

TELANGANA STATE POWER GENERATION CORPORATION LTD

5X800MW STPP YADADRI

**TECHNICAL SPECIFICATION
FOR
ULTRASONIC FLOW METER**

VOLUME - IIB

SECTIONS-A, C & D

SPECIFICATION No: PE-TS-417-145-I916



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


	<p>Technical specification for Ultrasonic Flow meters</p> <p>5X800MW STPP YADADRI</p>	SPEC NO.: PE-TS-417-145-I916	
		DOCUMENT NO.	
		VOLUME	II B
		SECTION	
		ISSUE NO.	
		REV. NO.	00
		DATE	22.03.2022

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D	Equipment Specification

755619/2022/PS-PEM-C I



Technical specification for
Ultrasonic Flow meters

5X800MW STPP Yadadri

SPEC NO.: PE-TS-417-145-I916

DOCUMENT NO

VOLUME II B

SECTION A


ISSUE NO

REV. NO. 00

DATE : 21.03.2022

SECTION – A

SCOPE OF ENQUIRY

	<p>Technical specification for Ultrasonic Flow meters</p> <p>5X800MW STPP Yadadri</p>	SPEC NO.: PE-TS-417-145-I916	
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SCOPE OF ENQUIRY


1. 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 meters along with accessories as mentioned in different sections of this specification for 5 X 800 MW YADADRI STPP project.
- 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 signed & stamped documents with company seal to be submitted by bidder.
 - a) Complete offer including calculation sheets, catalogues etc.
 - b) Quality Plan
 - c) Datasheet A & B, duly filled

2. 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 equipment 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 representatives shall be given access to the shop in which the equipment are being manufactured or tested and all test records shall be made available to them.
- 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 / Customer.

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SECTION – C

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SECTION – C

SPECIFIC TECHNICAL REQUIREMENT

	<p>Technical specification for</p> <p>ULTRASONIC FLOW METERS</p>		SPEC NO.: PE-TS-417-145-I916	
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SPECIFIC TECHNICAL REQUIREMENTS

The requirements in this section are specific for this project and shall over-ride the specification under Section-D in case of any contradiction. BIDDER to comply the stringent requirement as per BHEL decision without any commercial implication.

1.0 Bidder to note that duly filled up Data Sheet-B and Quality plan enclosed in Section-C of Volume IIB, to be signed and stamped and submitted with the bid.

2.0 Inspection shall be carried out in line with pre-approved drawings/data sheet/QP.

3.0 Supplier supervision is required for Erection & Commissioning of each Ultrasonic Flow Meter. All the expenses such as boarding, lodging and travel, Air fare etc. shall be in bidder's scope, BHEL shall provide supervision charges of E&C on lump sum basis as per purchase order.

4.0 DOCUMENTATION:

(A) Along with the bids:


- Duly filled, signed and stamped datasheet- A & B attached in Section-C of this Specification
- Signed and stamped QP in BHEL's format attached in Section-C of this Specification
- Documents pertaining to PQR
- Compliance Certificate

(B) **After the award of contract:** 10 sets of the following documents to be enclosed along with the contract documents for approval:

- Technical data sheet for each UFM & accessories in the pro forma enclosed under Data Sheet-B
- Quality plan duly signed and stamped.
- Assembly drawing of each type of flow UFM complete with all accessories indicating detailed dimensions, B.O.M. and weights.
- GA Drawing/ Installation drawings for UFM.

For Information

- Storage and Commissioning Instruction
- All relevant catalogues for the models of the UFM as well as accessories finalized.
- O&M manuals


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(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. |

5.0 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.

6.0 Design & Engineering details of all spares (make, model, rating, drawing, data sheet etc.) shall be submitted to the Owner prior to dispatch from manufacturers' works.

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COMPLIANCE CERTIFICATE

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**.
3. Sizing, Data Sheet-C in line with Data sheet-A of specification, dimensional drawings / UFM erection details, etc shall be submitted for BHEL/Customer review and approval, to reach BHEL within 15 days after receipt of LOI.
4. Selection of UFM sensors, mounting accessories, Electronics etc. are our (bidder's) responsibility. Any change in selection of type of sensor, electronics etc., if desired by BHEL / Customer during approval of the documents after award of contract, without major changes in process parameters as per tender Specification, shall be carried out without any commercial implication and time delay.
5. BHEL / Customer reserves the right to accept/rejects any variation to the specification.

