

TD-201 Rev No. 00	Form No.	 HYDERABAD	BHARAT HEAVY ELECTRICALS LIMITED RC PURAM, HYDERABAD - 32 PROJECT ENGINEERING & SYSTEMS DIVISION		PEMC-07133 Rev No. 00 Page 1 of 6	
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.		JOB SPECIFICATION OF SEWAGE TREATMENT PLANT				
Ref. Doc	Prepared : CHP	Checked : AKS	Approved : MSSN	Date : 20.03.17		

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The detailed specification of the Sewage treatment plant may be referred in the document PY 51264 attached herewith.

The plant specific details are elaborated below. A typical P&ID of the system is also enclosed:

1.0 PROJECT DATA:

Project	:	1 x 4.5 MLD Sequential Batch reactor (SBR) based Sewage Treatment Plant (STP)
Customer	:	M/s. BHEL-Bhopal (BHEL In-house requirement)
Project Location	:	BHEL-Bhopal Township, Barkhera.
Plant Capacity	:	4.5 MLD (average flow)
Peak Factor	:	1.2
Peak Flow	:	5.4 MLD
Consultant	:	Nil

2.0 Design Parameters

Raw Sewage Quality

Sl. No.	Parameter	Unit of Measure	Value
1	Biological Oxygen Demand	mg/l	188
2	Chemical Oxygen Demand	mg/l	516
3	Total Suspended Solids	mg/l	274

Guaranteed Treated Sewage Quality:

Sl. No.	Parameter	Unit of Measure	Value after Secondary treatment	Value after tertiary treatment
1	pH	-	6.5 – 9.0	6.5 – 9.0
2	Biological Oxygen Demand	mg/l	10	10
3	Chemical Oxygen Demand	mg/l	50	50
4	Total Suspended Solids	mg/l	10	10
5	NH ₄ - N	mg/l	5	5
6	N - total	mg/l	10	10
7	Fecal Coliform	MPN / 100ml	-	< 230
8	PO ₄ - P	mg/l	2	2

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PRICE SCHEDULES

SL. NO.	DESCRIPTION	QTY.	UNIT PRICE (Rs)	TOTAL PRICE (Rs)
1.0	DESIGN, ENGINEERING, MANUFACTURE, SUPPLY, ERECTION SUPERVISION & COMMISSIONING			
1.1	Design, Engineering, Manufacture, Supply of the key components of Biological treatment system of SBR.	1 set		
a.	Decanter Assembly			
b.	Diffuser with air grid			
c.	PLC system			
1.2	Engineering services for the design of the primary, secondary, tertiary and sludge handling system as per the specification.			
1.3	Erection supervision and commissioning including performance guarantee of the plant as per the specification.	1		
1.4	Special Tools & Tackles for Bidder supplied items as per the specification	1 set		
1.5	Commissioning and erection spares [Item wise list of commissioning and erection spares with unit rate and quantity for sl. 1.1 supply items above to be furnished by bidder)	1 set		
	TOTAL			
2.0	Recommended Spares (optional price)			
2.1	2 years recommended spares along with their quantities and unit rate for normal trouble free operation of the system described in Sl. No. 1.1 above based on bidders' experience. <i>Note: List for recommended spares and it's unit rate to be furnished by bidder.</i>	RO		

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TENDER DRAWINGS/DOCUMENTS

SI No.	Description	Drg. / Doc. No.	Rev. No.
1	Technical Purchase Specification for design of STP and supply of SBR components (Biological Treatment)	PY51264	00
2	Check List	--	
3	Scheme of Sewage Treatment Plant		00
4	Typical QAP Format		00

NOTE: The bidder to comply with all the above specifications without any deviation.

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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.		RECORD OF REVISIONS						
		Rev. No.	Date	Revision Details	Prepared By	Checked By	Approved By	
		00	20.03.17	First issue	CHP	AKS	MSSN	
		Ref. Doc.						

