC. NO.	0404177-PRO-DT-006	Rev-0	SHEET 3 OF 3			
Produced Water Analysis							
Parameters				Value			
pH				6-9			
Free Oil				50 ppm			
Total Suspended Solids				3500 ppm			
Sulphates				164 ppm			
Chlorides				49086 ppm			
8-Mar-19	0	ISSUED FOR REVIEW			SHR	ASK	AJ
Date	Rev	Description			PREP.	CKD	APPR


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DETAILED ENGINEERING DESIGN OF KUNNAR PRODUCED WATER DISPOSAL SYSTEM



DATASHEET OF RECOVERED OIL TRANSFER PUMP

Sheet 2 of 2

Document No. 0404177-PRO-DT-007

For Oil & Gas Development Company Limited Site Kunnar Gas Field
Unit Kunnar Gas Field Service Recover Oil Transfer Pump
No. Pumps Req'd 1 No. Motors Req'd 1 Provided By Submersible Pump
Item No. P-1002 Item Description N/A Mtd By N/A
No. Engines Req'd N/A No. Turbines Req'd N/A Provided By N/A Mtd By N/A
Pump Mfr. Size and Type Manufacturer Std. Serial No.

OPERATING CONDITIONS
Liquid Recoverd Oil Usgpm 25 Rated
Sp. Gravity at P. T. 0.86 Disch. Press., Psig 20
P.T. °F, Nor. 100 Max. 120 Suct. Press., Psig -2.44 Rated
Vap. Press. at P.T, Psia 0 Diff. Head (psig) 22.0
Vis. @ 100°C 2.21 cP NPSHA, ft. 29
Corr/Eros. Caused by Water Hydraulic Power(kW) 1.5
Location: O Indoor X Outdoor Area: O Safe X Hazardous
Working: O Continuous X Intermittent O Random

PERFORMANCE
Proposal Curve No. X
RPM X NPSHR (Water) X
NPSHR (Service) X
Eff. X BHP Rated X
Max. Head Rated IMP X
Min. Continuous gpm X
Rotation (Viewed from CPLG End) X

CONSTRUCTION
Nozzles Size Rating Facing Location
Suction 4"(VTC) 150# RF VTS
Discharge 3"(VTC) 150# RF VTS
Case-mount: O Centerline O Foot O Bracket O Vert. (Type)
- Split: O Axial O Rad; Type Volute O SGL O DBL O Diffuser
- Press: O Max. Allow, psig °F O Hydro Test psig
- Connect: X Vent X Drain O Gage O PSV
Impeller Dia.: O Rated O Max. O Type:
Mount: O Between Brgs O Overhung
Bearings-type: O Radial O Thrust
Lube: O Ring Oil O Flood O Oil Mist O Flinger O Pressure
X Mfr. Metastream or Eq. X Model Sparkproof
Coupling: Driver Half Mtd By: O Pump Mfr. O Driver Mfr. O Purchaser
Packing: O Mfr. & Type O Size/No. of Rings
Mech. Seal: X Mfr. & Model YES API Class. Code
O Mfr. Code (Note-2)

SHOP TESTS
O Non-Wit. Perf. O Wit. Perf.
O Non-Wit. Hydro O Wit. Hydro
O NPSH Req'd. O Wit. NPSH
O Shop Inspection
O Dismant. & Insp. After Test
O Other

MATERIALS
Casing : Ductile Iron (VTC)
Impeller : Cast Iron (VTC)
Shaft : Carbon Steel (VTC)
Baseplate: Yes

AUXILIARY PIPING
O C.W. Pipe Plan N/A O CU; O SS; O Tubing; O Pipe
O Total Cooling Water Req'd, gpm O Sight F.I. Req'd
O Packing Cooling Injection Req'd: O Total gpm O psig
O Seal Flush Pipe Plan O CS O SS O Tubing O Pipe
O External Seal Flush Fluid O gpm O psig
O Auxiliary Seal Plan O CS O SS O Tubing O Pipe
O Aux. Seal Quench Fluid

MOTOR DRIVER
Est. Power Req'd. 2 kW Frame Volts/Phase/Cycles NOTE-5
Type Explosion Proof Bearings Lube
Type TEFC Insul. F Full Load Amps
Enc IP 55 Temp. Rise, °C 80 Locked Rotor Amps
Approx. WT. Pump & Base VTS
Motor Turbine O

- NOTES :
1- X : Required O : Not Required.
2- Mechanical Seals shall be in accordance with ASME B 73.1.
3- Motor driver shall be in accordance with IEC 60034-1 and NEMA Standards and or other practice.
4- Pump with Motor should be mounted on common base plate by pump manufacturer.
5- Motor shall be Explosion Proof suitable for Zone-1, Group IIA, Class T6 and should compatible with 415V & 440 V / 50 Hz.
6- VTS : Vendor to Specify ; VTC : Vendor to Confirm

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OIL & GAS DEVELOPMENT COMPANY LIMITED



Specification for PW and Recovered Oil Transfer Pumps

0404177-PRO-SP-007

CONSULTANTS:

Mar, 2019




Petrochemical Engineering Consultants



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	DETAILED ENGINEERING DESIGN OF KUNNAR PRODUCED WATER DISPOSAL SYSTEM	
Doc. No. 0404177-PRO-SP-007	Specification For Produced Water & Recovered Oil Transfer Pump	Revision No. 0

1.0 INTRODUCTION


1.1 SCOPE



This specification covers the minimum technical requirements for the design manufacture, supply, inspection, testing and commissioning of Centrifugal pumps.

