

 <p>A4-10</p>		CE/416/SWAS/ANALYSER/PS
		<b>PROJECT : BULK TENDER</b>		
<p><b>COPY RIGHT AND CONFIDENTIAL</b></p> <p>The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in anyway detrimental to the interest of the company.</p>		<b>PURCHASE SPECIFICATION</b>		
		<b>FOR</b>		
		<b>SWAS ANALYSERS</b>		
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**SECTION- A**

**GENERAL INSTRUCTIONS TO BIDDERS:**

- 1.0 All required documents against this Tender/Specification shall be submitted in English only.
  - 2.0 Introduction: Bidders are required to offer Analysers used for SWAS in Power Plant applications.
  - 3.0 In order to accept the Technical offers / proposals from Bidders for the project mentioned in this Specification ( refer Sections C & D ), certain Pre-qualification criteria are required to be met by Bidder.
  - 4.0 Pre-qualification requirements are clearly mentioned in Section-B of this Specification. Bidder to read the same carefully and submit the details required for BHEL's acceptance.
  - 5.0 In case Bidder does not include the details or meet the requirements of Pre-qualification requirements, their offer will be summarily rejected and Bidder's Technical offers will not be evaluated.
  - 6.0 Evaluation methodology : BHEL shall initially open Bidder's PQR documents only as per Section B of this specification for review & acceptance. Only after acceptance of PQR documents, BHEL shall open Bidder's Technical offers as per CI 2.0 of above for evaluation. In the event of acceptance of Bidder's technical offers, the names of such Bidders along with details provided by them for PQR and details of Technical offers , shall be submitted to Endusers/Customers for their acceptance/approval. Commercial bids of only accepted/approved Bidders by Endusers/Customers, shall be considered by BHEL for further processing.
  - 7.0 Bidders are required to submit offers as detailed below :
    - aa. Documents pertaining to Pre-Qualification requirement ( CI AA of Section B of this Specification) shall be in a Separate cover with reference no. " CI AA of Section B" marked on it.
    - bb. Documents pertaining to Pre-Qualification requirement ( CI BB of Section B of this Specification) shall be in a Separate cover with reference no "CI BB of Section B" marked on it.
    - cc. Technical offers/proposals for the Project, whose requirements are mentioned in Sections C &D will be submitted in a separate cover with Project name & Reference marked on it.
  - 8.0 Whenever required during evaluation of PQR and Technical offers/bids, vendor is required to be present at BHEL Electronic Division, Bangalore, for discussions. Further in the event of order, during approval of the Vendor documents by End users/Customers, Vendor shall accompany BHEL representative for discussions.
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## **SECTION- B**

### **AA. Pre-Qualification Requirements (PQR) of Bidders for SWAS Analyser:**

1. The bidder should have executed/ completed work of “Design, supply, supervision of erection & commissioning of complete SWAS package in 200 MW or above capacity for at least 2 units of SWAS within preceding three (3) years as on the date of bid opening.
  2. Original Equipment Manufacturers based outside India, who are making offer for this tender shall have authorized representatives in India for support related to Documentation, Erection, Commissioning & any other co-ordination work.
  3. Submit Reference List of Projects wherein offered system is supplied & commissioned, along with details of analyzers. If bidder is offering a combination of makes, PQR of respective OEMs shall be considered for evaluation.
  4. For Vendors offering upgraded / latest models, PQR of equivalent previous models is acceptable. OEM shall certify that offered model is upgraded version of previous existing model.
  5. OEM shall furnish an undertaking that in case of change in Indian representative / agent, OEM shall continue to support supplies w.r.t to field service, supply of reagents and spare parts
  6. For analyzers Bidder should be authorized and he should have capacity to commission the analyzers all across the country. The bidder should have the team of experienced service engineers on pay role located at various parts of INDIA. (With documentary evidence).
  7. Bidder shall have optimum inventory of critical components like analyser sensors/ electronic modules.
  8. Bidders shall provide the operating parameters like sample flow, pressure and temperature requirement for correct functioning of the offered analysers. Bidders shall confirm that Analysers shall function with Sample Handling System(SHS) procured from any vendor meeting above sample requirements.
  9. BHEL shall issue call for service / commissioning with 15 days notice. Bidder shall agree to visit BHEL project sites jointly with SHS vendors within above notice period.
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**BB. Along with the documents related to PQR above, following details shall also be included in the Offer:**