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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.		<u>TECHNICAL PURCHASE SPECIFICATION</u> <u>FOR DESIGN OF STP AND SUPPLY OF SBR</u> <u>COMPONENTS (BIOLOGICAL TREATMENT)</u>				
Ref. Doc		Revisions : Refer to record of revisions :	Prepared : Pradeepa	Approved : M.S.S.N	Date : 20.03.17	

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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.		1.0 INTENT OF SPECIFICATION: The intent of the specification is to cover the details of scope of design, supply and services for Sewage Treatment Plant based on SBR technology. 2.0 GENERAL DESCRIPTION: 2.1 Design of the STP shall conform to CPHEEO manual and applicable standards. 2.2 Supplies shall be rendered in conformity with proven design principles. The requirements specified in this document must be fulfilled in its entirety and with maximum reliability. All the components shall be so designed that repairs and overhauling is minimum and can be carried out easily in the shortest possible time. 2.3 All equipment/items supplied shall conform to the provisions of statutory & other regulations in force in India and the State/Province where the project is executed. 2.4 The sewage treatment plant consists of the following systems: a. Sewage pumping station b. Primary treatment c. Secondary treatment d. Tertiary treatment e. Sludge handling system 2.5 Treatment process The treatment process for this STP is Sequential Batch Reactor (SBR) technology. The treatment should include sufficient removal of nutrients such as Nitrogen and Phosphorous to achieve the treated water quality specified at the outlet. Bidder shall design a complete, fully functional system for proper & easy operation meeting the stated performance requirements. Bidder shall be responsible for the design of the complete system and performance of the plant. 3.0 SCOPE OF WORK: The scope of work covered under this specification shall include: Design, manufacture, testing, supply, erection supervision and commissioning of the key components of biological treatment system of SBR as specified in the scope of supply. Also Bidder's scope includes design and engineering services for the primary, secondary, tertiary and sludge handling systems as required for the safe and trouble-free operation of STP. Please refer to the indicative scheme of the Sewage Treatment Plant enclosed along with the specification. Bidder's scope includes engineering of all the items / equipment indicated in the scheme. 3.1 Scope of Supply The scope of supply shall include the following items: a. Decanter Assembly b. Diffuser with air grid c. PLC system		
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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.			<u>a. Decanter Assembly:</u> Mechanical actuated decanter and related equipment accessories as described herein for each basin. Each decanter shall consist of an integral flotation unit, gear box, a 304/316 stainless steel movable weir assembly, scum guard, down comers and an electric motor-driven actuator with VFD to open and close the weir. The decanter shall have the ability to control the decant time between top water level and bottom water level. The travel of the decanter shall be limited and controlled by limit switches, which along with the motor shall be integrated with the process control system to prevent blower operation during decant phase of the cycle. All the down comers in each decanter should be of the same size. The decanter shall be designed with a scum guard mechanism to prevent the discharge of scum and floatables during decanter operation. During non-decant phase, the decanter shall be parked above design top water level, thereby eliminating any possibility of solids carryover. The decanter weir shall be positioned such that it is visible from the basin side wall for providing the operator with a visual check of the effluent quality. The decanter seals and bearings shall be constructed of maintenance free, synthetic materials for longest possible service life. All seals and bearings shall be shipped factory assembled, simplifying installation. All critical decanter components that may require inspection and maintenance shall be easily accessible from the access platform. <u>b. Diffuser with air grid</u> The diffuser with air grid shall have the following features: i) The diffusers shall be of fine bubble type membrane. The air grid manifold shall be fabricated of UPVC. ii) The air grid shall be provided with manifolds fabricated of PVC with flanged connection to suit the feeder pipe and with fixed threaded union joint connections for each air distribution header. iii) Air distributor sections shall be joined with positive locking fixed threaded union or flange type joints to prevent blow apart and rotation. iv) 316 Stainless steel supports shall be provided for the manifold and distributional headers. Supports shall be designed to be adjustable without removing the air distributor from the support. v) Membrane shall provide a water tight seal with the diffuser assembly to stop water ingress when not aerating. <u>c. PLC system:</u> Bidder shall provide PLC based SCADA system as per the latest technology with following minimum features: i) All field instruments and electro-mechanical equipment shall be monitored and controlled locally as well as in the centralized control room. Automatic operation shall also be done as per PLC logic. ii) In case of PLC operation failure in auto, manual mode of operation should enable the operator to control and operate the plant. iii) SCADA should have graphics, alarm reports, process trends, history, etc.		