1.2 DEFINITIONS

Following definitions apply throughout this document:

Company / Owner	Oil & Gas Development Company Limited (OGDCL)
Contractor	"Contractor" means the person or persons, firm or Proprietor whose proposal has been Accepted by the Company for verification of FEED package, engineering design, procurement, inspection, supply of material and equipment, construction commissioning, performance testing, one year of defect liability period and training of Company's personnel for the project and includes the Contractor's representative(s), successors and permitted assignees.
Vendor	The organization, firm or agency with whom order for the supply of equipment and or material has been placed.


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	DETAILED ENGINEERING DESIGN OF KUNNAR PRODUCED WATER DISPOSAL SYSTEM	 P&C Petrochemical Consultants
Doc. No. 0404177-PRO-SP-007	Specification For Produced Water & Recovered Oil Transfer Pump	Revision No. 0

1.3 Errors or Omissions

The review and comment by the COMPANY of any CONTRACTOR / SUPPLIER's drawings, procedures or documents shall only indicate acceptance of general requirements and shall not relieve the CONTRACTOR / SUPPLIER of its obligations to comply with the requirements of this specification and other related parts of the Contract Documents.

Any errors or omissions noted by the CONTRACTOR / SUPPLIER in this Specification shall be immediately brought to the attention of the COMPANY.

1.4 Deviations

All deviations to this Specification, other related specifications or attachments shall be brought to the knowledge of the COMPANY as a section in the bid. All deviations made during the procurement, design, manufacturing, testing and inspection shall be with written approval of the COMPANY prior to execution of Work. Such deviations shall be shown in the documentation prepared by the CONTRACTOR / SUPPLIER.



1.5 Conflicting Requirements

In the event of any conflict, inconsistency or ambiguity between the CONTRACTOR / SUPPLIER's scope of work, this Specification, Codes and Standards, referenced in the Project Specification or any other documents, the CONTRACTOR / SUPPLIER shall refer to the COMPANY whose decision shall prevail.

1.6 Reporting Procedure

A reporting and documentation system shall be agreed between the CONTRACTOR / SUPPLIER and the COMPANY for the status of procurement, design, manufacturing, inspection, testing and shipment of the


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	DETAILED ENGINEERING DESIGN OF KUNNAR PRODUCED WATER DISPOSAL SYSTEM	 Petrochemical Consultants
Doc. No. 0404177-PRO-SP-007	Specification For Produced Water & Recovered Oil Transfer Pump	Revision No. 0

equipment/material to be supplied under this specification. CONTRACTOR / SUPPLIER shall provide reports and summaries for production performance and testing operations in conformance with a manufacturing schedule approved by COMPANY.

Daily, weekly, monthly and run summaries of all major aspects of the production process shall be provided as reports to the COMPANY.

In addition to the inspection and witnessing of tests by the inspectors to be appointed by the COMPANY during the manufacturing and shipment of the equipment/material, COMPANY may appoint a third party or its own inspector for witnessing of the inspection and tests to be carried out at CONTRACTOR / SUPPLIER's facility under this specification.


1.7 Unit Responsibility


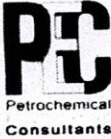
The CONTRACTOR / SUPPLIER shall be responsible for the complete design, manufacture, supply, fabrication, construction, installation/erection, and inspection and testing of the Centrifugal Pump units, including full compliance with all applicable design codes and standards, including those listed in Section 2.0 of this document and the requirements of the certifying authority, if applicable. The CONTRACTOR / SUPPLIER shall handle and expedite drawings and data, and supervise and coordinate all inspection and testing.

CONTRACTOR / SUPPLIER shall guarantee that all material and parts included in construction of the specified Centrifugal pump shall be new, unused and of the required/ specified grade.

1.8 Documentation

- a) Documents, calculation sheets, drawings, etc., to be submitted to the COMPANY shall be in English Language.


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	DETAILED ENGINEERING DESIGN OF KUNNAR PRODUCED WATER DISPOSAL SYSTEM	
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- b) Unless otherwise specified, the US Customary units shall be used in documents and drawings, except that pipe sizes, flange sizes and bolts/nuts shall be indicated in inches.
- c) The form of drawings and documents may be as per the CONTRACTOR /SUPPLIER's Standards. However, the format of the data sheet will be submitted to COMPANY for approval.
- d) Variations from or additions to this specification shall be called to the attention of the COMPANY and approved in writing by the COMPANY prior to starting fabrication.
- e) Information for installation, operating, maintenance or inspection purposes shall be submitted to COMPANY.


2.0 CODES AND STANDARDS


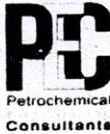
2.1 Codes, Standards and Regulations

The Centrifugal Pump(s) shall be designed, manufactured and tested in accordance with the requirements of this specification, other reference Project Specifications and the Latest Editions of following Codes, Standards and Statutory Regulations (where applicable):

API Standard 610	Centrifugal Pumps for General Refinery Services
API Standard 614 Systems	Lubrication, Shaft Sealing and Control Oil for Special Purpose Applications

API Standard 615 For Refinery Services	Sound Control of Mechanical Equipment
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API Standard 670	Non-Contacting Vibration and Axial Position Monitoring Systems
API Standard 678	Accelerometer Based Vibration and Axial Position Monitoring Systems.
API Standard 682	Sealing Plans for Centrifugal Pumps
ASME VIII DIV I	Pressure Vessels
ANSI B.1.20. 1	Pipe Threads General Purpose (inch)
ANSI B.16.5	Pipe Flanges and Flanged Fittings
ANSI B.31.3	Petroleum Refinery Piping
ISO Standard No.1940	Balance Quality of Rotating Rigid Bodies