(To be Signed & Stamped by the Bidder)

Signature with date	
Name	
Company seal	

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Technical specification for
Ultrasonic Flow meters

5X800MW STPP Yadadri

SPEC NO.: PE-TS-417-145-I916

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SECTION C


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SECTION – C

CUSTOMER'S SPECIFICATION

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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. ½”NPT cable gland

2. Transducer cable

3. All mounting hardware (SS-316)


4. SS Nameplate

12. Adjustment/Calibration/
/Maintenance

:


From handheld calibrator/ HART management system

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SECTION – C

DATASHEET – A & B


	DATA SHEET FOR UTRASONIC FLOW METER 5x800 MW YADADRI TPS		SPEC NO.: PE-TS-417-145-I916	
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SL NO	TAG NO.	SERVICE	ASSEMBLY TYPE	UNIT	TOTAL QTY
1	PAB10BP001	CW SUPPLY HEADER TO CONDENSER	UFM	NO.	7
2	PCB61BP001	CW BLOWDOWN HEADER	UFM	NO.	6
3	PCB10BP001	ACW HEADER	UFM	NO.	7
4	91PAB05BP001	TO INLET OF SIDE STREAM FILTRATION HEADER OF STAGE-I	UFM	NO.	2
5	91PAB05BP002	TO OUTLET OF SIDE STREAM FILTRATION HEADER OF STAGE-I	UFM	NO.	1
6	92PAB05BP001	TO INLET OF SIDE STREAM FILTRATION HEADER OF STAGE-II	UFM	NO.	1
7	92PAB05BP002	TO OUTLET OF SIDE STREAM FILTRATION HEADER OF STAGE-II	UFM	NO.	1
8	91GAD10BP001	RAW WATER DISCHARGE HEADER FOR STAGE-I	UFM	NO.	2
9	92GAD10BP001	RAW WATER DISCHARGE HEADER FOR STAGE-II	UFM	NO.	2
10	92GAD11BP001	ASH WATER DISCHARGE HEADER FOR STAGE-II	UFM	NO.	1
11	92PAB10BP001	CW MAKE UP DISCHARGE HEADER FOR STAGE-II	UFM	NO.	1


NOTE:

- Each KKS shall be prefixed as following:
 - For Individual unit 10, 20, 30, 40 & 50
 - For stage - 1(Unit-1 & 2) 91
 - For stage – 2(Unit-3,4 & 5) 92
 - For Common System (All units) 90

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GENERAL TECHNICAL REQUIREMENTS FOR ULTRASONIC FLOW METERS:


1. EACH ULTRASONIC FLOW METER SHALL BE OF TRANSIT TIME CLAMP ON TYPE WITH DUAL PATH AND WITH TWO SETS OF TRANSDUCERS.
2. ALL ACCESSORIES I.E. CABLE GLAND, TRANSDUCER CABLE, ALL MOUNTING HARDWARE AND SS NAMEPLATE SHALL BE PROVIDED WHICH ARE REQUIRED FOR THE COMPLETENESS OF THE SYSTEM.
3. MATERIAL OF ALL FITTINGS SHALL BE SS-316 OR BETTER.
4. CABLE GLAND, AS APPLICABLE SHALL BE OF SS AND DOUBLE COMPRESSION TYPE.
5. EACH ASSEMBLY SHALL BE IDENTIFIED WITH THE FOLLOWING INFORMATION: TAG NO., SERVICE, LINE SIZE & THICKNESS AND DIRECTION OF FLOW.
6. THE DATA SHEETS SHALL BE USED BY THE VENDOR AS INPUTS FOR DESIGNING ULTRASONIC FLOW METER ASSEMBLIES.
7. ULTRASONIC FLOW METER ASSEMBLIES SHALL UNDERGO TESTS AS PER QUALITY PLAN, WHICH WILL BE APPROVED BY END USER DURING CONTRACT EXECUTION STAGE.

	DATA SHEET FOR ULTRASONIC FLOW METER 5x800 MW YADADRI TPS		SPEC NO.: PE-TS-417-145-I916	
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Tag No. : PAB10BP001