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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.		iv) The control system shall be complete with cabinets, processor modules, I/O modules, power supply modules, communication modules & networks and other associated hardware. PLC based automation system shall be designed using adequate redundancy features. HMIs along with PLC panel & other peripherals shall be provided. v) Bidder shall also prepare diagram for all the loops being used for controlling of equipment and attach same with O & M manual of the plant. vi) Bidder shall include & arrange for training of customer's personnel on automation and special instrumentation items. vii) Bidder scope includes arranging visits by respective instrumentation and automation equipment manufacturer's competent representative at site as and when required, during erection & commissioning.																																							
		3.2 Scope of Services The scope of services for the STP shall include: a. Provide engineering services for the design of primary, secondary, tertiary and sludge handling system. BHEL shall procure the equipment for these systems except the biological treatment components which are mentioned above based on the design data provided by the Bidder. b. Engineering services for the detailed engineering of the system which shall include preparation of engineering drawings/documents such as process design & calculations, development of PFDs/P&IDs, Hydraulic diagrams, layouts, installation drawings, datasheets and sizing criteria of all the equipment of the STP. c. Bidder shall assist in obtaining the approvals of various engineering documents from customer. d. Bidder to furnish the required input details for the civil design of the STP. e. Bidder shall also provide the required input data (like load list, SLDs, instrument data sheets etc.) for the detailed design of associated electrical and instrumentation systems. f. Bidder to identify and furnish the list of equipment required for the complete STP. g. Provide service for the procurement engineering (specifications, data sheets etc.). h. Erection supervision and commissioning of the biological treatment system and site support for integrating other systems like primary treatment, tertiary treatment, sludge disposal system etc. i. Visit of process design expert to meetings at intimated location and project site for support, as and when required, during execution of the project. j. Performance guarantee Test of the overall plant. k. Training of Customer personnel in operation and maintenance of the plant.																																							
Ref. Doc		3.3 A typical services matrix is listed below: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Sl. No.</th> <th>Description</th> <th>Basic Engineering</th> <th>Detail Engineering</th> <th>Supply</th> <th>Execution</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Sewage Pumping station</td> <td>Bidder</td> <td>BHEL</td> <td>BHEL</td> <td>BHEL</td> </tr> <tr> <td>2</td> <td>Primary Treatment</td> <td>Bidder</td> <td>Bidder</td> <td>BHEL</td> <td>BHEL</td> </tr> <tr> <td>3</td> <td>Secondary Treatment</td> <td>Bidder</td> <td>Bidder</td> <td>Bidder</td> <td>BHEL & Supervision by Bidder</td> </tr> <tr> <td>4</td> <td>Tertiary Treatment</td> <td>Bidder</td> <td>Bidder</td> <td>BHEL</td> <td>BHEL</td> </tr> <tr> <td>5</td> <td>Sludge Handling system</td> <td>Bidder</td> <td>Bidder</td> <td>BHEL</td> <td>BHEL</td> </tr> </tbody> </table>				Sl. No.	Description	Basic Engineering	Detail Engineering	Supply	Execution	1	Sewage Pumping station	Bidder	BHEL	BHEL	BHEL	2	Primary Treatment	Bidder	Bidder	BHEL	BHEL	3	Secondary Treatment	Bidder	Bidder	Bidder	BHEL & Supervision by Bidder	4	Tertiary Treatment	Bidder	Bidder	BHEL	BHEL	5	Sludge Handling system	Bidder	Bidder	BHEL	BHEL
		Sl. No.	Description	Basic Engineering	Detail Engineering	Supply	Execution																																		
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2	Primary Treatment	Bidder	Bidder	BHEL	BHEL																																				
3	Secondary Treatment	Bidder	Bidder	Bidder	BHEL & Supervision by Bidder																																				
4	Tertiary Treatment	Bidder	Bidder	BHEL	BHEL																																				
5	Sludge Handling system	Bidder	Bidder	BHEL	BHEL																																				