3.0 APPLICABLE PROJECT SPECIFICATIONS

- Piping Specification
- Specification for Export Packing & Crating
- Specification for Painting and Surface Preparation
- Specification for Production Welding
- Specification for Equipment with low Temperature service and their Materials of Construction
- Specification for Unfired Pressure Vessel
- Specification for Structure Steel Works
- Specification for Instrumentation for Packaged Unit
- Specification for Motors
- Specification for Electrical requirements for Packaged Equipment


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	<p align="center">DETAILED ENGINEERING DESIGN OF KUNNAR PRODUCED WATER DISPOSAL SYSTEM</p>	
<p>Doc. No. 0404177-PRO-SP-007</p>	<p align="center">Specification For Produced Water & Recovered Oil Transfer Pump</p>	<p align="center">Revision No. 0</p>

4.0 ENVIRONMENTAL DESIGN CRITERIA

4.1 General

The design life of the equipment shall be 25 years minimum. Unless otherwise stated on the data sheets the centrifugal pump unit(s) will be located in an open exposed area.



4.2 Area Classification

DESIGN AND AMBIENT CONDITIONS	
Design Maximum Ambient Temperature (°C)	50
Design Minimum Ambient Temperature (°C)	0

CLIMATIC CONDITION (As per data by Pakistan Metrological Department)	
Relative Humidity (minimum monthly average)	40
Relative Humidity (maximum monthly average)	80

AREA CLASSIFICATION
Zone 1, Group IIA & Temperature Class T6

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5.0 TECHNICAL

The CONTRACTOR / SUPPLIER shall furnish the Centrifugal Pumps, controls, valves and auxiliaries in accordance with the requirements mentioned herein, in other project specifications and data sheets.

The CONTRACTOR / SUPPLIER shall be directly responsible for ensuring the proper operation of any Sub-CONTRACTOR ancillary equipment supplied with the equipment package. The CONTRACTOR / SUPPLIER's on-site representative is expected to be fully knowledgeable of the equipment and shall be capable of trouble shooting and correcting problems should this equipment not perform per design specifications.



5.1 Drawings, Calculations and Documentation

CONTRACTOR / SUPPLIER shall provide all information specified in the CONTRACTOR / SUPPLIER Data Requirements Schedule supplied with the requisition documentation.


In addition, CONTRACTOR / SUPPLIER shall provide a comprehensive Operations & Maintenance Manual to cover the entire supplied system. The manual will include but not limited to the following details:



1. Detailed outline and cross-sectional drawings of Centrifugal Pump
2. Name of Pump manufacturer and country of manufacturing
3. Load data and Anchor bolt plan
4. Anchor bolt sizes and location
5. Itemized weights, including maintenance weights

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	<p align="center">DETAILED ENGINEERING DESIGN OF KUNNAR PRODUCED WATER DISPOSAL SYSTEM</p>	
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6. Shaft coupling assembly drawing with details of allowable misalignment tolerances style of coupling guard
7. Primary and auxiliary sealing schematic
8. Cooling schematic
9. Lube oil schematic
10. Lube oil system arrangement drawing including sizes and, ratings.
11. Lube oil component drawings and data.
12. Driver.
13. Electrical and instrumentation schematics and list of components
14. Performance curves.
15. Materials of construction
16. Noise levels
17. Dimensional drawing of motor
18. Name of motor manufacturer and country of manufacturing
19. Motor performance data
20. Motor hazardous area classification


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21. Motor start details
 22. Recommended method for starting motor driven pump
 23. Flexible coupling, complete with suitable guard (non-sparking)
 24. Inspection and test reports
 25. Spare parts suitable for two year's operation
 26. Maintenance schedules
 27. Overhaul/ Maintenance Spare parts
 28. Commissioning/ Start-up tools & spare parts
 29. Operation and maintenance manual of complete Centrifugal Pump
 30. Complete load data required for foundation and anchor bolts design
 31. Complete process and utility piping within the package
 32. Rigid Coupling
 33. All special tools required for maintenance of the pump unit.
- CONTRACTOR / SUPPLIER connection drawings complete with detailed nozzle schedule.


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The assembly drawings shall contain all pertinent information relating to the standards, codes and specifications used in the design, manufacture, inspection and testing of the equipment, including the materials used, plus the total weight.

Review of drawings, calculations and other documents by the COMPANY does not relieve the CONTRACTOR / SUPPLIER of his responsibility for the suitability of the design to suit the stated conditions.

5.2 Motors

CONTRACTOR / SUPPLIER shall provide suitable motors as integral to the pump assembly and as per Specification for Motors.


6.0 DESIGN



6.1 General Design Specification

Except where amended by this specification, the design of centrifugal pump shall be in accordance with the requirements of API 610, Centrifugal Pumps for General Refinery Service.

For general service applications, where API 610 is not specifically requested, the CONTRACTOR / SUPPLIER may offer his standard design for consideration, provided it is guaranteed for the specified duties and approved by the COMPANY. The rated capacity of the pump shall not be less than 80% and not greater than 110% of the capacity at the best efficiency point for optimum performance.

The following sections indicate amendments and additions to the various requirements of API 610 with the relevant paragraph numbers of that standard cross referenced in brackets, where appropriate. The CONTRACTOR / SUPPLIER are to review the following amendments/additions in light of the latest edition of API 610.


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6.2 General

The CONTRACTOR / SUPPLIER shall not use impellers with vanes on the back for balancing axial thrust without specific approval by the COMPANY. Balancing of axial thrust shall be achieved by means of individually balanced impellers, opposed impeller arrangements or the use of balance pistons/drums. However, balance pistons shall not be used on applications involving the pumping of liquids containing abrasives. The NPSH required shall be at least 1.0 meter less than the NPSH available.

