

TELANGANA STATE POWER GENERATION CORPORATION LTD
4X270 MW BHADRADRI TPS, UNITS # 1 TO 4, MANUGURU,
KHAMMAM DISTRICT

TECHNICAL SPECIFICATION
FOR
ULTRASONIC FLOWMETER

VOLUME II-B & III

SPECIFICATION No: PE-TS-411-145-I916



BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT DIVISION
NOIDA, INDIA

PREAMBLE

1.0 The tender document contains three (3) volumes. The bidder shall meet the requirements of all the three volumes.

1.1 **Volume-I (CONDITIONS OF CONTRACT)**

This consists of four parts as below :-

- Volume-IA : This part contains instructions to bidders for making bids to BHEL.
- Volume-IB : This part contains general commercial conditions of the tender & includes provision that vendor is responsible for the quality of item supplied by their sub-vendors.
- Volume-IC : This part contains special conditions of contract.
- Volume-ID : This part contains commercial conditions for erection & commissioning site work, as applicable.

1.2 **Volume-II TECHNICAL SPECIFICATIONS**

Technical requirements are stipulated in Volume-II which comprises of :-

- Volume-IIA : General Technical Conditions
- Volume-IIB : Technical Specification including Drawings, if any.

1.2.1 **Volume-IIB**

This volume is sub-divided into following sections :-

- Section-A : This section outlines the scope of enquiry.
- Section-B : This section provides "Project Information".
- Section-C : This section indicates technical requirements specific to the contract, not covered in Section-D.
- Section-D : This section comprises of technical specifications of equipments complete with data sheet A, B and C.

Data Sheet - A specifies data and other requirements pertaining to the Equipment.

Data Sheet - B Specifies data to be filled by the bidder (Data Sheet-B is contained in Volume-III).

Data Sheet - C Indicates data/documents to be furnished after the award of contract as per agreed schedule by the vendor (as applicable).

1.2.2 **Volume-III TECHNICAL SCHEDULES**

This volume contains technical schedules and Data Sheets-B, which are to be duly filled by the bidder and the same shall be furnished with the technical bid as per instructions given in Document No. PE-SS-999-100-Q-002 in Volume-III.

2.0 The requirements mentioned in Section-C / Data Sheets-A of section-D shall prevail and govern in case of conflict between the same and the corresponding requirements mentioned in the descriptive portion in Section-D.



TECHNICAL SPECIFICATION
FOR
ULTRASONIC FLOWMETER

4X270 MW BHADRADRI TPS

SPEC NO.: PE-TS-411-145-I916

VOLUME II B

SECTION A

REV. NO. 00

DATE 05/06/2015

SHEET 1 OF 2

SECTION – A
SCOPE OF ENQUIRY



**TECHNICAL SPECIFICATION
FOR
ULTRASONIC FLOWMETER**

4X270 MW BHADRADRI TPS

SPEC NO.: PE-TS-411-145-I916

VOLUME II B

SECTION A

REV. NO. 00

DATE : 05/06/2015

SHEET 2 OF 2

SCOPE OF ENQUIRY

1.0 SCOPE

- 1.1 This specification covers the Design, Manufacture, Inspection and Testing at manufacturer's works, proper packing for transportation and delivery to site of the Ultrasonic flow meter with accessories as mentioned in different sections of this specification for 4X270 MW Bhadradri Thermal Power Plant.
- 1.2 The quality plan enclosed, forms the minimum requirement but not limited to be adhered to by the bidder. Bidder to sign and stamp the same and submit along with the offer as an acceptance.
- 1.3 Scope of supply shall be Ultrasonic flow meter along with accessories. as indicated in specification.
- 1.4 Following formats to be signed, stamped with company seal and submitted :
 - a) Complete offer including calculation sheets, catalogues etc.
 - b) Quality Plan
 - c) Datasheets A & B, duly filled
 - d) Schedule of submission of drawings/documents, equipment manufacture inspection and dispatch.
 - e) Schedule of price, unit prices, inspection schedule.