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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.		Basic Engineering: means conceptual design, sizing criteria. Detail Engineering: means Preparation of design documents, procurement specifications, technical offer scrutiny and vendor drawing approval. Execution: means civil design, civil works and E&C. However, all the civil inputs shall be provided by the Bidder. 3.4 Consumables Bidder shall furnish the list of chemicals / consumables required for the commissioning, operation and maintenance of the system. 3.5 Lubricants Bidder shall provide the flushing oil required, together with first fill of oil and/or grease for parts of equipment requiring lubrication under Bidder's scope. For all types of lubricants selected, equivalent grade of other makes shall be mentioned which can be sourced locally. 3.6 Erection & Commissioning Spares The Bidder shall also supply erection & commissioning spares along with his main equipment as per his experience, for replacement of damaged or unserviceable ones during the execution of the project at site, to avoid delays in the project commissioning. This shall form part of the main equipment supply. 3.7 Special Maintenance Tools and Tackles One set of special tools and tackles required for operation, maintenance, inspection and repair, neatly packed in steel boxes complete with operating instructions for Bidder's scope of equipment shall form part of the main equipment supply and a separate list for the same shall be furnished along with bid. 3.8 Recommended Spares A minimum requirement of spare parts for the overall plant based on the experience of the Bidder sufficient for two (2) years of normal trouble free operation shall be recommended and quoted separately as optional item. Bidder shall furnish the description along with recommended quantity for each item in the offer. 4.0 QUALITY & INSPECTION 4.1 Quality Assurance Program To ensure that the equipment and services under the Scope of Contract whether manufactured or assembled within the Bidder's works or at his Sub-Vendor's premises or at the Owner's site or at any other place or work are in accordance with the specifications, Bidder shall adopt suitable quality assurance program to control such activities at all points, as necessary. Such program shall be outlined by the Bidder and shall be finally accepted by the Owner / Authorized representative after discussions before the award of Contract. The QA program shall be generally in line with ISO-9002/IS-14001. A quality assurance program of the Bidder shall generally cover the following: System for shop manufacturing and site erection control including process controls, fabrication and assembly controls.		
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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.		4.2 Quality Assurance Documents The Bidder shall submit required no. of copies of the following Quality Assurance documents - Material test reports on components as specified by the specification and approved Quality Plans. - The inspection plan with verification, inspection plan check points, verification sketches, if used and method used to verify that the inspection and testing points in the inspection plan were performed satisfactorily. - Sketches and drawings used for indicating the method of traceability of the radiographs to the location on the equipment. - Non-destructive examination results, reports including radiography interpretation reports. - Factory tests results for testing required as per applicable codes and standard referred in the specification and approved Quality Plans. - Inspection reports duly signed by QA personnel of the customer and Bidder for the agreed customer hold points. The equipment shall be guaranteed to meet performance requirements required by this specification and rectification shall be carried out until satisfactory results are obtained. The Owner reserves the right to reject the equipment should the performance values fall short of those indicated in the schedule of Technical data sheets. 4.3 Quality Plan: Bidder to furnish Quality Plan [Supply Quality plan] to BHEL along with offer in their standard format for general review by BHEL. During Detailed engineering, in addition to various tests indicated in this specification, Quality plan will be reviewed with respect to standard Inspection, standard Engineering practices, applicable standards, code etc. Accordingly, various tests required, stages of inspection and appropriate agencies for Inspection will be intimated. Bidder to abide by the same. 4.4 TESTS & INSPECTION: The manufacturer shall conduct all tests required to ensure that the equipment furnished shall conform to the requirements of this specification and in compliance with requirements of applicable codes and standards. The particulars of the proposed tests and the procedures for the tests shall be submitted to the Purchaser/Consultant for approval before conducting the tests. 4.5 Test at Manufacturer's work (as applicable): 4.6 Material Tests 4.7 Other Tests 4.8 Site Performance Test: 4.9 Inspection agency: BHEL/Third Party appointed by BHEL/Customer The various inspection stages will be witnessed by individual agencies (or) Group of Agencies as per above, in line with approved quality plan.		