Pumps with rated capacity to the right of the best efficiency point on the head/capacity curve are not acceptable.

The suction side of all pumps handling hydrocarbons shall be designed for the full discharge pressure unless otherwise approved.

Radically split casings shall have confined solid metal, or confined spiral wound gaskets.


Impellers shall have solid hubs.



Shaft sleeves shall be coated with Colmonoy 6 or Satellite 6 over the seal contact area.

6.3 Nozzles and Pressure Casing Connections

All pumps shall have suction and discharge flanges of the same pressure and temperature rating.

Vertical pumps shall be supplied with flanged column pipes and, depending on the type of pump, either flanged and bolted bowls or bolted casing assembly. Column and bowl bolting shall be corrosion resistant for the intended service.


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6.4 External Forces and Moments

Pumps with nozzles NPS 16 and smaller in size, with casings constructed of steel or alloy steel, shall be capable of satisfactory operation when subjected to forces and moments.

6.5 Seals

The pump CONTRACTOR / SUPPLIER shall be responsible for the engineering and installation of the mechanical seal and its ancillary equipment.

As a minimum requirement, the seal end plates shall be of the same material as the pump casing. Carbon steel gland plates shall be supplied with ductile iron pump casings (if approved by COMPANY). Any special material requirements will be specified on the pump datasheet.

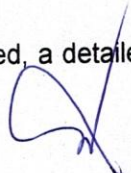
When recirculation to seal from pump discharge is required API Plan-I shall not be used. All vertical pumps with mechanical seals shall be equipped with a vent connection and valve at the highest point of the seal space. Pump for the service of LPG exporting shall have the double mechanical seal.



Seal cages shall be equipped with tapped holes or other means to facilitate their removal. Pumps handling liquids containing abrasives shall have provision(s) for injection of a flushing liquid.

6.6 Dynamics

Single stage overhung horizontal pumps shall preferably be of stiff shaft construction with torsional and lateral critical speeds at least 20% above the maximum pump operating speed.

When a torsional analysis is performed, a detailed report shall be provided to the COMPANY for approval.


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The assembled rotor(s) shall be dynamically balanced.

Balancing shall be generally in accordance with the requirements of ISO 1940, Grade 6.3 (or equivalent)

6.7 Lubrication

The pressure lubrication system shall be in accordance with the requirements of API 614 (where applicable).

6.8 Materials

Materials for pump parts shall be in accordance with those listed in API 610. The CONTRACTOR / SUPPLIER may propose equivalent or superior alternatives if, based on his experience, these would render equal or better service. Supplementary acceptance criteria required by the COMPANY for individual components of the pump(s) shall be as specified in the purchase requisition and attachments.

Cast Iron shall not be used for pressure containing parts without prior approval by the COMPANY.

The CONTRACTOR / SUPPLIER shall provide material certificates giving chemical composition and mechanical data for pressure – containing parts and all main components of the pump. The other parts of pump shall be in full compliance of API 610.

The bolts and nuts for the pumps shall be as given in following Table– 1

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TABLE - 1

Material for Bolts and Nuts in Pumps for Cold Service

Carbon Steel	Min. Design Temperature °C	Impact Tested
Bolts and Nuts	-100	SA 320 Gr. L7 and SA 194 Gr. 7 Cadmium Plated

6.9 Drivers


Unless otherwise, approved drivers for pumps shall be mounted in the pump CONTRACTOR / SUPPLIER's works, aligned and matchmarked. For vertical pumps, CONTRACTOR / SUPPLIER shall assemble and dowel motor or gear to the pump in its shop to assure proper unit fit-up and shaft mating.



Solid shaft, vertical motors with integral support skirts suitable for spigot mounting direct to the pump casings or motor pedestals are preferred. The use of hollow shaft motors is not acceptable without prior approval by the Company.

6.10 Couplings and Guards

Couplings on pumps operating at speeds above 4000 rpm shall be dynamically balanced in accordance with ISO 1940 (or equivalent).

Coupling guards shall meet all codes designated herein and any Government Statutory Requirements and shall be designed to permit ease of installation and removal. Coupling guards shall be constructed of non-sparking material. (Brass or equal, Aluminum is not permitted).


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6.11 Base plates

All vertical pumps, other than double case or canned type, shall be furnished with a separate sole plate by the CONTRACTOR /SUPPLIER.

6.12 Piping and Appurtenances

Instrumentation shall conform to the requirements of the relevant sections of the Project Specification for Instrumentation for Packaged Unit.

Change "1/2" " to read "3/4"

Sight flow indicators of the closed, 'see-through' type shall be furnished by the CONTRACTOR / SUPPLIER in each cooling water return line.

6.13 Inspection, Testing and Preparation for Shipment



Each individual pump of a series of identical units shall be inspected and tested. Random inspection and testing is not permitted.

All hydrostatic tests shall be carried out before any painting or preparation for painting is done.

The hydrostatic test shall be considered satisfactory when no casing or casing joint seepage or leaks are observed for a minimum of 60minutes.

The CONTRACTOR / SUPPLIER shall operate the pump in the shop for a minimum of 4 hours with a period at rated point of at least 1hour. The test shall comprise at least five points of complete test data, including head, capacity and power with vibration measurements. The data points shall normally be at shut off (zero flow), minimum continuous stable flow, midway between minimum and rated flows, rated flow and 110 per cent of rated flow.

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Test data shall be corrected for the speed, viscosity and specific gravity conditions specified on the data sheet, where appropriate.