2.0 GENERAL TECHNICAL INSTRUCTIONS

- 2.1 It is not the intent here to specify all the details of design and manufacture. However, the equipment shall conform in all respects to high standard of design, engineering and workmanship and shall be capable of performing the required duties in a manner acceptable to the customer / consultant, who will interpret the meaning of drawing and specification and shall be entitled to reject any component or material which in his judgment is not in full accordance herewith.
- 2.2 The omission of specific reference to any component / accessory necessary for the proper performance of the equipments shall not relieve the supplier of the responsibility of providing such facilities to complete the supply within the quoted prices.
- 2.3 BHEL's/Customer's representative shall be given access to the shop in which the equipments are being manufactured or tested and all test records shall be made available to him.
- 2.4 The equipment covered under this specification shall not be dispatched unless the same have been finally inspected, accepted and Material Dispatch Clearance Certificate (MDCC) is issued by BHEL.



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FOR
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4X270 MW BHADRADRI TPS

SPEC NO.: PE-TS-411-145-I916

VOLUME II B

SECTION B

REV. NO. 00

DATE : 05/06/2015

SHEET 1 OF 2

SECTION – B

PROJECT INFORMATION



PROJECT INFORMATION
FOR
4 X 270 MW BHADRADRI TPS

SPECIFICATION NO. `PE-TS-411-145-I916

VOLUME II - B

SECTION - B

REV 00

DATE 05.06.2015

PROJECT INFORMATION

INTRODUCTION

4x270 MW Bhadradi TPS is being set up by Telangana State Electricity Corporation Limited (TSGENCO) at Manuguru in the district of Khammam, Telangana, India.

The Bidder shall acquaint himself by a visit to the site, if felt necessary, with the conditions prevailing at site before submission of the bid. The information given here in under is for general guidance and shall not be contractually binding on BHEL/Owner. All relevant site data /information as may be necessary shall have to be obtained /collected by the Bidder.

APPROACH TO SITE

The distance from Manuguru to Major cities in state:

City	Km
Hyderabad	345
Warangal	180
Bhadrachalam	38
Kothagudem	70
Khammam	130
Vijayawada	195

District: KHAMMAM

State : TELANGANA

Nearest Airport: The nearest airport is Vijayawada Airport but the most used airport is the Hyderabad International Airport.

Nearest Railway Station: Manuguru railway station is 10KM from nearby town. However Warangal/Vijaywada railway Station is major railway station near to Manuguru.



PROJECT INFORMATION
FOR
4 X 270 MW BHADRADRI TPS

SPECIFICATION NO. PE-TS-411-145-1916

VOLUME II - B

SECTION - B

REV 00

DATE 05.06.2015

1. Owner : TSGENCO
2. Project Title : 4X270 MW Bhadradri TPS
3. Location : 16 Km from Manuguru Railway station
4. Nearest Railway Stn. : Manuguru
5. Temperature
 - a. Mean daily minimum ambient temperature during oldest month of the year: 11.5 Deg.C
 - b. Mean daily minimum ambient temperature during hottest month of the year: 45.1 Deg.C
6. Rainfall: Intensity of rainfall @ 50 mm/hr considering heaviest fall in 24 hrs
7. Wind Data: Basic wind speed at 10m height : 44 m/sec
8. Wind pressure As per IS: 875 Part III- 1987
9. Seismic Zone: Zone III as defined in IS:1893 (part-1)-2002 according to Indian Standard Seismic Zoning Map

10	Power Supply : The power supplies for distribution and auxiliaries shall be as under:	
	a) In plant generation	16.5kV $\pm 5\%$, 3ph, 50Hz $\pm 5\%$, high resistance earthed.
	b) MV distribution	6.6kV $\pm 6\%$, 3ph, 3w , 50 Hz, + 5 % to - 5%, Non-effectively earthed
	c) LT distribution	415V $\pm 10\%$, 3ph, 4W, 50Hz + 5% to -5%, Effectively earthed
	d) Motor rated above 160kW	6.6kV $\pm 6\%$, 3 ph 50Hz +5% to -5%.
	e) Motor rated 160kW and below all motorized actuators.	415V $\pm 10\%$, 3 ph, 50Hz +5% to -5%.
	f) For motors equal and below 30kW winding heating	24V AC $\pm 10\%$, 50 Hz %, [to be generated in 415V switchgear by vendor]
	g) DC Motors	220V DC + 10% to - 15%, 2 wire ungrounded system
	h) Control supply for relay panel/ 6.6kV breakers/415V breakers and DC emergency lighting.	220V DC + 10% to - 15%, 2 wire ungrounded system
	i) UPS for instrumentation & Control system	240V AC $\pm 1\%$, 1 ph ,50Hz $\pm 0.5\%$ 2 Wire AC system
	j) Control supply for 415V Motor contactors/AC Control circuits [to be generated in MCC /panel by vendor]	110V AC $\pm 10\%$, 50Hz + 5% to -5%.
	k) Diesel Generator emergency supply	415V $\pm 10\%$, 3ph,3W, 50Hz +5%to -5%.
11	Fault levels	
	a) 400kV	40kA rms for 1 sec
	b) 6.6kV	40 kA rms for 1 sec.
	c) 415V	50 kA rms for 1 sec.
	d) DC Supply	25 kA