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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.		5.0 PROTECTION FOR SHOP FABRICATED ITEMS: 5.1 All coated surfaces shall be protected against abrasion, impact, discoloration and any other damages. All exposed threaded portions shall be suitably protected with either a metallic or non-metallic protecting device. The parts which are likely to get rusted due to exposure to weather, should also be properly treated and protected in a suitable manner. All exposed metallic surfaces subject to corrosion shall be protected by shop application of suitable coatings. All surfaces which will not be easily accessible after the shop assembly, shall beforehand be treated and protected for the life of the equipment. All surfaces shall be thoroughly cleaned of all mill scale, oxide and other coatings and prepared in the shop. 5.2 The surfaces that are to be finish-painted after installation or require corrosion protection until installation, shall be shop painted with at least two coats of primer. The finished colors shall be as per manufacturer's standards. 5.3 Shop primer for all steel surfaces which will be exposed to operating temperature below 95°C shall be selected by the Bidder after obtaining specific approval of the Purchaser regarding the quality of primer proposed to be applied. 5.4 All other steel surfaces which are not to be painted shall be coated with suitable rust preventive compound subject to the approval of the Purchaser. 5.5 All material shall be delivered in a clean and usable condition. Openings shall be securely covered against entry of foreign material where appropriate. 6.0 PACKING AND TRANSPORTATION: All equipment shall be suitably protected, coated, covered or boxed and crated to prevent damage or deterioration during transit, handling and storage at site till the time of erection. Bidder shall follow necessary road safety rules and shall obtain permission from highway authorities for goods movement. However, these aspects shall be taken into consideration in the design of the packing for the system. 7.0 NAME PLATES & TAG PLATES: 7.1 Components whose identity is important for operation and maintenance of the plant shall be provided with permanently attached tag bearing the Purchaser's coding together with relevant text clearly inscribed. 7.2 A corrosion-resistant nameplate shall be attached to each unit in a clearly visible, easily accessible location. The nameplate shall be stamped with the following information: a. Manufacturer's name b. Manufacturer's model number c. Manufacturer's serial number d. Purchaser's equipment tag number (item No.) e. Service name f. Weight (kg) g. Hydrostatic test pressure, Bar. (g) h. Other design information of the flow media like flow rate, temperature, pressure etc. 7.3 Nameplates shall be 3 mm (0.12") thick engraved plate of sufficient rigidity with lettering of a minimum height of 4 mm (0.16"). The method of implementation and labelling will be informed for all components after award of contract.		
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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.		7.4 Identification tags shall be provided and placed on all Bidder furnished items. Tags shall be corrosion resistance, having a larger than diameter of 3 cm, and shall have black identification figures stamped thereon. Figure height shall be larger than 0.5 cm. Tags shall bear the component system designation symbol shown on the Bidder's drawings. 8.0 VENDOR DOCUMENTATION PROCEDURE 8.1 The O&M manuals shall contain the following details as minimum in addition to those indicated in the above table:- ➤ Identification details of the equipment like BHEL PO NO., Vendor's Sl. No., Vendors contact address with tel., fax details. ➤ Description of the equipment. ➤ Final Data sheets and Drawings of the equipment as per the list mentioned in this specification. ➤ O&M Manuals of the equipment. ➤ Recommended 2 years operational spares. ➤ Test reports. 