For multistage pumps, or other specified critical service units, a 1percent drop in head shall determine the NPSH required.

No plus tolerance on NPSH required shall be permitted at the rated flow point.

6.14 Preparation for Shipment

After completion of all inspection and testing requirements, the equipment shall be prepared and painted in accordance with the requirements of the Project Specification for Painting and Surface Preparation. Additionally pump internals shall be drained and dried.

6.15 CONTRACTOR / SUPPLIER's Data

The CONTRACTOR / SUPPLIER shall, in addition, furnish drawings and data in accordance with the requirements of the Company's procurement documentation.


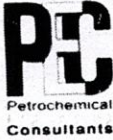
7.0 INSPECTION AND TESTING

7.1 General

Inspection and testing shall be carried out at the CONTRACTOR / Supplier's works and shall be witnessed by the COMPANY representatives and/or certifying authority.

The responsibility for inspection rests with the CONTRACTOR / SUPPLIER. However, the COMPANY and their authorized representative reserve the right to inspect the equipment at any time during manufacture to ensure that materials and workmanship are in accordance with this specification, other project specifications, the equipment data sheets and/or drawings. The CONTRACTOR /


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SUPPLIER shall provide a projected shop schedule with appropriate fabrication stages at the time drawings are submitted for approval, to highlight the inspection activity schedule.

The approval of any work by the COMPANY, or their authorized representative, shall in no way relieve the CONTRACTOR / SUPPLIER of any responsibility for carrying out the provisions of this specification. CONTRACTOR / SUPPLIER shall submit the Performance Test report.


All pumps shall be inspected and tested in accordance with API Standard 610, Section 4, Inspection, testing and preparation for shipment. The vibration data of pump unit to be taken during Performance Test of the package at rated speed and full capacity. CONTRACTOR / SUPPLIER shall submit vibration data record along with complete spectrum trend.

Certified reports on in-plant tests run on the pump shall be submitted to the COMPANY, by the CONTRACTOR / SUPPLIER for approval prior to shipment of the pumps.

7.2 General

- The following tests shall be performed as a minimum:
 - a) Hydrostatic test at 150 percent for design pressure.
 - b) Performance test including a functional test of all controls, alarm and trips and electrical items shall be done in accordance to section 4.3.3 of API Standard 610.
 - c) Complete unit test shall be done in accordance to section 4.3.4.2 of API Standard 610.
 - d) Equipment noise measurement


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Within 15 calendar days of the final successful tests, the CONTRACTOR /SUPPLIER must send to COMPANY one (1) original, eight (8) hard and three (3) soft copies of all material and test certificates.

Hydrostatic tests shall be carried out in the presence of COMPANY representative and/or of the certifying authority, when applicable. Hydrostatic testing shall be in accordance section 4.3.2.3 requirements of API Standard 610.

Fresh water only shall be used for testing. When testing items manufactured from stainless steel, the chloride ion content of the test water shall not exceed 30ppm. During testing the temperature of the vessel and test water shall not be lower than 7°C and not more than 25°C.

Hydro test pressure shall be held for a minimum of 60 minutes, irrespective of design code requirements. The complete alignment of the motor pump unit shall be ensured at the time offsetting up by the Pump Manufacturer, assisted by the competent and responsible staff of the motor CONTRACTOR / SUPPLIER.



7.3 Reports and Acceptance Certificates

Preliminary and final dossiers shall be prepared as described in the requisition document. Other relevant certificates shall also be provided together with equipment release note.

7.4 Material Inspection

The CONTRACTOR / SUPPLIER shall provide the certification of materials such as mill test reports, for review of the COMPANY. Material test reports shall demonstrate the compliance of the material specifications. Any non-compliance, not previously approved by the COMPANY, shall be at the risk of the CONTRACTOR / SUPPLIER. Radiographic, ultrasonic, magnetic particle or liquid penetrated inspection of welder material shall comply with section 4.2.2 of API Standard 610.

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7.5 Mechanical Inspection

COMPANY may inspect the equipment and all piping and appurtenances before assembly. Hardness of parts, welds and heat-affected zones shall be verified, as being within the allowable values, by testing. Results shall be submitted to the COMPANY. Mechanical inspection by COMPANY shall comply with Section 4.2.3 of API Std. 610.

7.6 Sound Level Test

Test shall be performed according to section 4.3.4.3 of API Standard 610.

7.7 NPSHR Test

Test shall comply with section 4.3.4.1 of API Standard 610.

7.8 Auxiliary Equipment test


Auxiliary system including control system shall be tested in Pump Manufacturer's shop with section 4.3.4.4 of API Standard 610.



7.9 Bearing Housing Resonance Test

Bearing housing resonance test shall be carried out in accordance with the requirement of section 4.3.4.5 of API 610.

8.0 MARKING


Stainless steel marking shall be permanently affixed to the each pump. The marking for the motor shall contain the minimum data specified in the motor specification. Marking for pumps shall contain the following data:




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8.1 Pumps

1. Name of manufacturer:
2. Date of manufacturer:
3. Model No:
4. Equipment Tag No.:
5. Body material:
6. Design code:
7. Pressure rating:
8. Capacity:
9. Pump head
10. Casing hydrostatic test pressure.
11. Horse Power
12. Speed
13. Weight of Skid
14. Pump Serial No.
15. Fluid Viscosity:


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16. Rated Temperature:

17. Fluid Specific Gravity:

Direction of rotation shall be affixed at a visible place on the pump.

9.0 PAINTING AND SURFACE PREPARATION

Internal and external surfaces shall be cleaned to remove all scale, rust, grease, dirt, weld spatter and foreign objects. The painting shall be under taken only when all the tests have been performed and accepted.