DATA SHEET – A & B


DATA SHEET – A			DATA SHEET – B (TO BE FILLED BY VENDOR)
GENERAL	PROJECT TAG NO. QUANTITY SERVICE : MAKE : MODEL	5x800 MW YADADRI TPS PAB10BP001 SEVEN (07) CW SUPPLY HEADER TO CONDENSER Bidder to indicate	
TECHNICAL	TYPE FLOW MEASUREMENT OUTPUT ACCURACY REPEATABILITY RANGEABILITY LOAD RESISTANCE HART COMPATIBILITY CONTACT RELAY OUTPUT DISPLAY/INDICATION OPERATING VOLTAGE TOTALIZING FACILITIES VELOCITY MEASUREMENT FLOW MEASUREMENT PROTECTION CLASS ENCLOSURE MATERIAL MOUNTING ELECTRICAL CONNECTION COMMUNICATION PORTS SOFTWARE DIAGNOSTIC FEATURE RECORDING /LOGGING	<input checked="" type="checkbox"/> Ultrasonic – Clamp On <input checked="" type="checkbox"/> TWO PATH <input checked="" type="checkbox"/> 2 SETs OF SENSORS <input checked="" type="checkbox"/> Instantaneous Flow Rate <input checked="" type="checkbox"/> Totalized Flow Isolated 4-20 mA DC linear output ± 1% of reading ± 0.3% of reading 400:1 MIN. 500 OHM <input checked="" type="checkbox"/> YES 2 NO + 2 NC Flow meter with LCD screen backlight based local display & keypad. <input checked="" type="checkbox"/> 230V AC <input checked="" type="checkbox"/> 24 VDC <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES (Volumetric flow) IP-68 (Submersible) <input checked="" type="checkbox"/> SS <input checked="" type="checkbox"/> DIE CAST ALUMINIUM SS Chain or Strap or Welded <input checked="" type="checkbox"/> CABLE GLAND RS 232 C <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES	
PROCESS DATA	RATE OF FLOW (T/HR) UPSTREAM WORKING PRESS (Kg/cm2g) DESIGN PRESS (Kg/cm2g) NORMAL TEMP (Deg C) MAXIMUM TEMP (Deg C) PIPE LOCATION	NORMAL : 84210 TPH MAXIMUM : 1,09,475 TPH 3.2 Kg/cm2(g) 5.5 Kg/cm2(g) 33.0 Deg C 60.0 Deg C <input checked="" type="checkbox"/> UNDERGROUND <input type="checkbox"/> OVERGROUND	
PIPE LINE DATA	PIPE SIZE (OD x THK) mm PIPE MATERIAL AVAILABLE PIPE STRAIGHT LENGTH	3980 x 22 CARBON STEEL UPSTREAM : 10D DOWNSTREAM : 5D	


	DATA SHEET FOR ULTRASONIC FLOW METER 5x800 MW YADADRI TPS		SPEC NO.: PE-TS-417-145-I916	
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Tag No. : PCB61BP001

DATA SHEET – A & B


DATA SHEET – A			DATA SHEET – B (TO BE FILLED BY VENDOR)
GENERAL	PROJECT TAG NO. QUANTITY SERVICE : MAKE : MODEL	5x800 MW YADADRI TPS PCB61BP001 SIX (06) CW BLOWDOWN HEADER Bidder to indicate	
TECHNICAL	TYPE FLOW MEASUREMENT OUTPUT ACCURACY REPEATABILITY RANGEABILITY LOAD RESISTANCE HART COMPATIBILITY CONTACT RELAY OUTPUT DISPLAY/INDICATION OPERATING VOLTAGE TOTALIZING FACILITIES VELOCITY MEASUREMENT FLOW MEASUREMENT PROTECTION CLASS ENCLOSURE MATERIAL MOUNTING ELECTRICAL CONNECTION COMMUNICATION PORTS SOFTWARE DIAGNOSTIC FEATURE RECORDING /LOGGING	<input checked="" type="checkbox"/> ULTRASONIC – CLAMP ON <input checked="" type="checkbox"/> TWO PATH <input checked="" type="checkbox"/> 2 SETs OF SENSORS <input checked="" type="checkbox"/> Instantaneous Flow Rate <input checked="" type="checkbox"/> Totalized Flow Isolated 4-20 mA DC linear output ± 1% of reading ± 0.3% of reading 400:1 MIN. 500 OHM <input checked="" type="checkbox"/> YES 2 NO + 2 NC Flow meter with LCD screen backlight based local display and keypad. <input checked="" type="checkbox"/> 230V AC <input checked="" type="checkbox"/> 24 VDC <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES (Volumetric flow) IP-68 (Submersible) <input checked="" type="checkbox"/> SS <input checked="" type="checkbox"/> DIE CAST ALUMINIUM SS Chain or Strap or Welded <input checked="" type="checkbox"/> CABLE GLAND RS 232 C <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES	
PROCESS DATA	RATE OF FLOW (T/HR) UPSTREAM WORKING PRESS (Kg/cm2g) DESIGN PRESS (Kg/cm2g) NORMAL TEMP (Deg C) MAXIMUM TEMP (Deg C) PIPE LOCATION	NORMAL : 257 TPH MAXIMUM : 335 TPH 2.2 Kg/cm2(g) 5.5 Kg/cm2(g) 33.0 Deg C 60.0 Deg C <input checked="" type="checkbox"/> UNDERGROUND <input type="checkbox"/> OVERGROUND	
PIPE LINE DATA	PIPE SIZE (OD x THK) mm PIPE MATERIAL AVAILABLE PIPE STRAIGHT LENGTH	219.1 x 6 CARBON STEEL UPSTREAM : 10D DOWNSTREAM : 5D	

