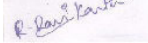
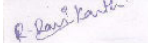
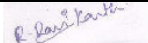
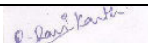
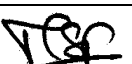
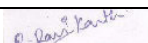
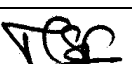
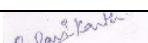
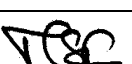
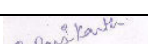
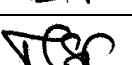
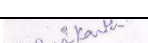
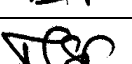
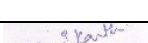
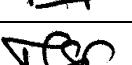
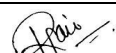
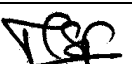
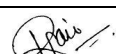
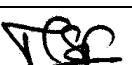
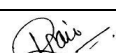
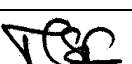
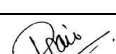
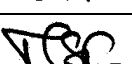
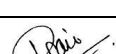
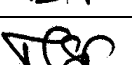
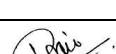
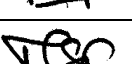
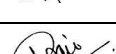
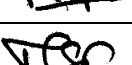
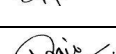
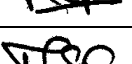


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Ref. Doc		Revisions :16 Refer to record of revisions :	Prepared : -sd- RAJEEV JAIN	Checked -sd- GIRISH	Approved : -sd- SIVA PRASAD	Date : 20.06.17	

TD-106-2 Rev No. 5	Form No.	 HYDERABAD	PRODUCT STANDARD BHEL, HYDERABAD –502032. PROJECT ENGINEERING & SYSTEMS DIVISION		PY51222																																																																																																																																																											
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Motor		PEMC-06674	NIRMA	13	Spares for CFP with Drive Motor		PEMC-06674	NIRMA	14	Dewatering Pump Weather proof		PEMC-06718	ONGC-H	15	Dewatering Pump Ex proof		PEMC-06718	ONGC-H	16	Vertical sump pump GT-3 area		PEMC-06719	ONGC-H	17	Mand spares for Vertical sump pump GT-3 area		PEMC-06719	ONGC-H	18	Closed Cooling water pump with drive motor		PEMC-6713	KPCL-Yelhanka	19	Spares for Closed Cooling water pump with drive motors		PEMC-6713	KPCL-Yelhanka	20	CEP with Drive Motor assembly	PY9751222206	PEMC-06773	NMDC	21	CEP with Drive Motor assembly	PY9751222214	PEMC-06829	TATA STEEL	22	Cooling water Pumps with Drive Motor assembly	PY9751222222	PEMC-06839	TATA STEEL	23	DMCW Pumps with Drive Motor assembly	PY9751222230	PEMC-06853	TATA STEEL	24	C&I Mandatory Spares for HRSG BFP		PEMC-05923	CPCL-GTG	25	Dirty Oil Pump with drive motor	PY9751222257	PEMC-06875	TATA STEEL	26	Clean Oil Pump with drive motor	PY9751222265	PEMC-06875	TATA STEEL	27	Dewatering Sump pump with drive motor for SSF Backwash pit	PY9751222273	PEMC-06906	TATA STEEL	29	Supervision of E&C of Dewatering Sump pump with drive motor for SSF Backwash pit	PY9751222273	PEMC-06906	TATA STEEL	30	Coupling for CTP Motor driven	PY9751222303	PEMC-06983	BCPL	28	Potable water pump with drive motor	PY9751222281	PEMC-06935	TATA STEEL	35	Supervision of E&C for Potable water pump with drive motor	PY9751222356	PEMC-06935	TATA STEEL	40	Raw Sewage Lifting Pump	PY9751222400	PY-AS-4-M096-8369-01	STP,BHEL BHOPAL	41	Return Activated Sewage Sludge Pumps	PY9751222419	PY-AS-4-M096-8369-01	STP,BHEL BHOPAL	42	Waste Activated Sewage Sludge Pumps	PY9751222427	PY-AS-4-M096-8369-01	STP,BHEL BHOPAL										
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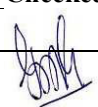
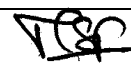
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		Rev. No.	Date	Revision Details	Prepared By	Revised By	Approved By
		00	30.11.15	FRESH ISSUE			
		01	27.01.16	Variant 05 & 06 added			
		02	12.02.16	Variant 07 & 08 added			
		03	26.02.16	Variant 09 added			
		04	05.3.16	Variant 10 added			
		05	07.03.16	Variant 11 to 13 added			
		06	04.04.16	Variant 14, 15, 16 & 17 added			
		07	05.04.16	Variant 18 & 19 added			
		08	20.04.16	Variant 20 added			
		09	28.05.16	Variant 21 added			
		10	01.06.16	Variant 22 added			
		11	03.06.16	Variant 24 added			
		12	05.07.16	Variant 25 & 26 added			
		13	29.08.16	Variant 27 & 29 added			
		14	20.09.16	Variant 30 added			
		15	25.11.16	Variant 28 & 35 added			
		16	20.06.17	Variant 40 to 42 added			
		Ref.	Doc.				

ESP-001-2A Rev.00		PROJECT ENGINEERING & SYSTEMS DIVISION		Std. / Doc. Number	
				Doc. No. PY-AS-4-M096-8369-01	
				Rev. No.	00
				Sheet 1 of 10	

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TECHNICAL SPECIFICATION FOR SUBMERSIBLE PUMPS

PROJECT	4.5 MLD STP, BHEL-BHOPAL
CUSTOMER	BHEL-BHOPAL

Revisions:00		Prepared by :	Checked by :	Approved by :	Date :
		RAJEEV JAIN	 GIRISH	 M.S.P.B	19.06.17

Refer to record of revisions

**PROJECT ENGINEERING & SYSTEMS DIVISION**

Std. / Doc. Number

Doc. No. PY-AS-4-M096-8369-01

Rev. No.

00

Sheet 2 of 10

DOCUMENTS TO BE SUBMITTED WITH THE BID:

The bidder must submit the following documents along with their bid for each Pump, so as to enable BHEL to evaluate their offer.

- a) Duly filled in Pump-Motor datasheet
- b) Tentative GAD for Pump with Motor
- c) Performance curves for pump
- d) Un-priced copy of price in attached BHEL price bid formats indicating quoted/ not quoted against each row & column.
- e) Equipment qualification criteria / PTR / Reference Lists
- f) Checklist as per annexure-4
- g) Deviation list [if any] as per annexure-8

In case the above mentioned documents are not submitted with the offer, the offer of the bidder may be liable for technical rejection.

**PROJECT ENGINEERING & SYSTEMS DIVISION**

Std. / Doc. Number

Doc. No. PY-AS-4-M096-8369-01

Rev. No. 00

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1.0.0 INTENT OF SPECIFICATION:

This specification specifies the requirement of Design, Engineering, Manufacturing, Assembling, Inspection, testing at manufacturer's works and Delivery of properly packed and painted for transport of Submersible Pump with drives and all accessories as specified in the scope of work and as required for the safe and trouble-free operation of equipment to be installed at site.

2.0.0 SPECIAL NOTES TO BIDDERS:

2.0.1 This specification shall be read in conjunction with its enclosures. In case of any discrepancy arising between this specification & its enclosures, the most stringent of all shall be followed and shall over-ride others. Further, if a requirement in this specification or its enclosures, calls for decision of BHEL, it shall be bidder's sole responsibility to clearly bring out the same distinctively in his technical tender offer, so as to enable BHEL to furnish their decision. If such a requirement is not duly addressed by bidder during tender stage and same comes out during order execution stage, it shall be binding on the bidder to comply with the decision furnished by BHEL then, without any cost, delivery, or any other commercial implications.

- a) Bidders shall comply with various requirements of this specification. Bidders can bring out only those deviations which are impractical to meet, for our review.
- b) Bidders may please note that unless the deviations are specifically brought out under deviations clause, it will be considered that no deviations are taken, even if they are mentioned elsewhere directly/indirectly in the offer.

2.0.2 Any additional equipment, material, etc., which are not specifically mentioned here, but are required to make the supplied equipment complete in all respect, in accordance with the intent of this technical specification, contractual agreement, statutory requirements, relevant/applicable codes/standards, good engineering practices, and for safe and trouble-free operation, shall be deemed to be covered under the scope of this specification.

2.0.3 The Bidder shall accept full responsibility for the completeness and for the faultless working of all the equipment. These shall be executed on the basis of proven design principle and in accordance with the latest state of the art in such a manner that the purpose to be served by the Pump unit is fulfilled in every respect and a maximum of operational dependability and efficiency are assured. Standardization of equipment, materials etc. shall be employed in the design. Care shall be taken to ensure safe operation as well as simplicity of assembling and dismantling of all parts of the plant.

2.0.4 Bidder shall quote strictly as per the scope of supply and requirements of this specification.

2.0.5 Bidder offer shall be strictly as per these specification requirements. Unsolicited or Alternate offers from the bidders will not be entertained.

2.0.6 In case bidder feels that it is necessary to exclude some components of scope of supply or some of the features of specification requirements due to any technical constraints, bidder shall bring the same to the notice of purchaser during pre-bid stage and take their prior approval before submission of their bid.

2.0.7 In case Bidder is unable to offer due to any specific requirement of specification. Bidder shall bring out the same in their regret letter. Otherwise it will be considered that non participation by the bidder is attributable to reasons other than any specification requirements.

3.0.0 APPLICATION OF SYSTEM:

3 Nos. [2 Working+1Standby] of Raw Sewage Lifting Pumps (Submersible Centrifugal) is envisaged for supplying Sewage from Raw Sewage Sump to Stilling Chamber.

2 Nos. [Working-1 No. for Each SBR] of Return Activated Sewage Sludge Lifting Pump (Submersible Centrifugal) is envisaged for Lifting Sewage sludge from Sequential batch reactor-1 & 2 & transferring to Anoxic zone of SBR tank.

2 Nos. [Working-1 No. for Each SBR] of Waste Activated Sewage Sludge Lifting Pump (Submersible Centrifugal) is envisaged for Lifting Sewage sludge from Sequential batch reactor-1 & 2 & transferring to Sludge Sump.