TECHNICAL SPECIFICATION FOR
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4X 270 MW BHADRADRI TPS

SPEC NO.: PE-TS-411-145-I916

VOLUME II B

SECTION C

REV. NO. 00

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SHEET 1 OF 2

SECTION-C
SPECIAL TECHNICAL REQUIREMENT



**TECHNICAL SPECIFICATION
FOR
ULTRASONIC FLOWMETER**

4X270 MW BHADRADRI TPS

SPEC NO.: PE-TS-411-145-I916

VOLUME II B

SECTION A

REV. NO. 00

DATE : 05/06/2015

SHEET 2 OF 2

SPECIFIC TECHNICAL REQUIREMENTS

The technical requirements in this section are specific for this project and shall override the specification under Section-D in case of any contradiction.

- 1.0 Bidder to note that duly filled up Data sheet-B, Quality Plan, Format “Schedule of submission of Drawings / Documents, Equipment Manufacture, Inspection and Dispatch” enclosed in Section-D of Volume IIB, to be signed and stamped and submitted with the bid.
- 2.0 Bidder Presence is required for 2 days each time (4 times) for any site support requirement. All the expenses like boarding, lodging and travel, Air fare etc. shall be in bidder’s scope.
- 3.0 DOCUMENTATION:**
- (A) **Along with the bids:** No separate documentation required at the time of bids except those specifically listed under Cl. No. 6.0 of Sec-D of Vol-II B.
- (B) **After the award of contract:** 10 sets of the following documents to be enclosed along with the contract documents for approval:
- a) Datasheet C completely filled-up.
 - b) Quality plan duly signed and stamped.
 - c) All Differential pressure vs Flow graphs.
 - d) Calculation Sheet.
 - e) Assembly dimensional drawings.
 - f) GA Drawing.
- (C) **Final documentation:** The documentation as listed below shall be submitted as a part of final documentation.
1. Approved final drawings/data sheets, – 10 sets with 2 CD-ROMS
 2. All Test certificates – 10 sets.
 3. Operation & Maintenance Manuals for Ultrasonic flow meter – 10 sets
 4. Assembly drawings and QP for approval – 10 sets.
 5. “As built” drawings – 10 sets.
- 4.0 In case during erection/commissioning of the Ultrasonic flow meter, any spares are required which have not been specified in the Start-up/commissioning spares list, the same will have to be supplied by the vendor free of cost.

1.07.00 ULTRASONIC FLOW TRANSMITTER

1. Type : Ultrasonic – Clamp On
2. Accuracy : +/- 1 % of reading
3. Repeatability : +/- 0.3 % of reading
4. Rangeability : 400 : 1
5. Output Signal : 4-20 mA DC with HART
6. Measured Parameter : Volumetric flow, Totalized flow and flow Velocity
7. Display : LCD with internal Key Pad (Flow rate & Totalization)
8. Power Supply : 24 V DC (2 Wire)
9. Enclosure : SS (IP- 68 – Submersible)
10. Mounting : SS Chain or Strap
11. Accessories
 1. Handheld calibrator
 2. ½”NPT cable gland
 3. Transducer cable
 4. All mounting hardware (SS-316)
 5. SS Nameplate
12. Adjustment/Calibration/ /Maintenance : From handheld calibrator/ HART management system
13. Applications : Plant water service

~~Note. Multi-path insertion type (minimum 4 path) Ultrasonic Flow meter shall be provided for Raw water/ Cooling Water flow measurements.~~

2.00.00 ~~HART HAND HELD CALIBRATOR~~

~~Hand held calibrators (5 nos. for each type) shall be provided for adjustment/ calibration/maintenance of the HART compatible~~



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SECTION B

REV. NO. 00

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SECTION – D

- **EQUIPMENT SPECIFICATION**
- **DATA SHEETS – A & B**
- **QUALITY PLAN**
- **BILL OF QUANTITY**
- **SPARES**
- **SCHEDULE OF SUBMISSION OF DRAWINGS/
DOCUMENTS, EQPT. MANUFACTURE, INSPECTION
AND DISPATCH**