	DATA SHEET FOR ULTRASONIC FLOW METER 5x800 MW YADADRI TPS		SPEC NO.: PE-TS-417-145-I916	
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Tag No. : PCB10BP001 DATA SHEET – A & B				
DATA SHEET – A			DATA SHEET – B (TO BE FILLED BY VENDOR)	
GENERAL	PROJECT TAG NO. QUANTITY SERVICE : MAKE : MODEL	5x800 MW YADADRI TPS PCB10BP001 SEVEN (07) ACW HEADER Bidder to indicate		
TECHNICAL	TYPE FLOW MEASUREMENT OUTPUT ACCURACY REPEATABILITY RANGEABILITY LOAD RESISTANCE HART COMPATIBILITY CONTACT RELAY OUTPUT DISPLAY/INDICATION OPERATING VOLTAGE TOTALIZING FACILITIES VELOCITY MEASUREMENT FLOW MEASUREMENT PROTECTION CLASS ENCLOSURE MATERIAL MOUNTING ELECTRICAL CONNECTION COMMUNICATION PORTS SOFTWARE DIAGNOSTIC FEATURE RECORDING /LOGGING	<input checked="" type="checkbox"/> ULTRASONIC – CLAMP ON <input checked="" type="checkbox"/> TWO PATH <input checked="" type="checkbox"/> 2 SETs OF SENSORS <input checked="" type="checkbox"/> Instantaneous Flow Rate <input checked="" type="checkbox"/> Totalized Flow Isolated 4-20 mA DC linear output $\pm 1\%$ of reading $\pm 0.3\%$ of reading 400:1 MIN. 500 OHM <input checked="" type="checkbox"/> YES 2 NO + 2 NC Flow meter with LCD screen backlight based local display and keypad. <input checked="" type="checkbox"/> 230V AC <input checked="" type="checkbox"/> 24 VDC <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES (Volumetric flow) IP-68 (Submersible) <input checked="" type="checkbox"/> SS <input checked="" type="checkbox"/> DIE CAST ALUMINIUM SS Chain or Strap or Welded <input checked="" type="checkbox"/> CABLE GLAND RS 232 C <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES		
PROCESS DATA	RATE OF FLOW (T/HR) UPSTREAM WORKING PRESS (Kg/cm2g) DESIGN PRESS (Kg/cm2g) NORMAL TEMP (Deg C) MAXIMUM TEMP (Deg C) PIPE LOCATION	NORMAL : 3451.2 TPH MAXIMUM : 4487 TPH 3.88 Kg/cm2(g) 7.50 Kg/cm2(g) 36.0 Deg C 60.0 Deg C <input type="checkbox"/> UNDERGROUND <input checked="" type="checkbox"/> OVERGROUND		
PIPE LINE DATA	PIPE SIZE (OD x THK) mm PIPE MATERIAL AVAILABLE PIPE STRAIGHT LENGTH	813 x 8 CARBON STEEL UPSTREAM : 10D DOWNSTREAM : 5D		