**4.0.0 TECHNICAL DETAILS/REQUIREMENTS:****4.1.0 Design Parameters and Technical Requirement of the Raw Sewage Lifting Pump:**

Sl. No.	Description	Unit	Rated Condition
1	Temperature Of Fluid	Deg. C	Ambient
2	Sludge Quality		Refer Annexure-1
3	Capacity Of each pump	m3/hr	95 [Variation Allowed: +10% to +15%]
4	Pump Differential Head	mwc	15
5	Quantity Required	Nos.	3 Nos.[2W+1S]
6	Drive(Pump Supplier Scope)		Motor[As per Manufacturer Standard]
7	Pump Type		Submersible Centrifugal Pump
8	Application		Handling Sludge
9	Duty		Continuous
10	Power Supply		3 Ph,415 V,+/- 10% Voltage Variation, 50Hz,+/- 5% Frequency variation,+/- 10% combined, DOL Starting
11	Material of Construction		Casing/Motor Housing: CI/SS, Impeller: CI/SS, Wear Ring: CI/Bronze/SS, Shaft: SS, Mechanical Seal: Silicon Carbide. Other Components as per Manufacturer standard. * In case bidder can't meet above mentioned material, Bidder can offer Equivalent/Superior material suitable to the requirement.

4.2.0 Design Parameters and Technical Requirement of the Return Activated Sewage Sludge Lifting Pump:

Sl. No.	Description	Unit	Rated Condition
1	Temperature Of Fluid	Deg. C	Ambient
2	Sludge Quality		Refer Annexure-1
3	Capacity Of each pump	m3/hr	25 [Variation Allowed: +10% to +15%]
4	Pump Differential Head(At Discharge Flange)	mwc	10
5	Quantity Required	Nos.	2 Nos.
6	Drive(Pump Supplier Scope)		Motor[As per Manufacturer Standard]
7	Pump Type		Submersible Centrifugal Pump
8	Application		Handling Sludge
9	Duty		Continuous
10	Power Supply		3 Ph,415 V,+/- 10% Voltage Variation, 50Hz,+/- 5% Frequency variation, +/- 10% combined, DOL Starting
11	Material of Construction		Casing/Motor Housing: CI/SS, Impeller: CI/SS, Wear Ring: CI/Bronze/SS, Shaft: SS, Mechanical Seal: Silicon Carbide. Other Components as per Manufacturer standard.* In case bidder can't meet above mentioned material, Bidder can offer Equivalent/Superior material suitable to the requirement.

**4.3.0 Design Parameters and Technical Requirement of the Waste Activated Sewage Sludge Lifting Pump:**

Sl. No.	Description	Unit	Rated Condition
1	Temperature Of Fluid	Deg. C	Ambient
2	Sludge Quality		Refer Annexure-1
3	Capacity Of each pump	m3/hr	55 [Variation Allowed: +10% to +15%]
4	Pump Differential Head(At Discharge Flange)	mwc	10
5	Quantity Required	Nos.	2 Nos.
6	Drive(Pump Supplier Scope)		Motor[As per Manufacturer Standard]
7	Pump Type		Submersible Centrifugal Pump
8	Application		Handling Sludge
9	Duty		Continuous
10	Power Supply		3 Ph,415 V,+/- 10% Voltage Variation, 50Hz,+/- 5% Frequency variation, +/- 10% combined, DOL Starting
11	Material of Construction		Casing/Motor Housing: CI/SS, Impeller: CI/SS, Wear Ring: CI/Bronze/SS, Shaft: SS, Mechanical Seal: Silicon Carbide, Other Components as per Manufacturer standard.* In case bidder can't meet above mentioned material, Bidder can offer Equivalent/Superior material suitable to the requirement.

5.0.0 SCOPE OF SUPPLY:

The scope of supply for this enquiry is as given below:

Please refer to the enclosed Schematic for Submersible Pump (Annexure-1) for general clarity on scope of supply. The system shall be provided as per annexure-1 taking into all requirements including for testing, painting, documentation, sub vendor list, equipment specifications etc., specified in this specification and enclosures.

Quantity of Pump & Drive Assembly:

- (i) 3 Nos. of Raw Sewage Lifting Pumps (Submersible Centrifugal)
- (ii) 2 Nos. Return Activated Sewage Sludge Lifting Pump (Submersible Centrifugal)
- (iii) 2 Nos. of Waste Activated Sewage Sludge Lifting Pump (Submersible Centrifugal)

The scope of supply for each pump & motor drive assembly is as given

5.1.0 Pump:

Submersible Centrifugal pump complete with all accessories as per specification & required accessories for smooth running of pump assembly. Performance requirement, Design and construction of the pump shall be guided by the Manufacturer standard.

5.2.0 Motor:

Motor Drive Rating shall be as per manufacturer standard practice. However the selected motor shall meet the maximum demand of the pump in the entire operating range of the pump. Design Standard of motor shall be as per Manufacturer standard practice.

**5.3.0 Type of Sealing: Mechanical Seal****5.4.0 Inter connecting Piping & Instrumentation:****For BHEL Pipe Size: Refer Annexure-1.****5.5.0** Necessary foundation bolts, nuts, shims/grouting pads etc.**5.6.0 Instrumentation:** Bidder to consider required instrumentation, which are required for smooth & trouble free operation as per manufacturer recommendation.**5.7.0 Suitable Auto Coupling type** Elbow on discharge side to be provided for removal of pump from pit without disturbing discharge pipe.**5.8.0** M.S. Galvanized lifting chain as per manufacturer recommendation to be provided. However while selecting minimum length required for sump depth (3 m) is to be considered.**5.9.0** All other items necessary for safe and smooth running of pump & Accessories required to make the supplied equipment complete in all respect.**5.10.0** Glands and lugs for power cable, control cable, Space heater cable and earthing cable (if any) suitable at motor end has to be supplied along with the main equipment. Glands shall be weather proof (as per motor category) double compression type Nickel plated Brass (ET) shall be provided with back nut and PVC shroud. Lugs shall be tinned copper heavy duty lug Cable dimensions shall be furnished during detail engineering, accordingly glands, lugs shall be supplied.**5.11.0 The motor is controlled through LT in sump. The power shall be supplied to motor through MCC & operated through PLC. No Local panel is envisaged. However if Bidder feels that if the panel is required, Bidder to consider the same duly taking care of motor On/Off through remote.****5.12.0** Required power Cable & Signal Cable as per manufacturer recommendation to be provided. However Minimum 5 m of power cable and signal cable are to be considered.**5.13.0 Commissioning Spares:****A.1) For Raw Sewage Lifting Pumps (Submersible Centrifugal):**

Three sets (One set for each pump & motor assembly) of commissioning spares for Raw Sewage Lifting Pumps (Submersible Centrifugal) shall be quoted and included in scope of supply as per manufacturer's recommendation.

A.2) For Return activated Sewage Sludge Pumps (Submersible Centrifugal):

Two sets (One set for each pump & motor assembly) of commissioning spares for Return activated Sewage Sludge Pumps (Submersible Centrifugal) shall be quoted and included in scope of supply as per manufacturer's recommendation.

A.3) For Waste activated Sewage Sludge Pumps (Submersible Centrifugal):

Two sets (One set for each pump & motor assembly) of commissioning spares for Waste activated Sewage Sludge Pumps (Submersible Centrifugal) shall be quoted and included in scope of supply as per manufacturer's recommendation.

5.14.0 Mandatory Spares: Not Applicable.**5.15.0 Special Tools and Tackles:**

For Raw Sewage Lifting Pumps (Submersible Centrifugal)/ Return activated Sewage Sludge Pumps (Submersible Centrifugal)/ Waste activated Sewage Sludge Pumps (Submersible Centrifugal)::

The bidder shall furnish a complete 3 sets [1 set each for Each pump] of all special tools, wrenches etc. with necessary tools boxes as required for operation and maintenance [disassemble, assemble, or maintaining the unit] as a part of scope of supply. **Bidder shall furnish a list of such tools along with offer for the system.** Prices for the special tools and tackles shall be part of main scope of supply.**6.0.0 OPTIONAL PRICES:** Please Refer to Attached Price Bid Format.

Bidder to furnish the following as optional prices:

1) 2 year recommended spares for each pump



7.0.0 EQUIPMENT QUALIFICATION CRITERIA (EQC)

The bidder shall be an established manufacturer of Submersible Pump & having adequate engineering, manufacturing & testing facilities for Submersible Pump confirming to the relevant applicable codes and standards. The Submersible Pump model offered shall be from the existing regular manufacturing range of bidder.

The offered Submersible Pump model shall meet the minimum service & manufacturing experience specified as below: Submersible Pump shall be identical or validly similar in terms of

- Type i.e. Submersible Centrifugal
- Capacity/Flow Rate
- Materials etc.
- Application.

as compared to at least 10 Units of the proposed model designed, manufactured, tested and supplied from the proposed manufacturing plant in the last 7(seven) years from the date of Technical bid opening and at least Five of these units shall have successfully operated in the field for at least 8000 hours individually without any major problem as on the date of issue of enquiry in the last three years. **As a proof for the same, Date of Supply/ Commissioning report/Customer Satisfaction report will be considered and same to be provided by vendor.**

Accordingly, Bidder to furnish reference list for the Submersible Pump consisting of year of supply, application, Customer Name, Quantity etc. as a minimum.

8.0.0 QUALITY PLAN & INSPECTION AGENCY & TESTING:

Quality Plan: Please refer annexure-5 for typical quality plan.

Based on Guidelines provided in Annexure-5, QAP to be furnished in line with manufacturer standard for BHEL review.

Inspection agency: As per manufacturer standard.

In case inspection is offered, Inspection shall be carried out by BHEL/Third Party appointed by BHEL. The various review/witness/observation stages by Individual agencies (or) Group of Agencies as above will be in line with approved quality plan.

Functional test: Bidder to conduct functional test as a minimum.

Material Test Report: Material test report to be furnished for BHEL review.

9.0.0 PAINTING:

As per Manufacturer standard practice. However standard quality paint to be used.

10.0.0 PACKING AND FORWARDING:

As per Manufacturer standard (Domestic/Seaworthy packing in case of import).

11.0.0 SUB VENDORS:

Motor: As per Pump Manufacturer standard.

Signal Cable:

- a) Cord Cable, b) Udey Pyrocable, c) Special Cables & d) Thermocables.

Cable Glands:

- a) Electromeg, b) CCI, c) Dowels, d) Metal Crafts Industries, Rajkot,

Cable Lugs:

- a) Phoneix, b) Dowells & c) Hex

LT Power Cable & Control Cable:

Polycab / apar industries / special cables / universal / RPG / KEI, Bhiwadi/ Havells / Skytone / Laser cables / Gems cab /Sbee cables / v-guard industries/ CCI / Cords/ General cable india / TBEA china / New Baofeng china / Far east china / Gupta power ltd.

Bidder shall follow approved sub vendors list. In case of any specific practical difficulty, bidder is requested to bring out the same with proper reason for not following vendor list. For other items for which sub vendors are not specified, bidder can follow their standard vendors. However, they have to ensure the Proven Track record of the sub vendors and Bidder to take prior approval of BHEL for the same.