8.2 The erection documentation shall consist of ➤ All drawings/documents, ➤ All such drawings/documents, not submitted for review, but essential for erection/ commissioning, e.g. assembly drawings, etc. ➤ Master document list ➤ Site dispatchable B.O.M. 9.0 Guarantees The guarantees shall form contract guarantees to be demonstrated through an approved performance test after the completion of the Plant. The schedule shall be finalized during the detail engineering stage. 10.0 Special Tools & Tackles Bidder to confirm the supply of any Special Tools and Tackles as per requirement. 11.0 Documents to be submitted along with the offer a. Inlet quality for which the plant has been designed b. Guaranteed outlet quality c. Process description d. Detailed scope of supply		
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<u>COPYRIGHT AND CONFIDENTIAL</u> 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>ANNEXURE – I</u> <u>KEY INFORMATION</u> 1.00.00 Name of the Bidding Company : 2.00.00 Registered in (mention the name of the Country) : 3.00.00 Name, designation, telex & telephone : number and postal address of responsible officer of Bidder to whom all reference shall be made for expeditious coordination. 4.00.00 Name, designation, telex & telephone : number and postal address of responsible officer of Indian Agent. 5.00.00 Bidder's proposal number : 6.00.00 Bidder's proposal date : 7.00.00 Validity of offer, counted from the : date of opening of bid 8.00.00 Guaranteed completion period, counted : from date of issuance of LOI/TOI 9.00.00 Confirm that Scope of supply and services are : Yes/No exactly as per specification requirement. 10.00.00 Confirm Technical Compliance with Specification : Yes/No 11.00.00 Confirm that Guarantees are as per Job Specification : Yes/No 12.00.00 Confirm that List of Recommended Spares has : Yes/No been furnished as per Annexure-II 13.00.00 Confirm that List of Special Tools & Tackles has : Yes/No been furnished as per Annexure-III 14.00.0 Confirm that deviations ,if applicable, have : Yes/No been furnished as per Annexure-IV Signature of Bidder's Authorized representative .with date..... Date.....				
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<u>ANNEXURE – III</u> <u>LIST OF SPECIAL TOOLS AND TACKLES</u> Bidder shall tabulate in the proforma below list of all tools and tackles as recommended by the respective manufacturer for regular, reliable operation. In case the Bidder has to add any other relevant information, the same shall be indicated herein. Continuation sheets of like size and format may be used as per Bidder's requirements. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Sl.No.</th> <th style="width: 55%;">Description</th> <th style="width: 20%;">Quantity</th> <th style="width: 15%;">Remarks</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">a</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">b</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">c</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">d</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Sl.No.	Description	Quantity	Remarks	a				b				c				d			
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<u>ANNEXURE – IV</u> <u>DEVIATION FROM SPECIFICATION</u> If the proposal submitted has got any deviation from the technical stipulations in the bidding document, the Bidder shall tabulate below the full particulars of such deviations and shall sign below. Additional sheets may be enclosed, if necessary. Deviation is to be furnished with mention of specific clause numbers. Technical and commercial deviations to scope of supply and services, shall be indicated separately. Bidders shall bring put only those deviations which are impractical to meet (or) not advisable <table border="1" style="width: 100%;"> <thead> <tr> <th>Sl.No</th> <th>CLAUSE NO.</th> <th>DESCRIPTION AS PER SPECIFICATION</th> <th>DEVIATION BY BIDDER</th> </tr> </thead> <tbody> <tr> <td style="height: 300px;"></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> We confirm that all the deviations/exceptions to the Technical Specification PY51084, Job Specification and enclosures including reference documents attached are listed in this Annexure only. No other deviations or exceptions even if mentioned elsewhere shall be considered for any technical/ commercial evaluation or for ordering. Signature of Bidder's Authorized representative .with date..... Date				Sl.No	CLAUSE NO.	DESCRIPTION AS PER SPECIFICATION	DEVIATION BY BIDDER				
Sl.No	CLAUSE NO.	DESCRIPTION AS PER SPECIFICATION	DEVIATION BY BIDDER								
Ref. Doc											