1. Technical literature / Manuals of offered Analysers, Sensors.
2. In the event of technical specification not indicated in Technical literature, confirmation from OEM is acceptable. Such confirmations shall be supported by type test certificates.
3. Un priced Purchase Order copies
4. Reports of successful erection & commissioning Protocols & Minutes of the meetings for handing over of SWAS analysers.
5. Submit List of Projects ( rating of > or = 200 MW Power Plants ) for which Erection & Commissioning has been carried out by Subsidiary / Authorized Indian representative for last three year & minimum three system.
6. Name & registered address of the Indian branch office or Indian representative for support of E&C and after sales service with Organization chart.
7. Bidder shall have facility in India for Engineering activities, preparation of Documents, trouble shooting and calibration of analysers. Submit these details.
8. If Bidder is not Original Equipment Manufacturer (OEM), than Bidder to include Authorization letter from OEM for Design, Engineering, Manufacture, Testing, supply, Erection, Commissioning and Servicing of the offered System. This Authorization letter provided by OEM to Bidder shall indicate the Type and Duration of the agreement.

Important note : In case Bidder does not submit details mentioned in above clauses or meet the requirements of Pre-qualification requirements, Offers will be summarily rejected and Bidder's Technical offers/proposals will not be Evaluated. Please read carefully the General instructions in Section A of this specifications.

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## SECTION- C

### SCOPE OF SUPPLY FOR SWAS ANALYSERS

SWAS analysers shall be supplied as per scope below:-

1. Analysers consisting of following:-
    - a. Conductivity (Specific ,Cation & Hotwell) - 251 Nos.
    - b. Dissolved Oxygen - 60 Nos.
    - c. Hydrazine - 11 No.
    - d. pH - 157 Nos.
    - e. Phosphate - 12 No.
    - f. Silica ( Three Channel ) - 23 No.
    - g. Chloride Analyser - 06 No.  
Sodium Analyser (Three channel)- 16 No.
    - h. Ammonia Analyser - 03
- Note :- Dual input analysers are not acceptable for Conductivity, pH & DO Analysers.
2. Mandatory Spares as per Annexure E - Considered for evaluation
  3. Commissioning Spares :  
Reagents required for commissioning & Handing over of System to Owner / end user.
  4. O & M manuals in 04 copies. One copy shall be despatched to site along with material.  
One copy of O & M manual in Windows compatible software.
  5. Calibration & Conformance certificates as per approved documents.
  6. Following activities are in Vendors scope:-
    - Total Commissioning & Handing over of Analysers to Customer / End User.
    - Coordination / Site support to Sample Handling System Vendor, as & when required.Specifications attached are for the complete SWAS including specification for Sample Handling system, which shall be procured separately. Analysers offered shall be suitable for working with the specifications indicated for sample handling system. In case, Vendor does not confirm as above, Offer shall be technically rejected. Vendor shall be required to visit site jointly with Sample Handling System Vendor for commissioning activity. BHEL shall inform with 15 days prior notice for the visit.
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**SECTION- D**

A	<p>General Requirement of Analysers:-</p> <ul style="list-style-type: none"> <li>- All analysers, cells, monitors etc. as offered shall be field proven, Microprocessor based analyser with self-diagnostic feature. The Bidder shall furnish along with his proposals all the required details in respect of each and every type of analysers/cells/monitors to establish that the offered analytical instruments are well proven for the similar applications.</li> <li>- The Bidder shall indicate in the offer the exact chemical composition of each and every reagent.</li> <li>- The make, type, model etc. of various analytical instruments shall be subjected to the Owner's approval.</li> <li>- The Bidder shall provide 2 x 4-20 mA linear isolated current output signals from analysers.</li> <li>- All analysers / monitors shall be furnished with all required accessories for proper functioning.</li> <li>- All sensors shall be supplied with 30 meter/run cable along with analysers.</li> <li>- Alarm contacts shall be furnished with the analysers/monitors for annunciation of high or / and low alarms as indicated in list of analysers. The contact rating shall be 5A at 240 V AC./ 0.5 A at 220V DC.</li> <li>- All analysers shall have Digital communication facility like RS 485 / HART/Modbus/Profibus.</li> <li>- Item No. of BOM as approved or Item No. of BOM issued along with MC shall be put on the respective Boxes &amp; Packing list by the vendor for easy correlation &amp; identification at the time of MRC.</li> <li>- Items shall be supplied, post inspection, in containers as per instructions in Section F.</li> <li>- All sensors/consumables/reagents with limited shelf life are to be supplied during commissioning only.</li> </ul>
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B.		
<b>1</b>	<b>Technical Specifications of Conductivity Analyser</b>	
a	Applicable standard	ASME PTC 19.11 except as modified in this specification.
b	Type:	
	i) Cell	Flow through type/ removable type (withdrawable type with sealing valve)
	ii) Monitors	Electronic (Microprocessor based) indicating type with multi range facility
c	Accuracy	± 1% of full scale span
d	Stability	±1% of full scale per month non-cumulative
e	Repeatability	±0.3% of span
f	Additional features	i) Automatic temperature compensation in the range 0- 100°C
		ii) Ammonia (NH <sub>3</sub> ) compensation.
<b>2</b>	<b>Technical Specification of pH Cell and Transmitters</b>	
a	Applicable Standard	pH electrodes shall conform to IS:6804 except as modified in this specification
b	Cell	Measuring and Reference Electrode Combination with Flow through type
c	Monitors	Electronic (microprocessor based) indicating type with adjustable range facility.
d	Accuracy/repeatability	± 0.03 pH/+0.02PH
e	Resolution	± 0.01 pH or 1 mV. 1C
f	Stability	0.02 pH per week
g	Accessories	i) Automatic temperature compensation with fast response integral temperature sensors in the range 0-100°C