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12.0.0 DOCUMENTATION:

- a) Documentation shall be submitted by bidder during detailed engineering stage, as per the Master Document List to be mutually finalized during detailed engineering stage.
- b) No. of Copies to be furnished :

All the documents shall be submitted as given below:

S.N.	DESCRIPTION	No. of copies to be Provided	WHEN TO SUBMIT
1	Initial drawings/documents under approval and information category.[Soft Copies]	1	Within 2 weeks of placement of order
2	Revised drawings/documents incorporating BHEL's comments. [Soft Copies]	1	Within 1 week of receipt of commented Drawings from BHEL
3	Final Drawings/documents	4	Within 2 months of placement of order.
4	Erection Documentation	5	2 Months before dispatch of equipment, The list of documents identified under master document list for erection to be furnished in 5 nos. of folders.
5	Draft O & M Manuals without test certificates (if felt necessary)[Soft Copies]	1	2 months before the delivery date of equipment
6	Revised O & M Manuals with Test Certificates to be submitted to BHEL (Hyderabad)	4	Within one month after dispatch of equipment
7	Final O&M Manuals in a CD	3	Within one month after dispatch of equipment

Following drawings to be submitted for BHEL approval:

- GA drawing, Datasheet, Cross sectional drawing, Performance Curves for Pump & Motor
- GA drawing, wiring diagram of Pump Assembly

13.0.0 PRICE BID FORMAT:

Bidder to indicate his offer as per Price Bid format enclosed as Annexure-3.

All the items included in the price bid format shall be quoted as per tender specification and pre-bid clarifications as per annexure-7, if any. Responsibility of ensuring correctness & completeness of scope of supply as per specification requirement solely lies with bidder.

The equipment supplied shall be complete in all respects. The bidder shall not be eligible for any extra payment in respect of such mountings, fittings, fixtures and accessories if required for the safe and reliable operation of the equipment. Any additional equipment, material, etc., which are not specifically mentioned here, but are required to make the supplied equipment complete in all respect, in accordance with the intent of this technical specification, contractual agreement,



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statutory requirements, relevant/applicable codes/standards, good engineering practices, and for safe and trouble-free operation, shall be deemed to be in bidder scope Only.

Main offer consists of those items which will be part of main order after successful bidder is identified. Optional Items consists of those items which need to be quoted by bidder but may or may not be ordered by BHEL. Bidders are instructed to provide the pricing details listed under Main offer and Optional items as per the prescribed format. Prices quoted by the bidder shall remain firm till the successful handing over of the entire package to end customer. Any request for upward revision of price during any intermediate stage before handing over the plant to end customer will be summarily rejected by BHEL.

The Priced Bid shall be submitted in Original (without any copy) duly signed and stamped on each page in a separate sealed envelope super scribing "Price Bid –Do not Open" This shall not contain any condition whatsoever failing which the Bids shall be liable to be rejected. In case of any correction, the bidder shall put its signature and its stamp. Eraser fluid will not be allowed for making any correction.

Bidder shall confirm to the un-priced bid as part of their offer.

14.0.0 PRE-BID CLARIFICATIONS & DEVIATIONS:

14.1.0 Bidders shall comply with various requirements of this specification. It may please be noted that the requirements specified here in this specification are the standard practices being followed by the bidders. However, same things are presented in a structured form so that it can be ensured that the requirements of ultimate customer are complied with.

14.2.0 Bidders can bring out only those deviations which are impractical to meet, for our review in pre bid clarification only.

14.3.0 Bidders may also please note that the data sheets for, valves, instruments etc., submitted along with the offer will be considered as indicative only, as the requirements specified in the specification are standard in nature. These will not be reviewed by BHEL before award of contract. Same will be reviewed during order execution stage in line with the requirements of specification and agreed deviations.

14.4.0 All pre-bid clarifications & deviations shall be clear bring as per annexure- 7 & 8 Only.

14.5.0 In case bidder doesn't bring any clarification/deviation in prebid stage, the same shall be brought in their offer with following conditions:

- Any deviations to Customer specifications, same are acceptable provided these deviations are also regularly accepted by Customer for their direct orders on bidders. During detailed engineering stage if it is found that any deviation brought out by bidder is not a regular deviation accepted by Customer, the particular deviation brought out by bidder will not be considered as an acceptable deviation.
- Bidders may please note that unless the deviations are specifically brought out under deviations clause, it will be considered that no deviations are taken, even if they are mentioned elsewhere directly/indirectly in the offer.
- Price implication due to non-acceptance [by BHEL/Customer] of the deviations asked by bidder shall not be acceptable by BHEL.

15.0.0 ANNEXURES:

Following input documents and specifications are enclosed to facilitate the bidder to furnish the offer and ensure compliance:

Annexure No.	Description
01	Schematic For Pump-Drive Assembly
02	Pump-Motor Data Sheet
03	Price Bid Format
04	Check List
05	QAP guide Line & Formats
06	BOM Standard Format & Master DOC List Format
07	Pre-bid clarification format
08	Deviation format

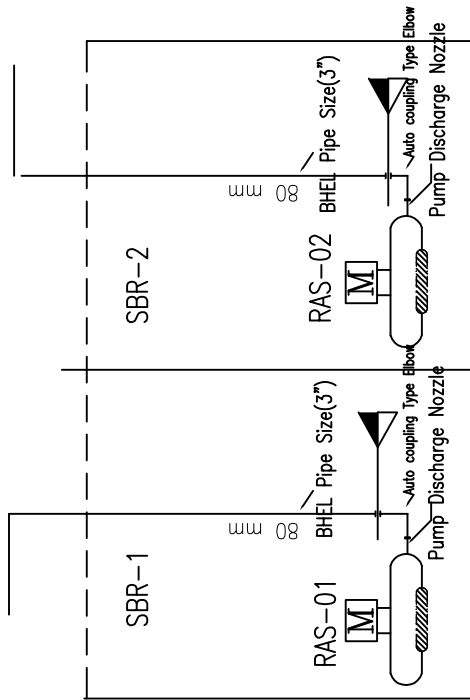
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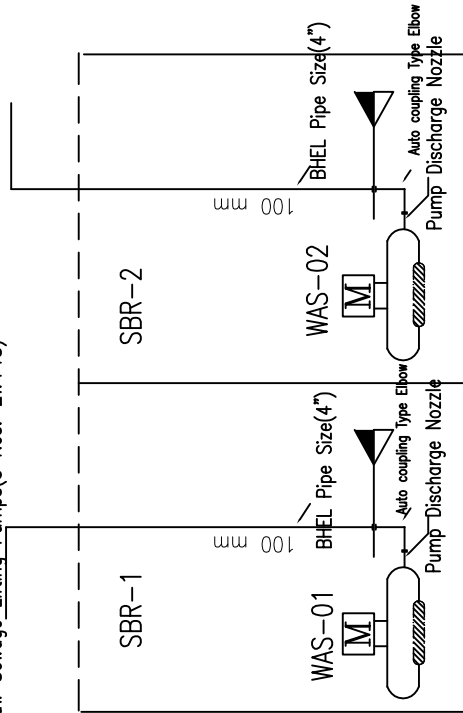
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company.	Annexure-1 SCHEMATIC FOR SUBMERSIBLE PUMP	

Revisions: Refer to record of revisions	Prepared by :	Checked by :	Approved by :	Date :
	Rajeev Jain	GIRISH	Siva Prasad Babu	20.06.17

ANNEXURE-1



Return Activated Sewage Sludge Lifting Pump
Total: 2 Nos. (1 No. for Each SBR)



Waste Activated Sewage Sludge Lifting Pump
Total:2 Nos.(1No. for Each SBR)

Note:

1. For other details pls refer specification.

[illegible]

D SECONDARY OR BIOLOGICAL TREATMENT

D.1 SEQUANCING BATCH REACTOR

Influent - Raw

BOD	188 mg/L
TSS	274 mg/L

Influent - SBR

Flow	4500 m ³ /d
Hourly Peak Flow	5400 m ³ /d
BOD	188 mg/L
COD	516 mg/L
TSS	274 mg/L
VSS/TSS	0.80
VSS	219.2 mg/L
TKN	30 mg/L
Ammonification limits	100%
Ammonified TKN	30 mg/L
TP	5 mg/L
Alkalinity (as CaCO₃)	264.2 mg/L
bCOD/BOD	1.6 kgbCOD/kgBOD
COD/BOD	2.7 kgCOD/kgBOD
Elevation of site to mean sea level	527 m

Temperature

Wastewater temperature for design	20 degC
maximum temp	30 degC

Effluent

BOD effluent	10 mg/L
SS effluent	10 mg/L
NH₄-N effluent	5 mg/L
TP effluent	2 mg/L

TN effluent	10 mg/L
Design parameters	
MLSS	4500 mg/L
Number of tanks	2
HRT	0.55 d
Reactor Sizing (including pre-react zone)	
Surface area per Reactor	225.0 m ²
Length	15.00 m.
Width	15.00 m.
Maximum Liquid depth	5.50 m.
Free board	0.50 m.
Top of the wall	6.00 m.
Cycle	
Number of cycles / tank . d	4.00
Total number of cycles / d	8.00
Aeration hours per day	12.00 hrs.
<u>OPERATIONAL PARAMETERS</u>	
MLSS	4500 mg/L
MLVSS	3219 mg/L
Sludge Retention Time, SRT	11 day
Observed yield	1.24 kgTSS / kgBOD
F/M (BOD₅/MLSS)	0.08 kg / kg • d
BOD₅ volumetric loading	0.34 kg / m ³ • d
BOD₅ volumetric loading	21 lb /1000 ft ³ • d
<u>WAS</u>	
Total Sludge production	1045 kg TSS/d
TSS load in the supernatant (effluent)	45.0 kg/d
Net sludge production	1000 kg/d

WAS concentration	8325 mg/L
Total WAS volume per day	120 m ³ /d
Number of WAS pumps per SBR	1
WAS pump capacity	0.86 m ³ /min
WAS pumping time	17.46 min/cycle

RAS

Number of RAS pumps per SBR	1
RAS pump capacity	0.39 m ³ /min
RAS pumping time	3.0 h

Aeration

O₂ for BOD t removed	1.1 kg/kg
Nitrification of TKN*	79%
O₂ for N nitrified	4.57 kg/kg
O₂ for N denitrified	2.90 kg/kg
AOR for BOD t removed	880 kg O ₂ /d
AOR for TKN t nitrified	383 kg O ₂ /d
Oxygen credit for denitrification	137 kg O ₂ /d
AOR t r	1127 kg O ₂ /d
AOR t r / hour	47 kg O ₂ /h
Corrected average depth	4.94 m
β salinity surface tension correction factor	0.98
Alpha	0.60
AOR/SOR	0.45 ratio
SOR t	2526 kg/d
SOR total / Cycle	105.2 kg/h
Oxygen peak factor	1.0
Fine bubble aeration	
Diffuser type	1m
Membrane diffusers loading	10 scfm/diff.
Diffuser height from bottom	0.20 m
Average submergence DWD	4.74 m
% O₂ transf.	2.0 %/ft