	DATA SHEET FOR UTRASONIC FLOW METER 5x800 MW YADADRI TPS		SPEC NO.: PE-TS-417-145-I916	
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Tag No. : 91PAB05BP001 DATA SHEET – A & B				
DATA SHEET – A				DATA SHEET – B (TO BE FILLED BY VENDOR)
GENERAL	PROJECT TAG NO. QUANTITY SERVICE : MAKE : MODEL	5x800 MW YADADRI TPS 91PAB05BP001 TWO (02) TO INLET OF SIDE STREAM FILTRATION HEADER OF STAGE-I Bidder to indicate		
TECHNICAL	TYPE FLOW MEASUREMENT OUTPUT ACCURACY REPEATABILITY RANGEABILITY LOAD RESISTANCE HART COMPATIBILITY CONTACT RELAY OUTPUT DISPLAY/INDICATION OPERATING VOLTAGE TOTALIZING FACILITIES VELOCITY MEASUREMENT FLOW MEASUREMENT PROTECTION CLASS ENCLOSURE MATERIAL MOUNTING ELECTRICAL CONNECTION COMMUNICATION PORTS SOFTWARE DIAGNOSTIC FEATURE RECORDING /LOGGING	<input checked="" type="checkbox"/> ULTRASONIC – CLAMP ON <input checked="" type="checkbox"/> TWO PATH <input checked="" type="checkbox"/> 2 SETs OF SENSORS <input checked="" type="checkbox"/> Instantaneous Flow Rate <input checked="" type="checkbox"/> Totalized Flow Isolated 4-20 mA DC linear output $\pm 1\%$ of reading $\pm 0.3\%$ of reading 400:1 MIN. 500 OHM <input checked="" type="checkbox"/> YES 2 NO + 2 NC Flow meter with LCD screen backlight based local display and keypad. <input checked="" type="checkbox"/> 230V AC <input checked="" type="checkbox"/> 24 VDC <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES (Volumetric flow) IP-68 (Submersible) <input checked="" type="checkbox"/> SS <input checked="" type="checkbox"/> DIE CAST ALUMINIUM SS Chain or Strap or Welded <input checked="" type="checkbox"/> CABLE GLAND RS 232 C <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES		
PROCESS DATA	RATE OF FLOW (T/HR) UPSTREAM WORKING PRESS (Kg/cm2g) DESIGN PRESS (Kg/cm2g) NORMAL TEMP (Deg C) MAXIMUM TEMP (Deg C) PIPE LOCATION	NORMAL : 4800 TPH MAXIMUM : 6240 TPH 2.5 Kg/cm2(g) 5.5 Kg/cm2(g) 33.0 Deg C 60.0 Deg C <input checked="" type="checkbox"/> UNDERGROUND <input type="checkbox"/> OVERGROUND		
PIPE LINE DATA	PIPE SIZE (OD x THK) mm PIPE MATERIAL AVAILABLE PIPE STRAIGHT LENGTH	1016 x 10 CARBON STEEL UPSTREAM : 10D DOWNSTREAM : 5D		

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Tag No. : 91PAB05BP002		DATA SHEET – A & B	
DATA SHEET – A		DATA SHEET – B (TO BE FILLED BY VENDOR)	
GENERAL	PROJECT TAG NO. QUANTITY SERVICE : MAKE : MODEL	5x800 MW YADADRI TPS 91PAB05BP002 ONE (01) TO OUTLET OF SIDE STREAM FILTRATION HEADER OF STAGE- I Bidder to indicate	
TECHNICAL	TYPE FLOW MEASUREMENT OUTPUT ACCURACY REPEATABILITY RANGEABILITY LOAD RESISTANCE HART COMPATIBILITY CONTACT RELAY OUTPUT DISPLAY/INDICATION OPERATING VOLTAGE TOTALIZING FACILITIES VELOCITY MEASUREMENT FLOW MEASUREMENT PROTECTION CLASS ENCLOSURE MATERIAL MOUNTING ELECTRICAL CONNECTION COMMUNICATION PORTS SOFTWARE DIAGNOSTIC FEATURE RECORDING /LOGGING	<input checked="" type="checkbox"/> ULTRASONIC – CLAMP ON <input checked="" type="checkbox"/> TWO PATH <input checked="" type="checkbox"/> 2 SETs OF SENSORS <input checked="" type="checkbox"/> Instantaneous Flow Rate <input checked="" type="checkbox"/> Totalized Flow Isolated 4-20 mA DC linear output $\pm 1\%$ of reading $\pm 0.3\%$ of reading 400:1 MIN. 500 OHM <input checked="" type="checkbox"/> YES 2 NO + 2 NC Flow meter with LCD screen backlight based local display and keypad. <input checked="" type="checkbox"/> 230V AC <input checked="" type="checkbox"/> 24 VDC <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES (Volumetric flow) IP-68 (Submersible) <input checked="" type="checkbox"/> SS <input checked="" type="checkbox"/> DIE CAST ALUMINIUM SS Chain or Strap or Welded <input checked="" type="checkbox"/> CABLE GLAND RS 232 C <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES	
PROCESS DATA	RATE OF FLOW (T/HR) UPSTREAM WORKING PRESS (Kg/cm2g) DESIGN PRESS (Kg/cm2g) NORMAL TEMP (Deg C) MAXIMUM TEMP (Deg C) PIPE LOCATION	NORMAL : 4800 TPH MAXIMUM : 6240 TPH 1.5 Kg/cm2(g) 5.5 Kg/cm2(g) 33.0 Deg C 60.0 Deg C <input type="checkbox"/> UNDERGROUND <input checked="" type="checkbox"/> OVERGROUND	
PIPE LINE DATA	PIPE SIZE (OD x THK) mm PIPE MATERIAL AVAILABLE PIPE STRAIGHT LENGTH	1422 x 14.2 CARBON STEEL UPSTREAM : 10D DOWNSTREAM : 5D	