<b>3</b>	<b>Technical Specification of Dissolved Oxygen Analyser</b>	
a	Applicable Standards	ASTM PTC 19.11 except as modified in this specification
b	Type	Electro-chemical
c	Accuracy	±4% of full scale value
d	Sensitivity	± two (2) per cent overall
e	Additional features	Automatic temperature compensation in the range 0- 100°C
<b>4</b>	<b>Technical Specification of Silica Analyzer (SI OX)</b>	
a	Applicable standard	ASME PTC 19.11 except as modified in this specification
b	Type	Multi-Channel Calorimetric Analyzer with inbuilt sequencer (with auto reagent shut off feature in case of sample loss or power loss) built in phosphate inhibition feature. Microprocessor based.
c	Accuracy	±1% of span
d	Repeatability	± 2% of full scale
e	Sensitivity	0.2 ppb
<b>5</b>	<b>Technical Specification of Hydrazine Analyzer</b>	
a	Applicable standard	ASME PTC 19.11 except as modified in this specification
a	Type	Electrochemical / Colorimetric
B	Accuracy	± 2% of full scale
c	Sensitivity	1.0 ppb

<b>6</b>	<b>Technical Specification of Sodium Ion Analyzer</b>	
a	Applicable standard	ASME PTC 19.11 except as modified in this specification
a	Type	Continuous flow through sample type with sodium responsive electrode and reference electrode having pH adjustment facility
b	Accuracy	± 5% of full scale
c	Sensitivity	0.1 ppb
<b>7</b>	<b>Technical Specification of Phosphate Analyzer</b>	
a	Applicable standard	ASME PTC 19.11 except as modified in this specification
a	Type	Continuous flow through sample type with calorimetric detection system
b	Accuracy	± 5% of full scale
c	Sensitivity	± 5% of full scale
<b>8</b>	<b>Technical Specification of Chloride analyser</b>	
a	Applicable standard	ASME PTC 19.11 except as modified in this specification
b	Type	Ion selective/ calorimetric detection system
c	Accuracy	± 5 micro gram / litre
d	Sensitivity	± 4% of full scale
<b>9</b>	<b>Technical Specification of Ammonia analyser</b>	
a	Applicable standard	ASME PTC 19.11 except as modified in this specification
b	Type	Ion Selective / calorimetric detection system
c	Accuracy	± 5 micro gram / litre
d	Sensitivity	± 4% of full scale

<b>Note:-</b>	
	<p>1. Vendors to clearly bring out deviations, if any, wrt specifications indicated above.</p> <p>2. Vendors to note that Deviations shall be discussed with only those vendors who quote for this tender.</p> <p>3. Vendors to note that response time/cycle time of offered analysers shall be in line with industry standards/ as indicated for proven approved models by end users.</p> <p>4. Typical range requirement of analysers is indicated in Table I below. Any change in ranges as per the requirement of specific project shall be incorporated without commercial implication to BHEL.</p> <p>5. Vendors to quote Models which meet Technical Requirements in Toto. If during evaluation of offer/detailed Engg., it is found that Model offered does not meet technical requirements &amp; a different model is available in Vendor Product range which meets technical requirements, then new Model has to be supplied without any commercial implication to BHEL.</p> <p>6. Purchase order for each project will be placed on one vendor only. BHEL will make efforts to obtain approval of quoted make and models with all customers. In the event any of the customer does not accept quoted makes, then vendor shall offer customer approved make and models at the quoted rates only, without any additional cost implication to BHEL.</p>