% O₂ transfer	31 %
Air requirement / SBR	718 scfm
No diff./react.	72 diff.
<u>Blowers</u>	
No. of blowers / per pair of SBR	2 units
Capacity	360 scfm
Capacity	10.2 m ³ /min
Relative humidity	95%
Extreme air temperature	45 oC
Capacity at inlet conditions	463 acfm
Capacity at inlet conditions	13.1 m ³ /min
Diffuser height from tank bottom	0.2 m
Diffuser headloss	0.65 psi
Air piping headloss	1.5 psi
Water column at design flow	7.5 psi
Design over pressure	0.5 psi
Blower discharge pressure	10.18 psi
Blower mechanical efficiency	0.70
Brake horse power	26.89 BHP

Maximum Particle Size at inlet of Raw Sewage Pump: 80 mm
Maximum Particle Size at inlet of RAS Sludge Pump: 100 mm
Maximum Particle Size at inlet of WAS Sludge Pump: 100 mm

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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company.	Annexure-2 DATA SHEET OF PUMP-MOTOR ASSEMBLY			

Revisions: Refer to record of revisions	Prepared by :	Checked by :	Approved by :	Date :
	Rajeev Jain	GIRISH	Siva Prasad Babu	20.06.17

CUSTOMER: BHEL BHOPAL
PROJECT: 4.5MLD STP PROJECT, BHEL-BHOPAL

DATA SHEET FOR RAW SEWAGE LIFTING PUMP			
Sl.no.	Description	BHEL Requirement	DETAILS
GENERAL DATA			
1	Service	Transferring Sewage from Raw Sewage Sump to Stilling Chamber.	
2	Number of Pumps	Total : 3 Nos.[2 W+1S]	
3	Location	Outdoor	
4	Duty	Continuous	
5	Drives	Motor	
6	Pumping fluid	Sewage Sludge[For Sludge Details Refer Annexure-1]	
7	Fluid temp Deg C	Ambient	
PUMP PERFORMANCE & OTHER DETAILS			
8	Pump Type	Submersible Pump	
9	Design Standard of pump	To be mentioned by Bidder	
10	Rated Flow (m ³ /hr)	95	
11	Rated Differential Head (mlc)	15	
12	Pump Model No.	To be mentioned by Bidder	
13	No. of Stages of pump	To be mentioned by Bidder	
14	Parallel operation	Yes	
15	Rated Speed of Pump (rpm)	To be mentioned by Bidder	
16	Rated speed of Motor (rpm)	To be mentioned by Bidder	
17	Pump Efficiency in %	To be mentioned by Bidder	
18	Available Pressure at centre line of Suction nozzle of Pump mlc	Min. 1.0 kg/cm ²	
19	NPSH(A) at pump suction nozzle (mlc)	10.0 m	
20	NPSH(R) (mlc)	To be mentioned by Bidder	
21	NPSH(A) - NPSH(R)	Minimum 1 m of margin between NPSH(A) & NPSH(R) to be maintained.	
22	Pump shut off head.	Flow vs Head curve shall be continuously rising towards shut-off head.	
23	Pump shut off head/rated head.	To be mentioned by Bidder	
24	Minimum Submersible Level required for Pump	To be mentioned by Bidder	
25	Impeller type	As per Manufacturing recommendation.	
26	Pump rated impeller dia, mm	To be mentioned by Bidder	
27	Pump max. impeller dia, mm	To be mentioned by Bidder	
28	Pump minimum impeller dia., mm	To be mentioned by Bidder	
PUMP CONSTRUCTION FEATURES			
29	Material of Construction*: Casing/Motor Housing: CI/SS, Impeller: CI/SS, Wear Ring: CI/Bronze/SS, Shaft: SS, Mechanical Seal: Silicon Carbide, Other Components as per Manufacturer standard. * In case bidder can't meet above mentioned material, Bidder can offer Equivalent/Superior material suitable to the requirement.	To be Confirmed by Bidder	
30	Sealing arrangement	Mechanical seal as per Manufacturer's Standard	
31	Type of bearings for pump	To be mentioned by Bidder	
32	Bearings lubrication	To be mentioned by Bidder	
33	Coupling used between Pump and Motor	To be mentioned by Bidder	
PERFORMANCE TEST STANDARD FOR PUMPS			
34	Performance test standard	To be mentioned by Bidder	
35	Maximum Allowed Working Pressure (MAWP) in Kg/cm ² g	To be mentioned by Bidder	
36	Hydraulic test pressure of casing Kg/cm ² (g)	Hydraulic test pressure of casing shall be 1.5 times the MAWP. Test duration shall be minimum 30 min.	
37	Noise level for Pump	To be mentioned by Bidder	
38	Vibration for Pump	To be mentioned by Bidder	
39	Pump Instruments	As per Manufacturer recommendation	

CUSTOMER: BHEL BHOPAL
PROJECT: 4.5MLD STP PROJECT, BHEL-BHOPAL

Sl.no.	Description	BHEL Requirement	DETAILS
MOTOR DETAILS			
61	Drive	Motor	
62	BKW at the rated point		
63	BKW at end of curve		
64	Selected drive rating in kW: Motor Drive Rating shall be as per manufacturer standard practice. However the selected motor shall meet the maximum demand of the pump in the entire operating range of the pump.	Bidder to mention motor kW rating for the motor duly taking care of the requirements.	
65	Design Standard of Motor	As per Manufacturer Standard	
66	Energy Efficient Class	As per Manufacturer Standard	
67	Manufacturer	As per Manufacturer Standard	
68	Ambient Temperature	50 Deg C All motors shall be designed to operate in humid atmosphere with a maximum ambient temperature of 50 Deg C.	
69	Area classification for motor	Safe Area	
70	Rated Voltage & Frequency	415 V & 50 Hz	
71	Permissible variations in Voltage/Frequency/Combined	(+/-)/10%/(+/-)/5%/(+/-)/10%	
72	No of poles / synchronous speed	Based on Pump Speed	
73	Method of Starting	Motor shall be capable of starting with DOL	
74	Method of cooling	To be Confirmed by Bidder	
75	Class of Insulation & Temp. rise	Class F with Temperature rise ltd. to class B	
76	Degree of protection	As per Manufacturer Standard, Min. IP 68	
77	TB Short time-Current & Short time-Time	40 kA , 0.25 Sec	
78	Cable, Cable glands & Lugs	Cable details shall be furnished during DDE. Accordingly suitable double compression Nickel plated brass cable glands with back nut and PVC shroud and Tinned copper lugs to be provided by the bidder.	
79	No. of Starts	As per Manufacturer recommendation	
80	Bearing RTDs, Winding RTDs & TGs	As per Manufacturer Recommendation	

CUSTOMER: BHEL BHOPAL
PROJECT: 4.5MLD STP PROJECT, BHEL-BHOPAL

DATA SHEET FOR Return Activated Sewage Sludge Lifting Pump			
Sl.no.	Description	BHEL Requirement	DETAILS
GENERAL DATA			
1	Service	Transferring Sewage sludge from Sequential batch reactor-1 & 2 & transferring to Stilling Chamber	
2	Number of Pumps	Total : 2 Nos.[1 No. Each for Each SBR]	
3	Location	Outdoor	
4	Duty	Continuous	
5	Drives	Motor	
6	Pumping fluid	Sewage Sludge[For Sludge Details Refer Annexure-1]	
7	Fluid temp Deg C	Ambient	
PUMP PERFORMANCE & OTHER DETAILS			
8	Pump Type	Submersible Pump	
9	Design Standard of pump	To be mentioned by Bidder	
10	Rated Flow (m ³ /hr)	25	
11	Rated Differential Head (mlc)	10	
12	Pump Model No.	To be mentioned by Bidder	
13	No. of Stages of pump	To be mentioned by Bidder	
14	Parallel operation	No	
15	Rated Speed of Pump (rpm)	To be mentioned by Bidder	
16	Rated speed of Motor (rpm)	To be mentioned by Bidder	
17	Pump Efficiency in %	To be mentioned by Bidder	
18	Available Pressure at centre line of Suction nozzle of Pump mlc	Min. 1.0 kg/cm ²	
19	NPSH(A) at pump suction nozzle (mlc)	10.0 m	
20	NPSH(R) (mlc)	To be mentioned by Bidder	
21	NPSH(A) - NPSH(R)	Minimum 1 m of margin between NPSH(A) & NPSH(R) to be maintained.	
22	Pump shut off head.	Flow vs Head curve shall be continuously rising towards shut-off head.	
23	Pump shut off head/rated head.	To be mentioned by Bidder	
24	Minimum Submersible Level required for Pump	To be mentioned by Bidder	
25	Impeller type	As per Manufacturing recommendation.	
26	Pump rated impeller dia, mm	To be mentioned by Bidder	
27	Pump max. impeller dia, mm	To be mentioned by Bidder	
28	Pump minimum impeller dia., mm	To be mentioned by Bidder	
PUMP CONSTRUCTION FEATURES			
29	Material of Construction*: Casing/Motor Housing: CI/SS, Impeller: CI/SS, Wear Ring: CI/Bronze/SS, Shaft: SS, Mechanical Seal: Silicon Carbide, Other Components as per Manufacturer standard. * In case bidder can't meet above mentioned material, Bidder can offer Equivalent/Superior material suitable to the requirement.	To be Confirmed by Bidder	
30	Sealing arrangement	Mechanical seal as per Manufacturer's Standard	
31	Type of bearings for pump	To be mentioned by Bidder	
32	Bearings lubrication	To be mentioned by Bidder	
33	Coupling used between Pump and Motor	To be mentioned by Bidder	
PERFORMANCE TEST STANDARD FOR PUMPS			
34	Performance test standard	To be mentioned by Bidder	
35	Maximum Allowed Working Pressure (MAWP) in Kg/cm ² g		
36	Hydraulic test pressure of casing Kg/cm ² (g)	Hydraulic test pressure of casing shall be 1.5 times the MAWP. Test duration shall be minimum 30 min.	
37	Noise level for Pump	To be mentioned by Bidder	
38	Vibration for Pump	To be mentioned by Bidder	
39	Pump Instruments	As per Manufacturer recommendation	