**TECHNICAL SPECIFICATION FOR
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SECTION D

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SECTION-D

EQUIPMENT SPECIFICATION



**TECHNICAL SPECIFICATION
FOR
ULTRASONIC FLOW METER**

SPEC NO.: PE-SS-999-145-I027

VOLUME II B

SECTION D

REV. NO. 01

DATE : 30.08.2012

SHEET 3 OF 21

1.0 SCOPE

This specification covers the Design, Manufacture, Calibration, Inspection and Testing at the manufacturer's works, proper packing for transportation and delivery to site of Ultrasonic Flow Meter for use in Utility/Captive Power Station/Combined Cycle Station.

2.0 CODES AND STANDARDS

- 2.1 All the equipments specified herein shall comply with the requirements of the latest issue of the relevant National and International standards.
- 2.2 The Ultrasonic Flow Meters shall be of proven reliability, accuracy and repeatability requiring a minimum of maintenance. The Design and Materials used for the components shall also comply with the relevant National and International standards.

3.0 TECHNICAL REQUIREMENT

The Ultrasonic Flow Meters and the accessories shall be suitable for continuous operation under an ambient temperature of 0-55°C for Transmitter and (-) 20 to 100°C for Transducer and Relative Humidity of 0-95% unless specified otherwise in volume IIB Section-B or Section-C.

All accessories required for mounting/erection of these instruments shall be furnished as necessary for completeness of the system.

3.1 Flow measurement

The Ultrasonic Flow Transmitter shall be based on transit-time flow measurement technique uses a pair of transducers with each transducer sending and receiving coded ultrasonic signals through the fluid. When the fluid is flowing, signal transit-time in the downstream direction is shorter than in the upstream direction; the difference between these transit times is proportional to the flow velocity. The Ultrasonic Flow Transmitter measures this time difference and uses programmed pipe parameters to determine flow rate and direction. Ultrasonic Flow Transmitters are classified as either wetted or non-wetted (clamp-on). Clamp-on transducers are clamped onto the outside of the pipe and never come into contact with the process fluid. Wetted transducers are mounted into the pipe or flow cell in direct contact with the process fluid. Hart Compatibility for the transmitter shall be provided. In case of Intrusion type meter shall be provided with spool piece along with end Flange & counter Flanges (as applicable).

3.2 Accessories:

All mounting hardware like clamping fixtures, mechanism to remove the sensors on line, interconnecting screened cables between Transducer & Transmitter , Cable Glands etc. is required to be supplied. Weather canopy for protection from direct sunlight and direct rain shall also be offered as an option. Material of all fittings shall be SS-316.

4.0 GUARANTEE AND PERFORMANCE

The guarantee of flow measuring assembly shall be 18 months from the date of dispatch or 12 months from commissioning whichever is earlier.



**TECHNICAL SPECIFICATION
FOR
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SPEC NO.: PE-SS-999-145-I027

VOLUME II B

SECTION D

REV. NO. 01

DATE : 30.08.2012

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5.0 TEST & INSPECTION

- 5.1 The bidder shall adopt suitable quality assurance plan to ensure that the equipments offered will meet the specification requirements in full.
- 5.2 The Quality Plan shall be discussed and finalized with the technically accepted bidders before opening the price bid. The stages where the purchaser would like to be associated for witnessing or verification would be indicated by the purchaser in the Quality Plan before approval.
- 5.3 Inspection will be conducted by BHEL and/or their authorized representatives as per the agreed inspection schedule. The inspection schedule will be submitted by the bidder for BHEL's approval at contract stage. The cost of all tests and inspections will be deemed to have been included in the bid. For all the type tests "Type Test Certificates" as per agreed Quality Plan shall be furnished. In the absence of the same, such Type Tests shall be arranged at the Vendor's works in the presence of BHEL and/or their authorized representatives or in independent Test House/Laboratory approved by BHEL.

6.0 SPARES AND CONSUMABLES**6.1 Commissioning Spares and consumables**

As part of the main equipment supply, the bidder shall supply all commissioning spares and consumables required during Start-up,

6.2 Recommended Spares

The bidder shall furnish a list of Recommended Spares along with the normal service expectancy period and frequency of replacement; quantities recommended for 3 years operation along with unit rate against each item to enable BHEL/BHEL's Customer to place a separate order later, if required.