The painting will consist of:



- Careful cleaning and degreasing:
- The painting will consists of appropriate coating system, which shall be specified by Pump Manufacturer / CONTRACTOR / SUPPLIER.
- Painting shall be according to the General Specification for Painting and Surface Preparation (165-2-3-SPM-035).

10.0 PREPARATION FOR SHIPMENT

After the final test, the unit shall be dried and cleaned thoroughly of all grease, loose scale, and rust (both internally and externally). The preparation for shipment shall meet the requirement as detailed in Specification for Export Crating and Packaging Annexure. Preparation for Shipment

- Each pump and its component shall be shipped in the same consignment.


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- All openings such as nozzles, vents and field connections shall be properly sealed to avoid entrance of foreign particles and protected during shipment.
- All fragile items shall be removed and crated in rigid packing crates with sufficient padding to prevent damage during shipment and shall be properly tagged for ease of field installation.
- The CONTRACTOR / SUPPLIER shall provide corrosion protection for all internal and external machine parts for sea shipment and six months outdoor storage and which can be easily removable at site.
- The water-tested parts, which are likely to contain residual water shall be properly drained and dried, so that the damage of the same by freezing during transportation and storage can be avoided.



10.2 Operating and Maintenance Manuals

- Five (5) sets of operating and maintenance manuals from the original equipment manual shall be provided to enable the COMPANY to install, operate and maintain the complete equipment ordered.
- The information and material supplied shall pertain directly to the unit purchased. Generalized or typical material shall not be included.

10.3 Spare Parts

- The CONTRACTOR / SUPPLIER shall submit a priced list of recommended two years spare parts with his commercial bid. This list shall include original manufacturer and local representative name, address and phone number for each item.


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11.0 GUARANTEE & WARRANTY


- The warranty shall be for a period of 12 months from date of initial commissioning or for a period of not less than 18 months from the date of shipment/dispatch, whichever is earlier. The CONTRACTOR / SUPPLIER will warrant the equipment to be free of defects in material and workmanship, and that it is of adequate size and capability to fulfill the design and operating conditions specified herein. The CONTRACTOR / SUPPLIER shall replace and install, without cost to the Company, any materials, supplies, or equipment which fails under design conditions due to defects in material or workmanship. If the defect is observed and/or such failure occurs within warranty. Acceptance of this order will signify acceptance of all conditions of this warranty.

The CONTRACTOR / SUPPLIER shall guarantee that the system provided meets the requirements of the functional performance of this specification, other project specifications, data sheets and P & IDs.

All equipment shall be guaranteed as follows:

- All equipment shall perform satisfactorily under the specific operating conditions as detailed on the data sheet and shall be fit for the intended purpose.
- Tests shall confirm the CONTRACTOR / SUPPLIER's guaranteed performance.

The CONTRACTOR / SUPPLIER shall guarantee the mechanical and structural integrity, workmanship and the materials of construction used in accordance with the requisition and requirements of this specification.


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**DETAILED ENGINEERING DESIGN OF
KUNNAR PRODUCED WATER DISPOSAL
SYSTEM**



**Doc. No.
0404177-PRO-SP-007**

**Specification For Produced Water &
Recovered Oil Transfer Pump**

Revision No. 0


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	KUNNAR PRODUCED WATER DISPOSAL SYSTEM	
	Specification For Submersible Pump	

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1.0 INTRODUCTION

OGDCL intends to set up Produced Water Injection system at Kunnar plant. The primary objective of this project is to dispose of produced water in Injection well through pumps in Injection well which is located just outside of the 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 Submersible Pumps. Compliance with the requirements of this specification does not relieve the VENDOR of furnishing Submersible 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


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most stringent SHALL apply. The entire equipment shall be designed for the life of min. 20 yrs. In all respects.

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	KUNNAR produced water disposal System
SHALL	Indicates a mandatory requirement.
SHOULD	Indicates a strong recommendation to comply with the requirements of this document.

4.0 ABBREVIATIONS

EPCC Engineering Procurement Construction and Commissioning


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Submersible Pump**

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


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5.0 BIDDER/SUPPLIER QUALIFICATION CRITERIA

TECHNICAL EVALUATION CRITERIA (GROUP-A) ANNEXURE-VI

Sr. No	REQUIREMENT / DESCRIPTION	TOTAL SCORE	SCORE OBTAINED
1	Authority letter of Bidder/Manufacturer & Local Agent (05 Nos) i) Authority letter ii) Not Submitted	5 Rejected.	
2	Compliance to Data Sheet & Specifications (10 Nos) i) Yes ii) No	10 Rejected	
3	Certifications (10 Nos) i) ISO 9001 ii) ISO 14001 iii) API Q1 iv) OHSAS 18001 Note: Copies of valid certificate to be submitted.	2.5 2.5 2.5 2.5	
4	Supply record during last 5 years to *International E&P Companies (20Nos) See Note 4 i) At least One Agreement with value greater than or equal to 1 MMUSD. OR ii) At least One Agreement with value $0.5 < x < 1$ MMUSD OR iii) At least 03 Agreements with value $0.1 < x < 0.5$ MMUSD iv) Noncompliance to any of the three conditions. Note: Copies of Purchase Orders to be submitted. ▪ Supply record as per table attached at Annex-III	20 15 10 Rejected.	
5	Complete Copies of third party Inspection Report *International E&P Companies (05 Nos) See Note 4 i) If Submitted ii) If not submitted	5 0	
6	Copies of Performance Certificate of material Supplied to *International E&P Companies (05 Nos) See Note 4 i) For $X \geq 3$ ii) For $1 \leq X < 3$ iii) For $X = 0$	5 2 0	
7	Proof of Pre-qualification of manufacturer with International E&P Companies (10 Nos) See Note 4 i) For $X \geq 3$ ii) For $1 \leq X < 3$ iii) For $X = 0$	10 5 0	
	Financial Strength of the Company (10 Nos)	10	