CUSTOMER: BHEL BHOPAL
PROJECT: 4.5MLD STP PROJECT, BHEL-BHOPAL

Sl.no.	Description	BHEL Requirement	DETAILS
MOTOR DETAILS			
61	Drive	Motor	
62	BKW at the rated point		
63	BKW at end of curve		
64	Selected drive rating in kW: Motor Drive Rating shall be as per manufacturer standard practice. However the selected motor shall meet the maximum demand of the pump in the entire operating range of the pump.	Bidder to mention motor kW rating for the motor duly taking care of the requirements.	
65	Design Standard of Motor	As per Manufacturer Standard	
66	Energy Efficient Class	As per Manufacturer Standard	
67	Manufacturer	As per Manufacturer Standard	
68	Ambient Temperature	50 Deg C All motors shall be designed to operate in humid atmosphere with a maximum ambient temperature of 50 Deg C.	
69	Area classification for motor	Safe Area	
70	Rated Voltage & Frequency	415 V & 50 Hz	
71	Permissible variations in Voltage/Frequency/Combined	(+/-)/10%/(+/-)/5%/(+/-)/10%	
72	No of poles / synchronous speed	Based on Pump Speed	
73	Method of Starting	Motor shall be capable of starting with DOL	
74	Method of cooling	To be Confirmed by Bidder	
75	Class of Insulation & Temp. rise	Class F with Temperature rise ltd. to class B	
76	Degree of protection	As per Manufacturer Standard, Min. IP 68	
77	TB Short time-Current & Short time-Time	40 kA , 0.25 Sec	
78	Cable, Cable glands & Lugs	Cable details shall be furnished during DDE. Accordingly suitable double compression Nickel plated brass cable glands with back nut and PVC shroud and Tinned copper lugs to be provided by the bidder.	
79	No. of Starts	As per Manufacturer recommendation	
80	Bearing RTDs, Winding RTDs & TGs	As per Manufacturer Recommendation	

CUSTOMER: BHEL BHOPAL
PROJECT: 4.5MLD STP PROJECT, BHEL-BHOPAL

DATA SHEET FOR Waste Activated Sewage Sludge Lifting Pump			
Sl.no.	Description	BHEL Requirement	DETAILS
GENERAL DATA			
1	Service	Transferring Sewage sludge from Sequential batch reactor-1 & 2 & transferring to Sludge Sump.	
2	Number of Pumps	Total : 2 Nos.[1 No. Each for Each SBR]	
3	Location	Outdoor	
4	Duty	Continuous	
5	Drives	Motor	
6	Pumping fluid	Sewage Sludge[For Sludge Details Refer Annexure-1]	
7	Fluid temp Deg C	Ambient	
PUMP PERFORMANCE & OTHER DETAILS			
8	Pump Type	Submersible Pump	
9	Design Standard of pump	To be mentioned by Bidder	
10	Rated Flow (m ³ /hr)	25	
11	Rated Differential Head (mlc)	10	
12	Pump Model No.	To be mentioned by Bidder	
13	No. of Stages of pump	To be mentioned by Bidder	
14	Parallel operation	No	
15	Rated Speed of Pump (rpm)	To be mentioned by Bidder	
16	Rated speed of Motor (rpm)	To be mentioned by Bidder	
17	Pump Efficiency in %	To be mentioned by Bidder	
18	Available Pressure at centre line of Suction nozzle of Pump mlc	Min. 1.0 kg/cm ²	
19	NPSH(A) at pump suction nozzle (mlc)	10.0 m	
20	NPSH(R) (mlc)	To be mentioned by Bidder	
21	NPSH(A) - NPSH(R)	Minimum 1 m of margin between NPSH(A) & NPSH(R) to be maintained.	
22	Pump shut off head.	Flow vs Head curve shall be continuously rising towards shut-off head.	
23	Pump shut off head/rated head.	To be mentioned by Bidder	
24	Minimum Submersible Level required for Pump	To be mentioned by Bidder	
25	Impeller type	As per Manufacturing recommendation.	
26	Pump rated impeller dia, mm	To be mentioned by Bidder	
27	Pump max. impeller dia, mm	To be mentioned by Bidder	
28	Pump minimum impeller dia., mm	To be mentioned by Bidder	
PUMP CONSTRUCTION FEATURES			
29	Material of Construction*: Casing/Motor Housing: CI/SS, Impeller: CI/SS, Wear Ring: CI/Bronze/SS, Shaft: SS, Mechanical Seal: Silicon Carbide, Other Components as per Manufacturer standard. * In case bidder can't meet above mentioned material, Bidder can offer Equivalent/Superior material suitable to the requirement.	To be Confirmed by Bidder	
30	Sealing arrangement	Mechanical seal as per Manufacturer's Standard	
31	Type of bearings for pump	To be mentioned by Bidder	
32	Bearings lubrication	To be mentioned by Bidder	
33	Coupling used between Pump and Motor	To be mentioned by Bidder	
PERFORMANCE TEST STANDARD FOR PUMPS			
34	Performance test standard	To be mentioned by Bidder	
35	Maximum Allowed Working Pressure (MAWP) in Kg/cm ² g		
36	Hydraulic test pressure of casing Kg/cm ² (g)	Hydraulic test pressure of casing shall be 1.5 times the MAWP. Test duration shall be minimum 30 min.	
37	Noise level for Pump	To be mentioned by Bidder	
38	Vibration for Pump	To be mentioned by Bidder	
39	Pump Instruments	As per Manufacturer recommendation	

CUSTOMER: BHEL BHOPAL
PROJECT: 4.5MLD STP PROJECT, BHEL-BHOPAL

Sl.no.	Description	BHEL Requirement	DETAILS
MOTOR DETAILS			
61	Drive	Motor	
62	BKW at the rated point		
63	BKW at end of curve		
64	Selected drive rating in kW: Motor Drive Rating shall be as per manufacturer standard practice. However the selected motor shall meet the maximum demand of the pump in the entire operating range of the pump.	Bidder to mention motor kW rating for the motor duly taking care of the requirements.	
65	Design Standard of Motor	As per Manufacturer Standard	
66	Energy Efficient Class	As per Manufacturer Standard	
67	Manufacturer	As per Manufacturer Standard	
68	Ambient Temperature	50 Deg C All motors shall be designed to operate in humid atmosphere with a maximum ambient temperature of 50 Deg C.	
69	Area classification for motor	Safe Area	
70	Rated Voltage & Frequency	415 V & 50 Hz	
71	Permissible variations in Voltage/Frequency/Combined	(+/-)/10%/(+/-)/5%/(+/-)/10%	
72	No of poles / synchronous speed	Based on Pump Speed	
73	Method of Starting	Motor shall be capable of starting with DOL	
74	Method of cooling	To be Confirmed by Bidder	
75	Class of Insulation & Temp. rise	Class F with Temperature rise ltd. to class B	
76	Degree of protection	As per Manufacturer Standard, Min. IP 68	
77	TB Short time-Current & Short time-Time	40 kA , 0.25 Sec	
78	Cable, Cable glands & Lugs	Cable details shall be furnished during DDE. Accordingly suitable double compression Nickel plated brass cable glands with back nut and PVC shroud and Tinned copper lugs to be provided by the bidder.	
79	No. of Starts	As per Manufacturer recommendation	
80	Bearing RTDs, Winding RTDs & TGs	As per Manufacturer Recommendation	

ESP-001-2A Rev.00		PROJECT ENGINEERING & SYSTEMS DIVISION	Std. / Doc. Number	
			Annexure-3 to Doc. No. PY-AS-4-M096-8369-01	
			Rev. No.	00

COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company.	Annexure-3 PRICE BID FORMAT FOR SUBMERSIBLE PUMP
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Revisions:	Prepared by :	Checked by :	Approved by :	Date :
Refer to record of revisions	Rajeev Jain	GIRISH	Siva Prasad Babu	20.06.17

		BHARAT HEAVY ELECTRICALS LIMITED R.C.PURAM, HYDERABAD-502032			
PROJECT ENGINEERING & SYSTEMS DIVISION					
PRICE FORMAT (R00) FOR Raw Sewage Lifting Pumps (Submersible Centrifugal) with Drive Assembly PROJECT : PROJECT 4.5 MLD STP,BHEL-BHOPAL					
SL NO	ITEM DESCRIPTION	QTY	UNIT	UNIT RATE (RS.)	TOTAL (RS.)
Bidder's Name : <Bidder to indicate> Bidder's Offer No. & Dt. : <Bidder to indicate> Bidder's Ref No. & Dt. :<Bidder to indicate> BHEL Enq. No. & date :<Bidder to indicate>					
1	MAIN OFFER				
A	Raw Sewage Lifting Pumps (Submersible Centrifugal) with Drive Assembly:[95 m3/hr,15 mwc]				
A.1.	MATERIAL SUPPLY-Raw Sewage Lifting Pumps (Submersible Centrifugal) with Drive Assembly				
	Raw Sewage Lifting Pumps (Submersible Centrifugal)[95 m3/hr,15 mwc] with Drive Assembly (weather proof) with required accessories as per Manufacturer standard duly taking care of requirments mentioned in specification	3	Set		
A.2	Commissioning spares				
	One set of commissioning spares per pump shall be quoted as per manufacturer's recommendation. (Ref. Note-12)	3	Set		
A.3	Special Tools & tackles				
	One set of Tools and tackles shall be quoted as per manufacturer's recommendation.	1	Set		
A.4	Supervision charges for erection & commissioning at site	--			
a	Travel expenses from vendor works to site and back per visit /person	--			
b	Per day charges per person for supervision of erection & commissioning at site including boarding, lodging, lcoal transportation etc., except for travel expenses as above.	--			
2	Optional Items				
B.1	2 Years Recommended Spares				
	Rrecommended spares list for two years normal operation along with unit price breakup for Pump, Drive & other accessories[For Each Varaiety of pump seperate list to be provided].. (List with price break up to be enclosed) (1 set stands for quantity required for the replacement of one pump, drive (or) accessories)	As per List	Set		
TOTAL					
Notes: 1) Bidder to quote strictly as per BHEL's NIT requirements. 2) Bidder to note that this is a LUMP SUM Turn-Key Order. However (a) Changes to the tender specification during execution of the project for successful operation of the system need to be carried out by bidder and commercial implications if any will be settled suitably. (b) Unit rates quoted by bidder shall be applicable for any changes in BOQ during detailed engineering stage. 3)Main offer consists of those items which will be part of main order after successful bidder is identified. Optional Items consists of those items which need to be quoted by bidder but may or may not be ordered by BHEL. Bidders are instructed to provide the pricing details listed under Main offer and Optional items as per the prescribed format.					