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Tag No. : 92PAB05BP001 DATA SHEET – A & B			
DATA SHEET – A			DATA SHEET – B (TO BE FILLED BY VENDOR)
GENERAL	PROJECT TAG NO. QUANTITY SERVICE : MAKE : MODEL	5x800 MW YADADRI TPS 92PAB05BP001 ONE (01) TO INLET OF SIDE STREAM FILTERATION HEADER OF STAGE-II Bidder to indicate	
TECHNICAL	TYPE FLOW MEASUREMENT OUTPUT ACCURACY REPEATABILITY RANGEABILITY LOAD RESISTANCE HART COMPATIBILITY CONTACT RELAY OUTPUT DISPLAY/INDICATION OPERATING VOLTAGE TOTALIZING FACILITIES VELOCITY MEASUREMENT FLOW MEASUREMENT PROTECTION CLASS ENCLOSURE MATERIAL MOUNTING ELECTRICAL CONNECTION COMMUNICATION PORTS SOFTWARE DIAGNOSTIC FEATURE RECORDING /LOGGING	<input checked="" type="checkbox"/> ULTRASONIC – CLAMP ON <input checked="" type="checkbox"/> TWO PATH <input checked="" type="checkbox"/> 2 SETs OF SENSORS <input checked="" type="checkbox"/> Instantaneous Flow Rate <input checked="" type="checkbox"/> Totalized Flow Isolated 4-20 mA DC linear output $\pm 1\%$ of reading $\pm 0.3\%$ of reading 400:1 MIN. 500 OHM <input checked="" type="checkbox"/> YES 2 NO + 2 NC Flow meter with LCD screen backlight based local display and keypad. <input checked="" type="checkbox"/> 230V AC <input checked="" type="checkbox"/> 24 VDC <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES (Volumetric flow) IP-68 (Submersible) <input checked="" type="checkbox"/> SS <input checked="" type="checkbox"/> DIE CAST ALUMINIUM SS Chain or Strap or Welded <input checked="" type="checkbox"/> CABLE GLAND RS 232 C <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES	
PROCESS DATA	RATE OF FLOW (T/HR) UPSTREAM WORKING PRESS (Kg/cm2g) DESIGN PRESS (Kg/cm2g) NORMAL TEMP (Deg C) MAXIMUM TEMP (Deg C) PIPE LOCATION	NORMAL : 7200 TPH MAXIMUM : 9360 TPH 2.5 Kg/cm2(g) 5.5 Kg/cm2(g) 33.0 Deg C 60.0 Deg C <input type="checkbox"/> UNDERGROUND <input checked="" type="checkbox"/> OVERGROUND	
PIPE LINE DATA	PIPE SIZE (OD x THK) mm PIPE MATERIAL AVAILABLE PIPE STRAIGHT LENGTH	1219 x 10 CARBON STEEL UPSTREAM : 10D DOWNSTREAM : 5D	

	DATA SHEET FOR ULTRASONIC FLOW METER 5x800 MW YADADRI TPS		SPEC NO.: PE-TS-417-145-I916	
			VOLUME II B	
			SECTION D	
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		SHEET 10	OF	14