**Table I**

SI NO	Analyser	Typical Range
1	Conductivity Analyser	Specific:- 0- 10 / 0-100 / 0-1000 $\mu$ S/cm, freely programmable Cation:- 0- 1 / 0-10 / 0-100 $\mu$ S/cm, freely programmable
2	pH Analyser	0-14 pH
3	Dissolved Oxygen Analyser	0-20 / 0-200 ppb, freely programmable
4	Hydrazine Analyser	0-20 / 0-200 ppb, freely programmable
5	Silica Analyser	0-100 / 0-1000 ppb, freely programmable
6	Sodium analyser	0-20 / 0-1000 ppb, freely programmable
7	Phosphate Analyser	0-10 / 0- 50 ppm, freely programmable
8	Chloride Analyser	0-10 / 0-100 ppb, freely programmable
9	Ammonia Analyser	0-10 / 0-20 ppm, freely programmable

**SECTION - "E"**

**MANDATORY SPARES FOR SWAS ANALYSERS**

SL. NO.	DESCRIPTION	Total Qty.
1	<b>:- Conductivity Analyser</b>	
a	Conductivity cells of each type	10 % of total qty for project or min. 2 nos.
b	Electronic module of each type	10 % of total qty for project or min. 1 no each type
2	<b>:- pH Analyser</b>	
a	pH cells	10 % of total qty for project or min. 2 nos.
b	Electronic module of each type	10 % of total qty for project or min. 1 no each type
3	<b>:- DO Analyser</b>	
a	Sensor assembly - complete assembly with ref. & measuring electrodes, electrolyte etc	10 % of total qty for project or min. 1 no.
b	Electronic module of each type	10 % of total qty for project or min. 1 no each type
4	<b>:- Hydrazine Analyser</b>	
a	Sensor assembly - complete assembly with ref. & measuring electrodes, electrolyte etc	10 % of total qty for project or min. 1 no.
b	Electronic module of each type	10 % of total qty for project or min. 1 no each type
c	Chemical reagents	For One Year Supply
5	<b>:- Silica Analyser</b>	

a	Cuvette Assembly	1 no.
b	Pump motor	1 no.
c	Tube replacement kit	1 set
d	Reaction chamber assembly	1 set
e	Electronic module of each type	10 % of total qty for project or min. 1 no each type
f	Chemical reagents	For One Year Supply
6	<b>:- Sodium Analyser</b>	
a	Sensor assembly - complete assembly with ref. & measuring electrodes, electrolyte etc	1 no.
b	Refurbishment kit	1 set
c	Electronic module of each type	10 % of total qty for project or min. 1 no each type
d	Chemical reagents	For One Year Supply
7	<b>:-Phosphate Analyser</b>	
a	Cuvette Assembly	1 no.
b	Pump motor	1 no.
c	Tube replacement kit	1 set
d	Reaction chamber assembly	1 set
e	Electronic module of each type	10 % of total qty for project or min. 1 no each type
f	Chemical reagents	For One Year Supply
8	<b>:- Chloride Analyser</b>	

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a	Sensor assembly - complete assembly with ref. & measuring electrodes, electrolyte etc	1 no.
b	Refurbishment kit	1 set
c	Electronic module of each type	10 % of total qty for project or min. 1 no each type
d	Chemical reagents	For One Year Supply
9	<b>:- Ammonia Analyser</b>	
a	Sensor assembly - complete assembly with ref. & measuring electrodes, electrolyte etc	1 no.
b	Refurbishment kit	1 set
c	Electronic module of each type	10 % of total qty for project or min. 1 no each type
d	Chemical reagents	For One Year Supply
Note:-		
	1. Vendors to quote individual prices for all items above. The prices shall be on per unit basis for each row item.	
	2. Vendors who do not comply pt. no. 1 will be disqualified from the tender.	

**SECTION - "F"**

- Analysers & Spares shall be packed project wise in lockable Metal Container suitable for outside storage at project sites. Typical requirements are as below:-
  - Type: Standard Outdoor type MS container, fully closed.
  - Dimension: Vendor to decide based on Qty of Analysers & Spares.

General condition:

- 1) The container shall be suitable to store imported and sophisticated components in open environment at thermal power plants. It shall be leak proof.
  - 2) Container shall be provided with proper glass wool thermal insulation at inside.
  - 3) Wall thickness (all sides), reinforcement, supporting lugs, lifting lugs, etc., shall be suitable to store and transport the container with the permissible load as required.
  - 4) Doors shall have suitable latches to lock the container with pad locks for safety purpose.
  - 5) Interior and external surface shall be completely painted as per the standard practice and it shall be Suitable for sea-shore atmosphere.
  - 6) Containers shall be provided with Tag Plates with Project Name.
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