	BHARAT HEAVY ELECTRICALS LIMITED R.C.PURAM, HYDERABAD-502032				
PROJECT ENGINEERING & SYSTEMS DIVISION					
PRICE FORMAT (R00) FOR Raw Sewage Lifting Pumps (Submersible Centrifugal) with Drive Assembly PROJECT : PROJECT 4.5 MLD STP,BHEL-BHOPAL					
SL NO	ITEM DESCRIPTION	QTY	UNIT	UNIT RATE (RS.)	TOTAL (RS.)
Bidder's Name : <Bidder to indicate> Bidder's Offer No. & Dt. : <Bidder to indicate> Bidder's Ref No. & Dt. :<Bidder to indicate> BHEL Enq. No. & date :<Bidder to indicate>					
4) Prices quoted by bidders for items under main offer : Sl. No. I [1] will be considered for evaluation of lowest bidder. For the purpose of tender (L1 bidder evaluation). For Supervision of E&C, total no of 2 Man days to be covered in 1 Visit have been considered. However, either or both of the number of man days or no of visits may change on either side based on the actual site requirement. However, BHEL reserves the right (a) To include any of the optional items in scope of supply (as per customer contract requirements) and accordingly consider the same in evaluation. Any such scope increase and change in evaluation will be intimated to vendor during technical evaluation(before price bid opening). (b) To place PO for any of the Optional items with in the contract period. Hence bidders need to mandatorily quote reasonable prices for all optional items considering such requirement and keep the validity of the prices till the end of contract period.					
5.a) For all items including Optional items, prices to be furnished in this prescribed price bid format only for each individual item. No combined prices, common prices or any other format will be accepted and such bids may be liable for rejection. 5.b) Bidder must not change the indicated item description, quantity & units in the price bid format. Bidder should only fill the unit rates & total price. 5.c) Bidder to quote for all the items as per price bid format. Incomplete/partial offer may be liable for rejection.					
6) Bidder to quote the base rates only. All other commercial charges for packing, freight, transportation, insurance, taxes & duties etc., shall be indicated separately.					
7 a.) Commissioning spares are those spares which are required at the time of commissioning and shall be recommended(as per bidders experience) and quoted by bidder. However commissioning spares indicated in the price bid format shall be quoted as minimum.					
8)With respect to Mandatory Spares; A) If any of above items indicated by the specified name are not applicable, bidder to offer alternative item serving the same function as per equipment's design and indicate below the item being replaced. B) If bidder is not able to meet the above note, then bidder may mention "Not Applicable". However, if found applicable during detailed engg. stage or alternative item as per equipment design can serve the same function, bidder to supply the specified quantity with out any delivery and commercial implications to BHEL.					
9) Reference document: PY51222 R16 , BHEL Doc. No. PY-AS-4-M096-8369-01Rev. 00 & annexures.					
10) Unpriced price bid format indicating as quoted against each applicable item shall be submitted duly signed & stamped along with technical offer by bidder as a token of concurrence that prices are submitted in this format only. The offer shall be liable for rejection in case if un-priced price bid format is not submitted or any modification is carried out in price bid format.					
11) In case the systems are being supplied from outside India, reputed Third Party Inspection like Llyods or equivalent has to be considered and the charges should be included in the Main offer. For those bidders who are supplying from India, such third party inspection charges need not be considered and same will be arranged by BHEL/BHEL nominated inspection agency.					
12) Any commissioning spare consumed over and above the recommended commissioning spares, during commissioning shall be supplied free of cost by the equipment vendor.					

		BHARAT HEAVY ELECTRICALS LIMITED R.C.PURAM, HYDERABAD-502032			
PROJECT ENGINEERING & SYSTEMS DIVISION					
PRICE FORMAT (R00) FOR RETURN ACTIVATED SEWAGE SLUDGE LIFTING PUMP WITH ELECTRIC MOTOR DRIVE FOR CUSTOMER : BHEL-BHOPAL PROJECT : PROJECT 4.5 MLD STP,BHEL-BHOPAL					
SL NO	ITEM DESCRIPTION	QTY	UNIT	UNIT RATE (RS.)	TOTAL (RS.)
Bidder's Name : <Bidder to indicate> Bidder's Offer No. & Dt. : <Bidder to indicate> Bidder's Ref No. & Dt. :<Bidder to indicate> BHEL Enq. No. & date :<Bidder to indicate>					
1	MAIN OFFER				
A	Return Activated Sewage Sludge Lifting Pump (Submersible Centrifugal) with Drive Assembly [25 m3/hr,10 mwc]				
A.1.	MATERIAL SUPPLY-Return Activated Sewage Sludge Lifting Pump (Submersible Centrifugal) with Drive Assembly				
	Return Activated Sewage Sludge Lifting Pump (Submersible Centrifugal) [25 m3/hr,10 mwc] with Drive Assembly(weather proof) with required accessories as per Manufacturer standard duly taking care of requirments mentioned in specification	2	Set		
A.2	Commissioning spares				
	One set of commissioning spares per pump shall be quoted as per manufacturer's recommendation. (Ref. Note-12)	2	Set		
A.3	Special Tools & tackles				
	One set of Tools and tackles shall be quoted as per manufacturer's recommendation.	1	Set		
A.4	Supervison charges for erection & commissioning at site				
a	Travel expenses from vendor works to site and back per visit /person	--			
b	Per day charges per person for supervision of erection & commissioning at site including boarding, lodging, lcoal transportation etc., except for travel expenses as above.	--			
2	Optional Items				
B.1	2 Years Recommended Spares				
	Rrecommended spares list for two years normal operation along with unit price breakup for Pump, Drive & other accessories [For Each Varaity of pump seperate list to be provided]. (List with price break up to be enclosed) (1 set stands for quantity required for the replacement of one pump, drive (or) accessories).	As per List	Set		
TOTAL					
Notes:					
1) Bidder to quote strictly as per BHEL's NIT requirements.					
2) Bidder to note that this is a LUMP SUM Turn-Key Order. However (a) Changes to the tender specification during execution of the project for successful operation of the system need to be carried out by bidder and commercial implications if any will be settled suitably. (b) Unit rates quoted by bidder shall be applicable for any changes in BOQ during detailed engineering stage.					

	BHARAT HEAVY ELECTRICALS LIMITED R.C.PURAM, HYDERABAD-502032				
PROJECT ENGINEERING & SYSTEMS DIVISION					
PRICE FORMAT (R00) FOR RETURN ACTIVATED SEWAGE SLUDGE LIFTING PUMP WITH ELECTRIC MOTOR DRIVE FOR CUSTOMER : BHEL-BHOPAL PROJECT : PROJECT 4.5 MLD STP,BHEL-BHOPAL					
SL NO	ITEM DESCRIPTION	QTY	UNIT	UNIT RATE (RS.)	TOTAL (RS.)
Bidder's Name : <Bidder to indicate> Bidder's Offer No. & Dt. : <Bidder to indicate> Bidder's Ref No. & Dt. :<Bidder to indicate> BHEL Enq. No. & date :<Bidder to indicate>					
3)Main offer consists of those items which will be part of main order after successful bidder is identified. Optional Items consists of those items which need to be quoted by bidder but may or may not be ordered by BHEL. Bidders are instructed to provide the pricing details listed under Main offer and Optional items as per the prescribed format.					
4) Prices quoted by bidders for items under main offer : Sl. No. 1[A.1,A.2,A.3 & A.4] will be considered for evaluation of lowest bidder. For the purpose of tender (L1 bidder evaluation). For Supervision of E&C, total no of 2 Man days to be covered in 1 Visit have been considered. However, either or both of the number of man days or no of visits may change on either side based on the actual site requirement.However, BHEL reserves the right (a) To include any of the optional items in scope of supply (as per customer contract requirements) and accordingly consider the same in evaluation. Any such scope increase and change in evalution will be intimated to vendor during technical evaluation(before price bid opening). (b) To place PO for any of the Optional items with in the contract period. Hence bidders need to mandatorily quote reasonable prices for all optional items considering such requirement and keep the validity of the prices till the end of contract period.					
5.a) For all items including Optional items, prices to be furnished in this prescribed price bid format only for each individual item. No combined prices, common prices or any other format will be accepted and such bids may be liable for rejection. 5.b) Bidder must not change the indicated item description, quantity & units in the price bid format. Bidder should only fill the unit rates & total price. 5.c) Bidder to quote for all the items as per price bid format. Incomplete/partial offer may be liable for rejection.					
6) Bidder to quote the base rates only. All other commercial charges for packing, freight, transportation, insurance, taxes & duties etc., shall be indicated separately.					
7 a.) Commissioning spares are those spares which are required at the time of commissioning and shall be recommended(as per bidders experience) and quoted by bidder. However commissioning spares indicated in the price bid format shall be quoted as minimum.					
8)With respect to Mandatory Spares; A) If any of above items indicated by the specified name are not applicable, bidder to offer alternative item serving the same function as per equipment's design and indicate below the item being replaced. B) If bidder is not able to meet the above note, then bidder may mention "Not Applicable". However, if found applicable during detailed engg. stage or alternative item as per equipment design can serve the same function, bidder to supply the specified quantity with out any delivery and commercial implications to BHEL.					
9) Reference document: PY51222 R16 , BHEL Doc. No. PY-AS-4-M096-8369-01Rev. 00 & annexures.					
10) Unpriced price bid format indicating as quoted against each applicable item shall be submitted duly signed & stamped along with technical offer by bidder as a token of concurrence that prices are submitted in this format only. The offer shall be liable for rejection in case if un-priced price bid format is not submitted or any modification is carried out in price bid format.					
11) In case the systems are being supplied from outside India, reputed Third Party Inspection like Llyods or equivalent has to be considered and the charges should be included in the Main offer. For those bidders who are supplying from India, such third party inspection charges need not be considered and same will be arranged by BHEL/BHEL nominated inspection agency.					
12) Any commissioning spare consumed over and above the recommended commissioning spares, during commissioning shall be supplied free of cost by the equipment vendor.					