6.3 Special Tools & Tackles

The bidder shall furnish a list of Special Tools & Tackles included in the bid.

7.0 DRAWINGS & DOCUMENTS**7.1 The offer shall include the following in 4 copies each.**

- i. Technical data sheet for each flow measuring device assembly in the Pro forma enclosed under Data Sheet-B.
- ii. Catalogue/Technical Literature.
- iii. Assembly drawing with dimensional details.

7.2 4 copy each of the following along with 2 CDs to be furnished after award of contract for owner approval.

- i. Technical Data Sheet-C.
- ii. Sizing Calculations.
- iii. Assembly drawing with dimensions.
- iv. Installation drawing.



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SHEET **5 OF 21****8.0 FOR INFORMATION**

- 8.1 Storage and Commissioning Instruction
8.2 O&M are to be supplied as specified.

9.0 PACKING & MARKING

- 9.1 Each item shall be properly packed with adequate protection against friction, stresses, vibration & shock during transportation. Each packing box shall have marking as per Purchase Order.
- 9.2 Each assembly shall be identified with the following information.
- Tag No.
 - Service.
 - Line size & thickness.
 - Direction of flow.

10.0 APPLICABLE DATA SHEETS

This document shall be read in conjunction with following data sheets.

1. Data Sheet - A & B : Data sheet no. PES-145-27-DS1-0



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SECTION D

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PRINCIPLE OF MEASUREMENT

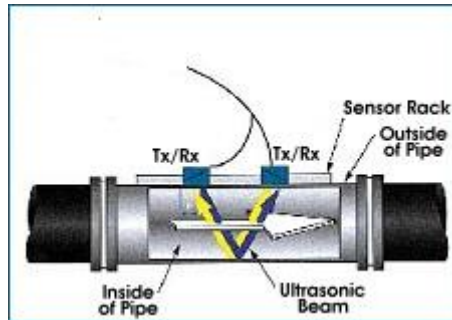


FIG.1

Transit-time flow meters measure the difference in travel time between pulses transmitted in a single path along and against the flow. Two transducers are used, one upstream of the other. Each acts as both a transmitter and receiver for the ultrasonic beam.

TYPICAL INSTALLATION (ASSEMBLY)

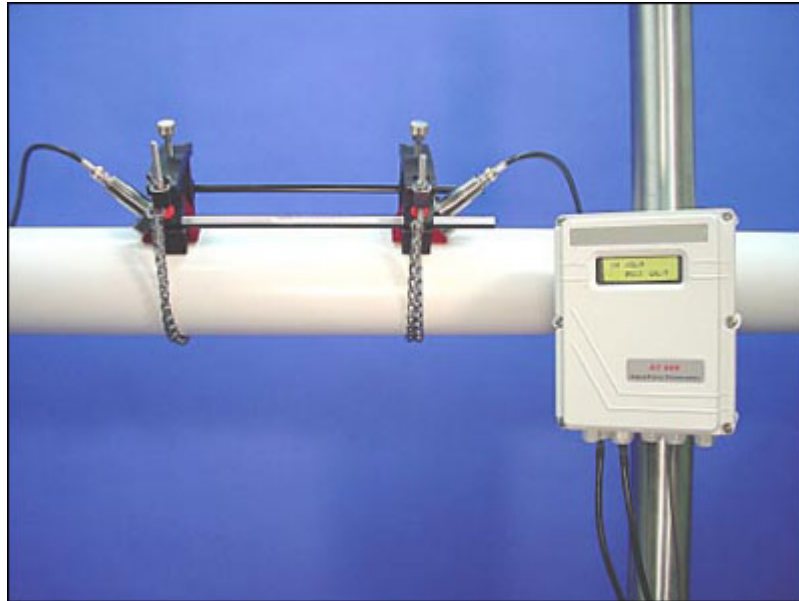


FIG.2

Ultrasonic flow meter suitable for clamp on flow measurement without modifications to pipe work.