Tag No. : 92PAB05BP002		DATA SHEET – A & B	
DATA SHEET – A			DATA SHEET – B (TO BE FILLED BY VENDOR)
GENERAL	PROJECT TAG NO. QUANTITY SERVICE : MAKE : MODEL	5x800 MW YADADRI TPS 92PAB05BP002 ONE (01) TO OUTLET OF SIDE STREAM FILTRATION HEADER OF STAGE- II Bidder to indicate	
TECHNICAL	TYPE FLOW MEASUREMENT OUTPUT ACCURACY REPEATABILITY RANGEABILITY LOAD RESISTANCE HART COMPATIBILITY CONTACT RELAY OUTPUT DISPLAY/INDICATION OPERATING VOLTAGE TOTALIZING FACILITIES VELOCITY MEASUREMENT FLOW MEASUREMENT PROTECTION CLASS ENCLOSURE MATERIAL MOUNTING ELECTRICAL CONNECTION COMMUNICATION PORTS SOFTWARE DIAGNOSTIC FEATURE RECORDING /LOGGING	■ ULTRASONIC – CLAMP ON ■ TWO PATH ■ 2 SETs OF SENSORS ■ Instantaneous Flow Rate ■ Totalized Flow Isolated 4-20 mA DC linear output ± 1% of reading ± 0.3% of reading 400:1 MIN. 500 OHM ■ YES 2 NO + 2 NC Flow meter with LCD screen backlight based local display and keypad. ■ 230V AC ■ 24 VDC ■ YES ■ YES ■ YES (Volumetric flow) IP-68 (Submersible) ■ SS ■ DIE CAST ALUMINIUM SS Chain or Strap or Welded ■ CABLE GLAND RS 232 C ■ YES ■ YES ■ YES	
PROCESS DATA	RATE OF FLOW (T/HR) UPSTREAM WORKING PRESS (Kg/cm2g) DESIGN PRESS (Kg/cm2g) NORMAL TEMP (Deg C) MAXIMUM TEMP (Deg C) PIPE LOCATION	NORMAL : 7200 TPH MAXIMUM : 9360 TPH 1.8 Kg/cm2(g) 5.5 Kg/cm2(g) 33.0 Deg C 60.0 Deg C ■ UNDERGROUND □ OVERGROUND	
PIPE LINE DATA	PIPE SIZE (OD x THK) mm PIPE MATERIAL AVAILABLE PIPE STRAIGHT LENGTH	1625 x 14.2 CARBON STEEL UPSTREAM : 10D DOWNSTREAM : 5D	

	DATA SHEET FOR UTRASONIC FLOW METER 5x800 MW YADADRI TPS		SPEC NO.: PE-TS-417-145-I916	
			VOLUME II B	
			SECTION D	
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Tag No. : 91GAD10BP001		DATA SHEET – A & B	
DATA SHEET – A			DATA SHEET – B (TO BE FILLED BY VENDOR)
GENERAL	PROJECT TAG NO. QUANTITY SERVICE : MAKE : MODEL	5x800 MW YADADRI TPS 91GAD10BP001 TWO (02) RAW WATER DISCHARGE HEADER FOR STAGE-I Bidder to indicate	
TECHNICAL	TYPE FLOW MEASUREMENT OUTPUT ACCURACY REPEATABILITY RANGEABILITY LOAD RESISTANCE HART COMPATIBILITY CONTACT RELAY OUTPUT DISPLAY/INDICATION OPERATING VOLTAGE TOTALIZING FACILITIES VELOCITY MEASUREMENT FLOW MEASUREMENT PROTECTION CLASS ENCLOSURE MATERIAL MOUNTING ELECTRICAL CONNECTION COMMUNICATION PORTS SOFTWARE DIAGNOSTIC FEATURE RECORDING /LOGGING	<input checked="" type="checkbox"/> ULTRASONIC – CLAMP ON <input checked="" type="checkbox"/> TWO PATH <input checked="" type="checkbox"/> 2 SETs OF SENSORS <input checked="" type="checkbox"/> Instantaneous Flow Rate <input checked="" type="checkbox"/> Totalized Flow Isolated 4-20 mA DC linear output $\pm 1\%$ of reading $\pm 0.3\%$ of reading 400:1 MIN. 500 OHM <input checked="" type="checkbox"/> YES 2 NO + 2 NC Flow meter with LCD screen backlight based local display and keypad. <input checked="" type="checkbox"/> 230V AC <input checked="" type="checkbox"/> 24 VDC <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES (Volumetric flow) IP-68 (Submersible) <input checked="" type="checkbox"/> SS <input checked="" type="checkbox"/> DIE CAST ALUMINIUM SS Chain or Strap or Welded <input checked="" type="checkbox"/> CABLE GLAND RS 232 C <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES	
PROCESS DATA	RATE OF FLOW (T/HR) UPSTREAM WORKING PRESS (Kg/cm ² g) DESIGN PRESS (Kg/cm ² g) NORMAL TEMP (Deg C) MAXIMUM TEMP (Deg C) PIPE LOCATION	NORMAL : 8000 TPH MAXIMUM : 10400 TPH 2.8 Kg/cm ² (g) 10 Kg/cm ² (g) 33.0 Deg C 60.0 Deg C <input checked="" type="checkbox"/> UNDERGROUND <input type="checkbox"/> OVERGROUND	
PIPE LINE DATA	PIPE SIZE (OD x THK) mm PIPE MATERIAL AVAILABLE PIPE STRAIGHT LENGTH	1118 x 10 CARBON STEEL UPSTREAM : 10D DOWNSTREAM : 5D	