		BHARAT HEAVY ELECTRICALS LIMITED R.C.PURAM, HYDERABAD-502032			
PROJECT ENGINEERING & SYSTEMS DIVISION					
PRICE FORMAT (R00) FOR Waste Activated Sewage Sludge Lifting Pump WITH ELECTRIC MOTOR DRIVE FOR CUSTOMER : BHEL-BHOPAL PROJECT : PROJECT 4.5 MLD STP,BHEL-BHOPAL					
SL NO	ITEM DESCRIPTION	QTY	UNIT	UNIT RATE (RS.)	TOTAL (RS.)
Bidder's Name : <Bidder to indicate> Bidder's Offer No. & Dt. : <Bidder to indicate> Bidder's Ref No. & Dt. : <Bidder to indicate> BHEL Enq. No. & date : <Bidder to indicate>					
1	MAIN OFFER				
A	Waste Activated Sewage Sludge Lifting Pump (Submersible Centrifugal) with Drive Assembly [55 m3/hr,10 mwc]				
A.1.	MATERIAL SUPPLY-Waste Activated Sewage Sludge Lifting Pump (Submersible Centrifugal) with Drive Assembly				
	Waste Activated Sewage Sludge Lifting Pump (Submersible Centrifugal) [55 m3/hr,10 mwc] with Drive Assembly(weather proof) with required accessories as per Manufacturer standard duly taking care of requirments mentioned in specification	2	Set		
A.2	Commissioning spares				
	One set of commissioning spares per pump shall be quoted as per manufacturer's recommendation. (Ref. Note-12)	2	Set		
A.3	Special Tools & tackles				
	One set of Tools and tackles shall be quoted as per manufacturer's recommendation.	1	Set		
A.4	Supervision charges for erection & commissioning at site	--			
a	Travel expenses from vendor works to site and back per visit /person	--			
b	Per day charges per person for supervision of erection & commissioning at site including boarding, lodging, lcoal transportation etc., except for travel expenses as above.	--			
2	Optional Items				
B.1	2 Years Recommended Spares				
	Rrecommended spares list for two years normal operation along with unit price breakup for Pump, Drive & other accessories[For Each Varaiity of pump seperate list to be provided].. (List with price break up to be enclosed) (1 set stands for quantity required for the replacement of one pump, drive (or) accessories).	As per List	Set		
TOTAL					
Notes:					
1) Bidder to quote strictly as per BHEL's NIT requirements.					
2) Bidder to note that this is a LUMP SUM Turn-Key Order. However (a) Changes to the tender specification during execution of the project for successful operation of the system need to be carried out by bidder and commercial implications if any will be settled suitably. (b) Unit rates quoted by bidder shall be applicable for any changes in BOQ during detailed engineering stage.					

	BHARAT HEAVY ELECTRICALS LIMITED R.C.PURAM, HYDERABAD-502032				
PROJECT ENGINEERING & SYSTEMS DIVISION					
PRICE FORMAT (R00) FOR Waste Activated Sewage Sludge Lifting Pump WITH ELECTRIC MOTOR DRIVE FOR CUSTOMER : BHEL-BHOPAL PROJECT : PROJECT 4.5 MLD STP,BHEL-BHOPAL					
SL NO	ITEM DESCRIPTION	QTY	UNIT	UNIT RATE (RS.)	TOTAL (RS.)
Bidder's Name : <Bidder to indicate> Bidder's Offer No. & Dt. : <Bidder to indicate> Bidder's Ref No. & Dt. : <Bidder to indicate> BHEL Enq. No. & date : <Bidder to indicate>					
3)Main offer consists of those items which will be part of main order after successful bidder is identified. Optional Items consists of those items which need to be quoted by bidder but may or may not be ordered by BHEL. Bidders are instructed to provide the pricing details listed under Main offer and Optional items as per the prescribed format.					
4) Prices quoted by bidders for items under main offer : Sl. No. 1[A.1,A.2,A.3 & A.4] will be considered for evaluation of lowest bidder. For the purpose of tender (L1 bidder evaluation). For Supervision of E&C, total no of 2 Man days to be covered in 1 Visit have been considered. However, either or both of the number of man days or no of visits may change on either side based on the actual site requirement. However, BHEL reserves the right (a) To include any of the optional items in scope of supply (as per customer contract requirements) and accordingly consider the same in evaluation. Any such scope increase and change in evaluation will be intimated to vendor during technical evaluation(before price bid opening). (b) To place PO for any of the Optional items with in the contract period. Hence bidders need to mandatorily quote reasonable prices for all optional items considering such requirement and keep the validity of the prices till the end of contract period.					
5.a) For all items including Optional items, prices to be furnished in this prescribed price bid format only for each individual item. No combined prices, common prices or any other format will be accepted and such bids may be liable for rejection. 5.b) Bidder must not change the indicated item description, quantity & units in the price bid format. Bidder should only fill the unit rates & total price. 5.c) Bidder to quote for all the items as per price bid format. Incomplete/partial offer may be liable for rejection.					
6) Bidder to quote the base rates only. All other commercial charges for packing, freight, transportation, insurance, taxes & duties etc., shall be indicated separately.					
7 a.) Commissioning spares are those spares which are required at the time of commissioning and shall be recommended(as per bidders experience) and quoted by bidder. However commissioning spares indicated in the price bid format shall be quoted as minimum.					
8)With respect to Mandatory Spares; A) If any of above items indicated by the specified name are not applicable, bidder to offer alternative item serving the same function as per equipment's design and indicate below the item being replaced. B) If bidder is not able to meet the above note, then bidder may mention "Not Applicable". However, if found applicable during detailed engg. stage or alternative item as per equipment design can serve the same function, bidder to supply the specified quantity with out any delivery and commercial implications to BHEL.					
9) Reference document: PY51222 R16 , BHEL Doc. No. PY-AS-4-M096-8369-01Rev. 00 & annexures.					
10) Unpriced price bid format indicating as quoted against each applicable item shall be submitted duly signed & stamped along with technical offer by bidder as a token of concurrence that prices are submitted in this format only. The offer shall be liable for rejection in case if un-priced price bid format is not submitted or any modification is carried out in price bid format.					
11) In case the systems are being supplied from outside India, reputed Third Party Inspection like Llyods or equivalent has to be considered and the charges should be included in the Main offer. For those bidders who are supplying from India, such third party inspection charges need not be considered and same will be arranged by BHEL/BHEL nominated inspection agency.					
12) Any commissioning spare consumed over and above the recommended commissioning spares, during commissioning shall be supplied free of cost by the equipment vendor.					

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			Annexure-4 to Doc. No. PY-AS-4-M096-8369-01	
			Rev. No.	00

COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company.	Annexure-4 CHECKLIST FOR SUBMERSIBLE PUMP
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Revisions:	Prepared by :	Checked by :	Approved by :	Date :
Refer to record of revisions	Rajeev Jain	GIRISH	Siva Prasad Babu	20.06.17

ANNEXURE-4
CHECKLIST FOR OFFER FOR SUBMERSIBLE PUMP WITH DRIVE ASSEMBLY

Description	Enclosed (Yes/No)
Bidder to confirm to the scope of supply as per BHEL specs Doc. No. PY-AS-4-M096-8369-01.	
Bidder to furnish duly filled Pump-Motor datasheet as per Annexure-2. <u>Datasheets in other formats are strictly not accepted. Bidder to furnish filled in the Datasheets as per BHEL tender enquiry only.</u>	
Bidder to confirm that Auto Coupling type Elbow at pump discharge shall be in their scope in line with P&ID (Annexure-1).	
Bidder to confirm that the Motor Efficiency class considered shall be as per Manufacturer standard.	
Bidder to Confirm that seaworthy packing is considered in case of importing the pump.	
Bidder to furnish a list of commissioning spares (Refer Cl. No. 5.12 of Doc. No. PY-AS-4-M096-8369-01.).	
Bidder to furnish a list of special tools & tackles (Refer Cl. No. 5.14 of Doc. No. PY-AS-4-M096-8369-01.).	
Bidder's confirmation required for furnishing a list of 2 year recommended spares in their offer separately with optional price.	
Bidder to furnish reference list for the offered pump.	
Bidder to furnish the filled in unpriced price bid format along with their offer as per Annexure-3.	
Bidder to quote individual price for each item mentioned in the seal priced bid as per price bid format (Annexure-03 of BHEL specs Doc. No. PY-AS-4-M096-8369-01). Bidder to confirm the same.	
Deviations to the BHEL tender specifications shall be clearly bought by bidder in a separate deviation list. Bidder to furnish deviation list, if any, as per Annexure-07 of BHEL specs Doc. No. PY-AS-4-M096-8369-01	
All important documents such as unpriced price bid, reference list, pump performance curve, Pump & drive assembly GA drawings, CS drawings must necessarily to be furnished by bidder along with their offer.	
Bidder to raise Pre bid queries, if any, must be raised as per Attached format (Annexure-08) before submission of technical and commercial bid. Any deviation/ queries raised during technical bid submission shall not be entertained.	

SIGNATURE:
NAME:
DESIGNATION:
COMPANY:
DATE:

ESP-001-2A Rev.00		PROJECT ENGINEERING & SYSTEMS DIVISION	Std. / Doc. Number	
			Annexure-5 to Doc. No. PY-AS-4-M096-8369-01	
			Rev. No.	00

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Revisions: Refer to record of revisions	Prepared by :	Checked by :	Approved by :	Date :
	Rajeev Jain	GIRISH	Siva Prasad Babu	20.06.17

TD-201 Rev No. 00 Form No.		PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	ANNEXURE
			Rev No. 00
			Page 1 of 3
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company.	QAP GUIDELINES & FORMAT (ANNEXURE) The QAP format and guidelines for filling up the format shall be used by vendor for preparation and submission of QAP after order placement. Note : 1. Typical /Indicative /Standard QAP(s) for equipment /package attached is reference document and to use by successful bidder in future for preparation and submission of QAP for BHEL /CUSTOMER approval. 2. No deviation to reference document is acceptable.		