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8	i. Three Years Audited Financial reports of the bidder / manufacturer. ii. Non submission of Three years audited financial reports of bidder / manufacturer. ▪ Filling of information as per Annex-I.	Rejected.	
9	Manufacturer Document Compliance/ Submission (10 Nos) i. Product Catalogue ii. Quality Plan iii. Equipment Details iv. Manufacturing Specifications	2.5 2.5 2.5 2.5	

Note:

1. Minimum pre-qualification criteria to obtain 70 Score.
2. Bid exceeding 70 Score but rejected in any one of the sub category will be non-responsive i.e. sub category 1, 2, 3, 5 & 9.
3. Date of tender opening will be considered to calculate 05 Years requirement of API certificate.
4. International E & P Companies should be upstream member of International Association of Oil & Gas Producers (IOGP) or a member Pakistan Petroleum Exploration & Production Companies Association (PPEPCA).
5. In case Bidder supplied material to companies fall under note 4 through contractor, then proof to be submitted.

6.0 CODES AND STANDARDS

6.1 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.
- Submersible Pumps SHALL be designed and manufactured in conformity with the codes, specification listed below and with the equipment data sheets.



6.2 International Codes & Standards (Latest editions shall apply)

- API


API 674



Submersible Pumps-

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- | | |
|--|--|
| <p>API 675</p> <p>API 670</p> <p>API RP 520/521</p> <p>API 615</p> <ul style="list-style-type: none"> • ASME <p>ASME B1.1</p> <p>ASME B1.20.1</p> <p>ASME Sec. VIII Div. I</p> <p>ASME Sec. II</p> <p>ASME Sec. V</p> <p>ASME Sec. IX</p> <p>ASME B31.3</p> <p>ASME B16.5</p> <p>ASME B16.20</p> <ul style="list-style-type: none"> • ASTM • ISO <p>ISO 10474</p> <p>ISO 15664</p> | <p>Submersible Pumps –</p> <p>Machinery Protection Systems.</p> <p>Sizing, Selection and Installation of Pressure Relieving Devices in Refineries.</p> <p>Sound Control of Mechanical Equipment for Refinery Services.</p> <p>Unified Inch Screw Threads.</p> <p>Pipe Threads, General Purpose, Inch.</p> <p>Rules for Construction of Pressure Vessels.</p> <p>Materials.</p> <p>Non Destructive Examination.</p> <p>Welding, Brazing and Fusing Qualifications.</p> <p>Process Piping.</p> <p>Pipe Flanges and Flanged Fittings.</p> <p>Metallic Gaskets for Pipe Flanges-Ring Joint, Spiral Wound, and Jacketed.</p> <p>American Society for Testing and Materials.</p> <p>Steel and steel products – Inspection documents.</p> <p>Acoustic – Noise Control Design Procedures for Open Plant.</p> |
|--|--|


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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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6.3 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

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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.


6.4 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.



6.5 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:

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


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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

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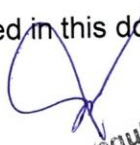
suiting to meet the specified service conditions and / or local codes governing health and safety.



6.6 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 Submersible 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.

6.7 Company's Intention

It is the intention of the COMPANY to procure the Submersible Pumps based on Data Sheets, P&IDs, this specification document and referenced documents as mentioned in section 5.0. SUPPLIER SHALL be responsible to supply Submersible 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 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.


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6.8 Supplier Responsibility

The SUPPLIER SHALL be responsible for the complete design, manufacturing, supply, inspection and testing of Submersible 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.



6.9 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.

7.0 REFERENCE DOCUMENTS

1. Specification for Painting and Surface preparation (4946-SP-003).
2. Specification for Motor (4946-SP-002).
3. Specification for Corrosion Inhibitor system (4946-SP-004).


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8.0 SITE DATA



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

DESIGN AND AMBIENT CONDITIONS	
Design Maximum Ambient Temperature - °C	50
Design Minimum Ambient Temperature - °C	0

CLIMATIC CONDITION (As per data by Pakistan Metrological Department)	
Relative Humidity (minimum monthly average)	40
Relative Humidity (maximum monthly average)	80


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AREA CLASSIFICATION
Zone 1, Group IIA & Temperature Class T6


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9.0 VENDOR'S SCOPE OF SUPPLY

9.1 General

For scope of Submersible 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:

- Submersible Pumps as specified in the equipment data sheets 0404177-PRO-DT-006 and 0404177-PRO-DT-007.
- Electrical Motor with terminal boxes as specified as per specs: 0404177-PRO-DT-006, 0404177-PRO-DT-007 AND 0404177-PRO-SP-008.
- Gear reducer as per speed requirement in accordance to the design/operating pumping parameters (if required).
- Flexible coupling & coupling guard (non -sparking type).
- Pulsation dampener
- 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.


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- 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 hardcopies.
- Equipment dossier which includes all test results MTC etc.
- Details of civil foundations as per package.

The requirements set out in this document SHALL not be construed to eliminate consideration of the manufacturer's standard design. The manufacturers 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. Preferable Vendors for the pump are, national Oil Well USA, Weatherford USA or equivalent.

9.2 Exclusions



- Installation of the packages
- Pump foundation.
- Local start / stop push button.
- Motor starters.
- Power cabling to motor.