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						Form No.																													
<table><thead><tr><th>Var. No</th><th>Item</th><th>STP Capacity</th><th>Matl. Code</th><th>Ref. docs /drgs</th></tr></thead><tbody><tr><td>01</td><td>Sewage Treatment Plant based on SBR Technology</td><td>4.5 mld at BHEL, Bhopal</td><td>PY9751264014</td><td>PEMC 07133</td></tr><tr><td></td><td></td><td></td><td></td><td rowspan="2"></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td rowspan="2"></td></tr><tr><td></td><td></td><td></td><td></td></tr></tbody></table> VARIANT TABLE						Var. No	Item	STP Capacity	Matl. Code	Ref. docs /drgs	01	Sewage Treatment Plant based on SBR Technology	4.5 mld at BHEL, Bhopal	PY9751264014	PEMC 07133																			 PRODUCT STANDARD BHEL, HYDERABAD -32. PROJECT ENGINEERING – MECHANICAL	
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						PY 51264																													
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	Rev. No.	Date	Revision Details	Revised By	Approved By
	00	20.03.17	Original Issue	Pradeepa	M.S.S.N
	Ref. Doc.				

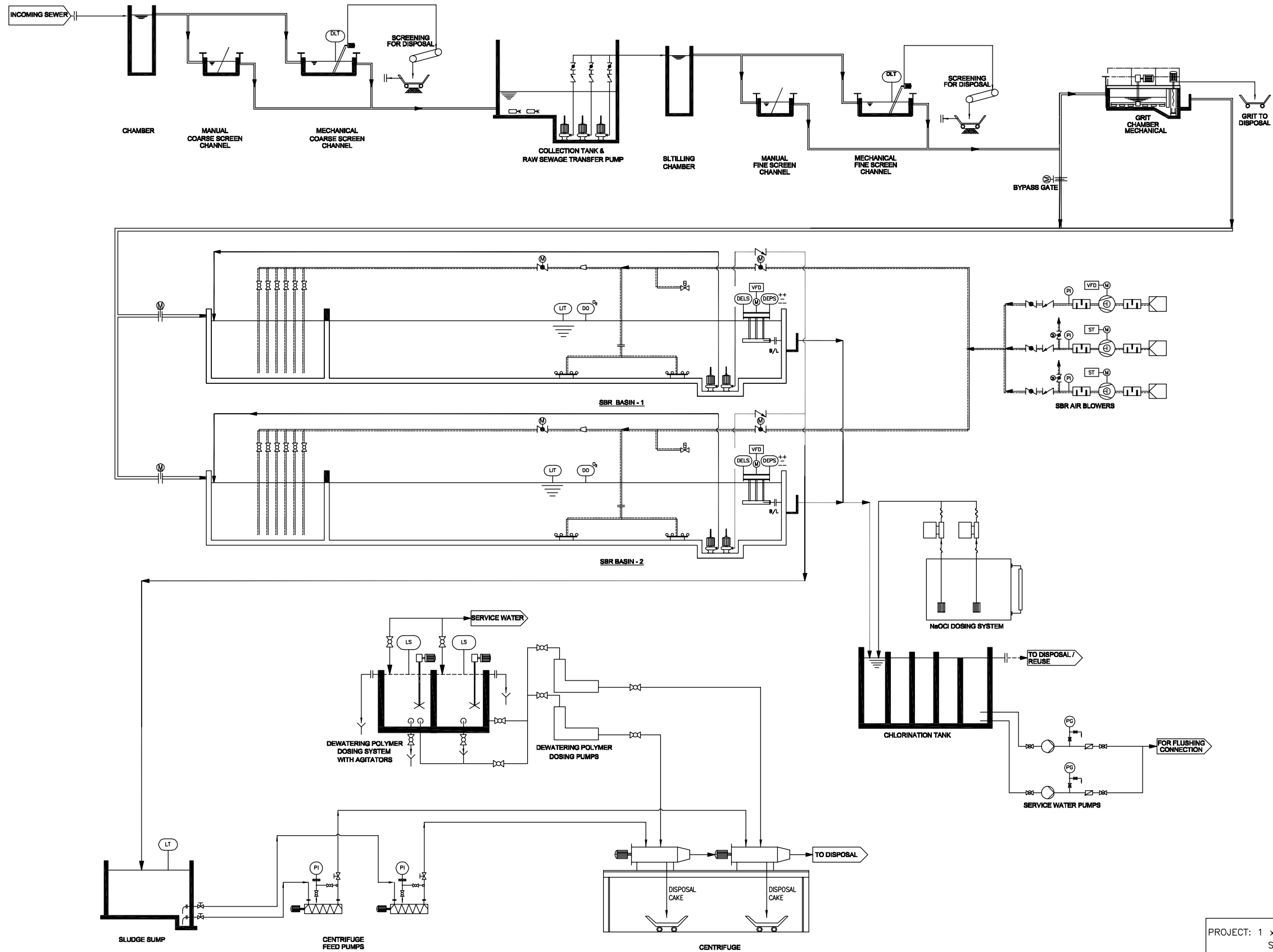
CHECK LIST

Note: Bidder to note that Check List shall be completely filled and the data required in-line with Check List shall be submitted along with their Offer to enable Purchaser to evaluate the offer submitted.

<u>S.No.</u>	<u>Description</u>	Enclosed or [Yes/No]	Remarks/Comments By Bidder
1	Bidder to confirm compliance with PEMC-07133 and its annexure without any deviations.		
2	Bidder has already raised pre-bid queries (if any) on Purchase specification.		
3	Bidder Shall submit completely filled following Annexures enclosed with Technical Purchase Specification PY 51264, Rev00 along with their offer Annexure-I: Key Information Annexure-II: List of Recommended Spare Parts Annexure-III: Special Tools and Tackles Annexure-IV: Deviation from specification		