Form No.	 HYDERABAD	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	ANNEXURE
	Rev No. 00		
	Page 2 of 3		
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	<u>GUIDELINES TO VENDORS FOR PREPARATION OF QUALITY ASSURANCE PLAN</u> - QAP shall be made in landscape mode on A4 size paper as per the format enclosed. Font size shall be minimum 10. - Each page of QAP shall contain the following information. - Vendor's name & address. - Customer: BHEL, Hyderabad. - Project. - BHEL Product Standard Number/revision number as referred in P.O. - BHEL Purchase Order Number & Date. - Product as per P.O. description. - QAP Number (unique and shall not repeat)/revision number/date. - Page number and number of pages - QAP shall contain four parts / stages as follows. - Raw materials and bought out items. - In process Control / Inspection. - Final assembly, Inspection & Testing. - Painting, preservation & packing. - Under 'Component', indicate name of the component (say casing, rotor, pressure gauge, etc). - Under 'Characteristics', indicate appropriately (say chemical analysis, mechanical properties, NDT (UT,DP etc.), hydrostatic test, calibration check etc.) - Under 'Class', indicate minor, major or critical depending on the importance of characteristic. - Under 'Type of check', indicate appropriately (say chemical, mechanical, UT, DP etc.) - Under 'Quantum of check', indicate appropriately (say 100%, 10%, sample, per melt, per heat, all pieces etc.) - Under 'Reference document' and 'Acceptance norms', appropriate National & International standards, BHEL standards, approved drawing references etc. should be indicated. It is not correct to mention as "Vendor's internal standards or Vendor's standard practice etc.". If vendors' internal standards are referred, same shall be in line with BHEL Spec. indicated in the P.O. These may require review & approval by our Engineering dept. - Under 'Format of record', indicate appropriately supplier's test certificate, calibration certificate, lab report, inspection report etc.		
		Ref. Doc	Please refer 'Agency' in QAP format. Under P: Perform, W: Witness, V: Verify Indicate against each characteristic 1: (BHEL CQS/Nominated inspection agency), OR 2: (Vendor / Sub vendor)

Form No.	 HYDERABAD	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	ANNEXURE
	Rev No. 00		
	Page 3 of 3		
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.		Note: Performing agency is normally vendor or his sub vendor (Legend 2). Where witness points are indicated in specification, P.O., Drawing etc., for such operations, Under Witness (W) column use 1. Under 'Verify' column, use code 1. 12. Under 'D' please put (☐ Tick) against each characteristic where vendor proposes to submit test certificate/report etc. OR as required as per BHEL Specification. 13. Vendor's signature & stamp should be available on each page of QAP. 14. Vendor should read the BHEL Product Standard thoroughly and QAP should be made only inline and relevant to the Specification & Approved Drawings. 15. The following operations/characteristics/check points may be included (AS APPROPRIATE) a) Visual check b) Dimensional check c) Mechanical and Chemical properties. d) Surface preparation before painting (by chemical cleaning, sand blasting, shot blasting etc. as the case may be.) e) Painting check for shade, Dry Film Thickness (DFT), Adhesion/ peel off test etc. f) Check for correctness for all components mounted as per General arrangement Drawing, Bill Of Materials (BOM), etc. for range, rating, make, color, size, location as per GA, quantity, label description including tag nos., annunciator facia, loose components, accessories, spares etc. g) Verification of test certificate for protection class for the enclosures. h) Mechanical functioning of switches. i) Continuity of earthing and provision of earth points. j) Colour coding of wiring, size, tightness & dressing of wiring. k) Review of test certificates of assembled items, raw materials, internal test reports etc. l) Witness of functional checks, which may include mechanical run & electrical run, H.V.test, IR measurement, Electrical and Mechanical tests etc. m) PQR, WPS, Welder Qualification Record, welding records (fit up, DP) etc. n) Material identification (for punch marks of serial numbers, Heat No, Melt No, Inspector's stamp etc.) o) Hydraulic Pressure Test, Pneumatic Pressure Test, Liquid Penetration Examination and other Non-Destructive Tests. p) Tests on Galvanised items (Visual, Hammer Test, Knife Test, Thickness, Pierce Test (Copper sulphate test), Hydrogen evaluation test, Stripping test (for Mass of Zinc coating) q) All tests as per BHEL Product Standard & approved drawings including Type tests and Routine tests on individual items and on System as a whole. r) Packing and Preservation. 16. QAP Format enclosed. 17. Typical Manufacturing QAP(s) is /are attached.	
		Ref. Doc	

VENDOR'S NAME & ADDRESS:			MANUFACTURING QUALITY PLAN						QP. NO.:				
			CUSTOMER: BHEL, HYDERABAD – 32.			BHEL P.O.NO.:			REV NO:		DATE:		
			PROJECT: PRODUCT:			P.O.DATE: BHEL SPEC:			REV:		PAGE 1 OF 1		
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY P W V			REMARKS
1.0	RAW MATERIALS & BOUGHT OUT ITEMS												
2.0	INPROCESS INSPECTION												
3.0	FINAL INSPECTION & TESTING												
4.0	PRESERVATION & PACKING												

VENDOR TO NOTE: THIS FORMAT IS IN MICROSOFT WORD. HEADER & FOOTER SHALL BE AVAILABLE IN EACH PAGE OF QP. QP SHALL BE IN LANDSCAPE & A4 SIZE ONLY. FONT SIZE SHALL BE MIN 10. VENDOR SHALL SIGN & STAMP IN EACH PAGE OF QP. LOI REF. & DATE ARE NOT ACCEPTABLE. P.O.NO. & DATE SHALL BE INDICATED. QP NO. SHOULD BE UNIQUE AND SHALL NOT REPEAT. ALL THE TESTS / CHECKS INDICATED IN THE BHEL SPEC. SHALL BE INDICATED IN THE QP.

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL CQS (OR BHEL NOMINATED INSPECTION AGENCY) & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.	PREPARED BY	APPROVED BY	APPROVED BY
	VENDOR'S SIGNATURE & STAMP	BHEL QA SIGNATURE & STAMP	CUSTOMER'S SIGNATURE & STAMP

		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.:						
								REV NO:		DATE:				
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PROJECT: PACKAGE: CENTRIFUGAL PUMP BHEL TECH SPEC:			PAGE 4 OF 4						
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	D	AGENCY P W V			REMARKS

Notes:-

1. This MQP should be read along with specification ((Latest revisions to be considered as per PO), approved drawings & approved datasheet.
2. Specification/drawing/datasheet shall prevail over quality plan for contradiction if any.
3. Any project/customer specific requirements which shall be notified have to be fulfilled by the vendor at the time of execution of order.

Abbreviations:-

MTC	–	Material Test certificate	COC	–	Certificate of Compliance	DFT	–	Dry Film Thickness
TC	–	Test Certificate	NDE	–	Non Destructive Examination	IR	–	Inspection Report
DFT	–	Dry Film Thickness	IBR	–	Indian Boiler Regulations	IS	–	Indian Standards

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL CQS (OR BHEL NOMINATED INSPECTION AGENCY) & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

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			Annexure-5 to Doc. No. PY-AS-4-M096-8369-01	
			Rev. No.	00

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Revisions: Refer to record of revisions	Prepared by :	Checked by :	Approved by :	Date :
	Rajeev Jain	GIRISH	Siva Prasad Babu	20.06.17

MASTER DOCUMENT LIST -															
	Vendor Name:				PROJECT:										
	Vendor Contact Person:				BHEL PO No.		PO date:			PO Dly. Date:					
	Vendor contact No.				Supplier's Job No.										
	SYSTEM/PACKAGE:	Raw Sewage Lifting Pumps/ Return activated Sewage Sludge Pumps/ Waste activated Sewage Sludge Pumps				TODAY-DATE	20/Jun/17								
Sl.No	DRG/DOC. NAME	DRG/ DOC NO.	NO. OF SHTS.	CAT	CRITICAL FOR MFG?	REQD.FOR CUSTOMER SUBMISSION?	Plan date of submission	Count of DUE as on Dt.	STATUS	Rev-0			Rev-1		
			NO.	(A / I)	(Y/N)	(Y/N)	dd-mmm-yyyy		" /PV/PB /PC/AA	SD	AD	APP.CAT	SD	AD	APP.CAT
10	BILL OF MATERIAL			A	N	N									
11	BILLING BREAKUP			A	N	N									
12	QUALITY ASSURANCE PLAN			A	N	Y									
13	SUB VENDOR LIST			I	N	N									
14	COMMISSIONING SPARES LIST			A	N	N									
15	Mandatory Spares List			A	N	N									
16	LUBE OIL SCHEDULE			I	N	N									
17	STARTUP PROCEDURE			I	N	N									
18	ERECTION PROCEDURE & Comissioing procedure			I	N	N									
19	INSPECTION/TESTS REPORTS/CERTIFICATE			I	N	N									
20	O& M Manuals(Soft Copies)	PYVO4M087868203		A	N	N									
21	O& M Manuals(Hard Copies)** ** hard copy shall be furnished after getting concurrence on soft copy.	PYVO4M087868204		I	N	N									
							TOTAL	0		^APP.CAT					
	A-Approval Category	PV-Commented and pending with vendor					TOTAL "PV"		0	A1-'Approved					
	I-Information Category	PB- Pending with BHEL					TOTAL "PB"		0	A2-'Mfg. Clearance given subject incorporation of comments					
		PC- Pending with Customer					TOTAL "PC"		0	A3-Commented.Revision & resubmission required.					
		AA- Approved					TOTAL "AA"		0	A4- Retained for info.					
		" " - Not yet Due.													
		OD-Overdue					TOTAL "OD"		0						
		" " - Not yet Due.													

Vendor documentation status									
Total No of Docs	Due as on Date	Submited by vendor as on Dt.	Approved by BHEL as on Dt.	Commented by BHEL as on Dt.	Pending with BHEL/CUSTOMER as on date	%age of Dos Approved	%age of critical Dos Approved	Is Mfg. Clearance given?	Status/ Remarks
(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	% age	% age	(Y/N)./(If Y) put Dt.	
0	0	0	0	0	0	#DIV/0!	0.00%	Y	

ESP-001-2A Rev.00		PROJECT ENGINEERING & SYSTEMS DIVISION	Std. / Doc. Number	
			Annexure-7 to Doc. No. PY-AS-4-M096-8369-01	
			Rev. No.	00

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Revisions: Refer to record of revisions	Prepared by :	Checked by :	Approved by :	Date :
	Rajeev Jain	GIRISH	Siva Prasad Babu	20.06.17

DEVIATION SCHEDULE TECHNICAL

Bidder are requested to mark “✓” as applicable

☐ No Deviation required

☐ Deviation required

List of deviations (expectations and /or addition requested by Bidder) from specification, standards and /or drawing etc.

Sl. No.	Section / Part/Subsection	Page No.	Clause No.	Bid Specification	Bidder's Query	Purchaser's Reply

Note: Bidder to furnish this duly filled format along with SEAL & SIGN at pre-bid stage only and any deviations appearing elsewhere shall not be considered.

SIGNATURE : _____
NAME : _____
DESIGNATION : _____
COMPANY : _____
DATE : _____

COMPANY SEAL

ESP-001-2A Rev.00		PROJECT ENGINEERING & SYSTEMS DIVISION	Std. / Doc. Number	
			Annexure-8 to Doc. No. PY-AS-4-M096-8369-01	
			Rev. No.	00

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Revisions: Refer to record of revisions	Prepared by :	Checked by :	Approved by :	Date :
	Rajeev Jain	GIRISH	Siva Prasad Babu	20.06.17

DEVIATION SCHEDULE TECHNICAL

Bidder are requested to mark “✓” as applicable

☐ No Deviation required

☐ Deviation required

List of deviations (expectations and /or addition requested by Bidder) from specification, standards and /or drawing etc.

Sl. No.	Section / Part/Subsection	Page No.	Clause No.	Bid Specification	Bidder's Query	Purchaser's Reply

Note: Bidder to furnish this duly filled format along with SEAL & SIGN at pre-bid stage only and any deviations appearing elsewhere shall not be considered.

SIGNATURE : _____
NAME : _____
DESIGNATION : _____
COMPANY : _____
DATE : _____

COMPANY SEAL