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ULTRASONIC FLOW METER**

4X270 MW BHADRADRI TPS

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SECTION D

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SECTION-D

DATA SHEETS - A&B



DATA SHEET FOR UTRASONIC FLOW METER

SPEC NO.: PE-TS-411-145-I916	
VOLUME	II B
SECTION	D
REV. NO.	00
DATE	:05.06.15
SHEET	9 OF 21

PROCESS DATA	FLUID RATE OF FLOW (T/HR) UPSTREAM WORKING PRESS (Kg/cm2g) DESIGN PRESS (Kg/cm2g) NORMAL TEMP (Deg C) MAXIMUM TEMP (Deg C) PIPE LOCATION	CLARIFIED WATER NORMAL : 34500 MAXIMUM : 44850 2.5 5.0 33 Bidder to indicate <input type="checkbox"/> UNDERGROUND <input type="checkbox"/> OVERGROUND
	PIPE LINE DATA PIPE SIZE (OD x THK) mm PIPE MATERIAL AVAILABLE PIPE STRAIGHT LENGTH	2335 X 18 MM CARBON STEEL AS PER IS 2062 GR.B UPSTREAM : 10D DOWNSTREAM : 5D

NOTE:- 1) Accessories like ½” NPT cable gland, Transducer cable, All mounting hardware (SS-316), SS nameplate etc. shall be provided.
 2) Double compression type nickel plated brass cable gland.
 3) Transducer cable min length shall be mentioned as per GA of Pit and location of transmitter.
 4) Remote Transmitter:
 i) Enclosure Material – Die Cast Aluminium (incase PP offered, suitable metal enclosure/housing shall be provided. Since it is located in the field.



DATA SHEET FOR UTRASONIC FLOW METER

SPEC NO.: PE-TS-411-145-I916	
VOLUME	II B
SECTION	D
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DATE	:05.06.15
SHEET	11 OF 21

PROCESS DATA	FLUID RATE OF FLOW (T/HR) UPSTREAM WORKING PRESS (Kg/cm2g) DESIGN PRESS (Kg/cm2g) NORMAL TEMP (Deg C) MAXIMUM TEMP (Deg C) PIPE LOCATION	CLARIFIED WATER NORMAL : 34500 MAXIMUM : 44850 2.5 5.0 33 Bidder to indicate <input type="checkbox"/> UNDERGROUND <input type="checkbox"/> OVERGROUND
	PIPE LINE DATA PIPE SIZE (OD x THK) mm PIPE MATERIAL AVAILABLE PIPE STRAIGHT LENGTH	2335 X 18 MM CARBON STEEL AS PER IS 2062 GR.B UPSTREAM : 10D DOWNSTREAM : 5D

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DATA SHEET FOR UTRASONIC FLOW METER

SPEC NO.: PE-TS-411-145-I916

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SECTION D

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<p>PROCESS DATA</p>	<p>FLUID RATE OF FLOW (T/HR) UPSTREAM WORKING PRESS (Kg/cm2g) DESIGN PRESS (Kg/cm2g) NORMAL TEMP (Deg C) MAXIMUM TEMP (Deg C) PIPE LOCATION</p>	<p>CLARIFIED WATER NORMAL : 34500 MAXIMUM : 44850 2.5 5.0 33 Bidder to indicate <input type="checkbox"/> UNDERGROUND <input type="checkbox"/> OVERGROUND</p>	<p>..... </p>
<p>PIPE LINE DATA</p>	<p>PIPE SIZE (OD x THK) mm PIPE MATERIAL AVAILABLE PIPE STRAIGHT LENGTH</p>	<p>2335 X 18 MM CARBON STEEL AS PER IS 2062 GR.B UPSTREAM : 10D DOWNSTREAM : 5D</p>	<p>..... </p>

NOTE:- 1) Accessories like ½” NPT cable gland, Transducer cable, All mounting hardware (SS-316), SS nameplate etc. shall be provided.
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DATA SHEET FOR UTRASONIC FLOW METER

SPEC NO.: PE-TS-411-145-I916	
VOLUME	II B
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PROCESS DATA	FLUID RATE OF FLOW (T/HR) UPSTREAM WORKING PRESS (Kg/cm2g) DESIGN PRESS (Kg/cm2g) NORMAL TEMP (Deg C) MAXIMUM TEMP (Deg C) PIPE LOCATION	CLARIFIED WATER NORMAL : 34500 MAXIMUM : 44850 2.5 5.0 33 Bidder to indicate <input checked="" type="checkbox"/> UNDERGROUND <input type="checkbox"/> OVERGROUND
	PIPE LINE DATA PIPE SIZE (OD x THK) mm PIPE MATERIAL AVAILABLE PIPE STRAIGHT LENGTH	2335 X 18 MM CARBON STEEL AS PER IS 2062 GR.B UPSTREAM : 10D DOWNSTREAM : 5D