9.3 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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10.0 DESIGN

10.1 General

Submersible 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.



10.2 Mechanical

10.2.1 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.


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- **Lubrication**

Pump lubrication systems shall be manufacturer's standard with proven experience for the type, rating and application as per API 610 (where applicable). 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 crankcase 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.

- **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**


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Electrical Motor Drivers The electric motor SHALL be designed in accordance with the LV Motor as per specification/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.

10.2.2 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.


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

10.2.4 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


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- 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.

10.2.5 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.


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10.2.6 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 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 0.9m excess NPSH available.

10.3 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.


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10.4 Piping

The supply, fabrication and erection of all pipe work SHALL comply with Specification for Piping Material Classe 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 shall be provided where necessary to smooth out pulsations. Preferred type is bladder type dampener



10.5 Instrumentation

Instrument selection, design and installation SHALL be provided if required

10.6 Electrical

Electrical selection, design and installation SHALL be provided if required


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10.7 Civil

10.7.1 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.

10.7.2 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.
- 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.


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10.8 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.

10.9 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.

11.0 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 the internal and external material shall be in compliance to cater the produced water composition specification mentioned in the attached data sheet 0404177-PRO-DT-007 and 0404177-PRO-DT-008 for the whole life of the pump mentioned at para 2.0 of this specification.
- c) All pressure part materials SHALL be normalized and all plate materials SHALL have an under tolerance of "zero" millimeter.
- d) The VENDOR SHALL propose material specifications for Company Review and Approval.
- e) Cast iron shall not be used for liquid end pressure containing parts handling flammable liquids or toxic materials.


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- f) 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.
- g) Sulphur content of all pressure part materials SHALL be kept less than 0.003%.
- h) Seals SHALL prevent the ingress of moisture and particulates.
- i) Gaskets SHALL be asbestos free.
- j) The use of sealing materials that can result in blockages / seizure of hydraulic components are strictly prohibited.
- k) The **VENDOR SHALL** ensure maximum standardization and interchangeability of Components.
- l) Unless otherwise required, all the internal parts in contact with the contained fluid SHALL be made of the same quality of material.
- m) All metallic materials exposed to hydrogen sulphide, 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.
 - 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.

12.0 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.

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13.0 SURFACE PREPARATION AND PAINTING

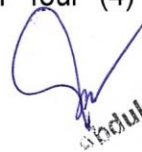
Surface preparation and Painting & Coating of the Submersible Pumps and all the accessories SHALL be in accordance with Specification for Painting and Surface preparation (165-2-3-SPM-035).



14.0 INSPECTION AND TESTING REQUIREMENT

14.1 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 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.


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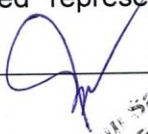
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14.2 Pre-Inspection Meeting

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.

14.3 Inspection and Testing of Submersible Pumps

Inspection & testing of all the components of Submersible 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 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


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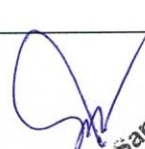
certification on the materials, shop test data, etc., SHALL be made available to verify that the requirements of the purchase order are being met. The VENDOR SHALL provide test certificates for all tests carried out on component equipment, as detailed in the Document and Data Submittal Requirements (DDSR) 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.

Prior to the test specified above, VENDOR SHALL perform individual component test in all package auxiliaries and components and the record SHALL have 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.

14.4 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 sixty working


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days' notice in writing of readiness for this Testing. Without prior approval of OGDCL load testing shall not be carried out. Test reports duly signed and stamped shall be provided with the consignment prior to shipment for OGDCL approval. OGDCL has the right to either witness the FAT/TPI or not at its own cost. If OGDCL arranges third party inspection. Supplier shall facilitate regarding provision of all the docs or else required by inspector. 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.

14.5 Third Party Inspecting Authority

The Third Party Inspection Authority (TPIA) SHALL be appointed by OGDCL (if deemed appropriate). 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 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.


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14.6 General Requirement


The VENDOR SHALL provide COMPANY and TPIA Inspector with at least 60 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.



14.7 Site Acceptance Test / Final Acceptance Criteria

After the mechanical completion and commissioning of the Submersible 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.

14.8 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.


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14.9 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 approve 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.



14.10 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.

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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.



15.0 SPARE PARTS

VENDOR to provide a comprehensive listing of spare parts, recommendations covering Start-Up, Commissioning and two (2) years of Continuous Equipment's Operation. Cost of spare parts shall not be the part of financial evaluation. OGDCL has the right either to purchase all the recommended parts or selected items are purchased.

16.0 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



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performance of all equipment's supplied under this specification. **VENDOR SHALL** provide a performance guarantee for the pumps.

17.0 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. 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

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separately. The equipment SHALL be delivered with one copy of the Installation, operation and maintenance manuals.

18.0 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. Commissioning of the package shall be carried out by the suppliers qualified engineer. OGDCL shall provide only boarding/lodging to the commissioning engineer only.

18.1 Start-up and Commissioning Support

The VENDOR SHALL also be responsible for providing Start-Up and Commissioning Support at site at its own expenses, Also, commissioning team shall train the OGDCL manpower for adequate operation of the pumps in all respect for smooth operation. 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 (if contract is awarded).

18.2 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,

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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.

18.3 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, Training SHALL cover basic theory equipment, construction operating procedures, maintenance procedures and control system training as a minimum.

19.0 DOCUMENTATION

19.1 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.

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- Performance curves for Pump & Drive system showing the selection criteria.
- Completed Data Sheets with Process Guarantee.
- Detailed scope of supply including detailed material.
- 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.

19.2 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

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

20.0 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.


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