4	Tentative Electrical Load List is enclosed with offer.		
5	Bidder shall furnish the list of Erection and commissioning spares along with their offer.		
6	Bidder to fill Deviation list (Refer Annexure-IV of PY 51264). Only those deviation indicated in this list will be considered during technical evaluation of offer. Bidder to indicate the deviations which are impractical.		
7	All other requirements except for the deviation brought out under deviation list, have been taken into consideration.		
8	Bidder has submitted unpriced "Price bid format" with "Quoted" mentioned against price		

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INVENTORY NO. SIGN. AND DATE REF. DRG. NO. COMPUTER FILE NAME



PROJECT: 1 x 4.5MLD, SEQUENTIAL BATCH REACTOR BASED SEWAGE TREATMENT PLANT AT BHEL BHOPAL									
		BHARAT HEAVY ELECTRICALS LTD. HYDERABAD		NAME		SIGN.	DATE	NO.OF VAR.	
				DRN.	AJIT YADAV	---	---	21.03.17	
				CHD.	CH.P	---	---	21.03.17	N.A.
				APPD.	M.S.S.N	---	---	21.03.17	
DEPT. P.E.&SD CODE 450	UNTOTL. DIMS. GR. C/M/F		SCALE NTS	WEIGHT (KG) -N.A.-	REF. TO ASSY. DRG. -N.A.-		ITEM NO. -N.A.-	NO.OF ITEMS -N.A.-	
TITLE SCHEME OF SEWAGE TREATMENT PLANT				CARD CODE	BHEL DRAWING NO.				REV.
					SHT. No 1				NO. OF SHT. 1

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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. 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 : - 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. - 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.		
	Ref. Doc		

VENDOR'S NAME & ADDRESS:		MANUFACTURING QUALITY PLAN							QP. NO.:				
		CUSTOMER: BHEL, HYDERABAD – 32.				BHEL P.O.NO.:			REV NO.:		DATE:		
		PROJECT:				P.O.DATE:			PAGE 1 OF 1				
		PRODUCT:				BHEL SPEC: REV:							
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
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