NOTE:- 1) Accessories like ½” NPT cable gland, Transducer cable, All mounting hardware (SS-316), SS nameplate etc. shall be provided.
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ULTRASONIC FLOWMETER
4X 270 MW BHADRADRI TPS

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SECTION D

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SECTION-D

BILL OF QUANTITY



Technical specification for
ULTRASONIC FLOW METER

4X270 MW BHADRADRI TPS

SPECIFICATION NO. **PE-TS-411-145-1916**

VOLUME **II-B**

SECTION **D**

REV. NO. 00

DATE 05/06/2015

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BILL OF QUANTITY

[A] ULTRASONIC FLOWMETER WITH ALL ACCESSORIES

S. No.	KKS	SERVICE/ ITEM DESCRIPTION	QTY/UNIT	TOTAL QTY FOR STN
1	1PAB10CF001, 2PAB10CF001, 3PAB10CF001 & 4PAB10CF001	COOLING WATER SUPPLY HEADER TO CONDENSER (ONE AGAINST EACH TAG)	1	4



**TECHNICAL SPECIFICATION FOR
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SPEC NO.: PE-TS-411-145-I916

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SECTION D

REV. NO. 00

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**SECTION-D
QUALITY PLAN**



PEM :: C&I

**QUALITY PLAN
FOR
ULTRASONIC FLOWMETER**

QUALITY PLAN NO.: **PE-QP-999-145-I-011**
 VOLUME IIB
 SECTION D
 REV. NO. 00 DATE: 31.03.2014
 SHEET **19 OF 21**

Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency \$			Remarks
									P	W	V	

1	Standard Certificates	Certificate of Compliance, Warranty Certificate,	Major	Visual	As applicable	Technical documents/Approved documents	Technical catalogue/Approved documents	Technical catalogue/Approved documents	2/3	---	2, 1	
2	Visual Check	Mechanical	Major	Visual	100%	Technical catalogue/Approved documents	Technical catalogue/Approved documents	Technical catalogue/Approved documents	2/3	1	1	
3	Functional test & power ON	Electrical	Major	Visual	100%	Functional test report for meter & transducer	Approved documents	Technical catalogue/Approved documents	2/3	-	1	
4	HART Communication	Electrical	Major	---	100%	Technical catalogue/Approved documents	Technical catalogue/Approved documents	Technical catalogue/Approved documents	-	-	1	

LEGEND:

- \$ P - Agency Performing the Test.
- W - Agency Witnessing the Test.
- V - Agency Verifying the Test.

- 1 - Customer
- 2 - Vendor
- 3 - Sub-vendor



TECHNICAL SPECIFICATION FOR
ULTRASONIC FLOW METER
4X270 MW BHADRADRI TPS

SPEC NO.: PE-TS-411-145-I916

VOLUME II B


SECTION D

REV. NO. 00

DATE : 05/06/2015

SHEET 20 OF 21

**SCHEDULE OF SUBMISSION OF DRAWINGS/ DOCUMENTS, EQPT.
MANUFACTURE, INSPECTION AND DISPATCH**

	Technical specification for ULTRASONIC FLOW METER 4X270 MW BHADRADRI TPS	SPECIFICATION NO. PE-TS-411-145-I916	
		VOLUME II-B	
		SECTION D	
		REV. NO. 00	DATE: 05/06/2015
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SCHEDULE OF SUBMISSION OF DRAWINGS / DOCUMENTS, EQUIPMENT MANUFACTURE INSPECTION AND DESPATCH

1. <u>ZERO DATE</u>	<u>DATE of LOI / FOI / TOI</u>
2. Submission of Data Sheets / documents / catalogues for approval.	2 Weeks from the Zero date.
3. Technical finalisation, freezing of inputs of manufacture by way of vetting of documents and technical discussions and resubmissions of documents (if required)	6 Weeks from the Zero date.
4. Inspection of Equipment as per Approved (Category-I) drawings / documents.	18 Weeks from the Zero date.
5. Release of MDCC by BHEL	19 Weeks from the Zero date.
6. Dispatch (Packaging & Dispatch)	20 Weeks from the Zero date.
7. Final documents submission as per Contract	24 Weeks from the Zero date.

NOTE: Delays due to non-fulfillment of the requirements of approved Quality Plan and approved Data sheets, Drawings, Catalogues and Sizing Calculations observed during inspection shall be to the Vendor's account.

Delays due to INCOMPLETE (Partly) submission of Data sheets, Drawings, Catalogues and Sizing Calculations also be considered as "**DOCUMENTS NOT SUBMITTED**"

(Signature and Stamp of the Bidder)



Technical specification for
ULTRASONIC FLOWMETER
**1X800 MW KOTHAGUDEM TPS STAGE-VII,
UNIT#12, PALONCHA**

SPECIFICATION NO. **PE-TS-410-145-1916**

VOLUME **III**

SECTION

REV. NO. 01

DATE: 24.06.2015

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VOLUME-III

**COMPLIANCE CERTIFICATE
For**

ULTRASONIC FLOWMETER

(To be Signed & Stamped by the Bidder)

Project: 1X800 MW KOTHAGUEM TPS STAGE-VII, UNIT#12, PALONCHA

Specification no.: PE-TS-410-145-1916

We shall comply with the following:-

1. All the requirements as stated in Technical Specification / Specific Technical requirement / Data sheets / Drawings, BHEL quality plan etc as enclosed in the tender, shall be fully complied **without any deviation.**
2. BHEL Quality Plan (enclosed with the specification) duly signed and stamped is submitted herewith **without any deviation.**

Signature with date	
Name	
Company seal	



Technical specification for
ULTRASONIC FLOWMETER
1X800 MW KOTHAGUDEM TPS STAGE-VII,
UNIT#12, PALONCHA

SPECIFICATION NO. **PE-TS-410-145-1916**

VOLUME **III**

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4	INSPECTION SCHEDULE



Technical specification for
ULTRASONIC FLOWMETER
1X800 MW KOTHAGUDEM TPS STAGE-VII,
UNIT#12, PALONCHA

SPECIFICATION NO. **PE-TS-410-145-1916**

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SCHEDULE OF PRICES

S.NO.	ITEM DESCRIPTION	QTY	UNIT PRICE
[A] ULTRASONIC FLOW METER			
S. No.	KKS NO.	SERVICE/ ITEM DESCRIPTION	
1	PAB10BP001	CW HEADER TO CONDENSER	1
2	PCB20BP001	ACW SUPPLY HEADER	1

[B] SUPERVISION OF ERECTION & COMMISSIONING

S. No.	KKS NO.	SERVICE/ ITEM DESCRIPTION		PRICE PER ITEM
1	PAB10BP001 & PCB20BP001	SUPERVISION OF INSTALLATION (FOR 2 MAN DAYS PER TAG)	1	

PARTICULARS OF THE BIDDER / AUTHORISED REPRESENTATIVE

NAME	DESIGNATION	SIGNATURE	DATE	COMPANY SEAL



Technical specification for
ULTRASONIC FLOWMETER
1X800 MW KOTHAGUDEM TPS STAGE-VII,
UNIT#12, PALONCHA

SPECIFICATION NO. **PE-TS-410-145-1916**

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SCHEDULE OF UNIT PRICES

ULTRASONIC FLOW METER

S. No.	ITEMS	UNIT PRICE
1.	SENSOR	
2.	TRANSMITTER	
3.	CABLE BETWEEN SENSOR TO TRANSMITTER (PER METER)	
4.	SUPERVISION OF INSTALLATION PER MAN DAYS	

PETICULARS OF THE BIDDER / AUTHORISED REPRESENTATIVE

PETICULARS OF THE BIDDER / AUTHORISED REPRESENTATIVE				
NAME	DESIGNATION	SIGNATURE	DATE	COMPANY SEAL



Technical specification for
ULTRASONIC FLOWMETER
1X800 MW KOTHAGUDEM TPS STAGE-VII,
UNIT#12, PALONCHA

SPECIFICATION NO. **PE-TS-410-145-1916**

VOLUME **III**

SECTION

REV. NO. 01

DATE: 24.06.2015

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INSPECTION SCHEDULE

(PLACE & ADDRESS OF TESTING/ INSPECTION AND ITS SCHEDULE DATE & DURATION IN NUMBER OF DAYS ITEM/COMPONENTWISE TO BE LISTED)

PARTICULARS OF THE BIDDER / AUTHORISED REPRESENTATIVE

NAME	DESIGNATION	SIGNATURE	DATE	COMPANY SEAL