	DATA SHEET FOR ULTRASONIC FLOW METER 5x800 MW YADADRI TPS		SPEC NO.: PE-TS-417-145-I916		
			VOLUME	II B	
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Tag No. : 92GAD10BP001

DATA SHEET – A & B

DATA SHEET – A			DATA SHEET – B (TO BE FILLED BY VENDOR)
GENERAL	PROJECT TAG NO. QUANTITY SERVICE : MAKE : MODEL	5x800 MW YADADRI TPS 92GAD10BP001 TWO (02) RAW WATER DISCHARGE HEADER FOR STAGE-II Bidder to indicate	
TECHNICAL	TYPE FLOW MEASUREMENT OUTPUT ACCURACY REPEATABILITY RANGEABILITY LOAD RESISTANCE HART COMPATIBILITY CONTACT RELAY OUTPUT DISPLAY/INDICATION OPERATING VOLTAGE TOTALIZING FACILITIES VELOCITY MEASUREMENT FLOW MEASUREMENT PROTECTION CLASS ENCLOSURE MATERIAL MOUNTING ELECTRICAL CONNECTION COMMUNICATION PORTS SOFTWARE DIAGNOSTIC FEATURE RECORDING /LOGGING	<input checked="" type="checkbox"/> ULTRASONIC – CLAMP ON <input checked="" type="checkbox"/> TWO PATH <input checked="" type="checkbox"/> 2 SETs OF SENSORS <input checked="" type="checkbox"/> Instantaneous Flow Rate <input checked="" type="checkbox"/> Totalized Flow Isolated 4-20 mA DC linear output ± 1% of reading ± 0.3% of reading 400:1 MIN. 500 OHM <input checked="" type="checkbox"/> YES 2 NO + 2 NC Flow meter with LCD screen backlight based local display and keypad. <input checked="" type="checkbox"/> 230V AC <input checked="" type="checkbox"/> 24 VDC <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES (Volumetric flow) IP-68 (Submersible) <input checked="" type="checkbox"/> SS <input checked="" type="checkbox"/> DIE CAST ALUMINIUM SS Chain or Strap or Welded <input checked="" type="checkbox"/> CABLE GLAND RS 232 C <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES	
PROCESS DATA	RATE OF FLOW (T/HR) UPSTREAM WORKING PRESS (Kg/cm2g) DESIGN PRESS (Kg/cm2g) NORMAL TEMP (Deg C) MAXIMUM TEMP (Deg C) PIPE LOCATION	NORMAL : 12000 TPH MAXIMUM : 15600 TPH 2.8 Kg/cm2(g) 10 Kg/cm2(g) 33.0 Deg C 60.0 Deg C <input checked="" type="checkbox"/> UNDERGROUND <input type="checkbox"/> OVERGROUND	
PIPE LINE DATA	PIPE SIZE (OD x THK) mm PIPE MATERIAL AVAILABLE PIPE STRAIGHT LENGTH	1422 x 12 CARBON STEEL UPSTREAM : 10D DOWNSTREAM : 5D	


	DATA SHEET FOR ULTRASONIC FLOW METER 5x800 MW YADADRI TPS		SPEC NO.: PE-TS-417-145-I916	
			VOLUME II B	
			SECTION D	
			REV. NO. 00	DATE : 22.03.2022
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Tag No. : 91GAD11BP001		DATA SHEET – A & B	
DATA SHEET – A			DATA SHEET – B (TO BE FILLED BY VENDOR)
GENERAL	PROJECT TAG NO. QUANTITY SERVICE : MAKE : MODEL	5x800 MW YADADRI TPS 92GAD11BP001 ONE (01) ASH WATER DISCHARGE HEADER FOR STAGE-II Bidder to indicate	
TECHNICAL	TYPE FLOW MEASUREMENT OUTPUT ACCURACY REPEATABILITY RANGEABILITY LOAD RESISTANCE HART COMPATIBILITY CONTACT RELAY OUTPUT DISPLAY/INDICATION OPERATING VOLTAGE TOTALIZING FACILITIES VELOCITY MEASUREMENT FLOW MEASUREMENT PROTECTION CLASS ENCLOSURE MATERIAL MOUNTING ELECTRICAL CONNECTION COMMUNICATION PORTS SOFTWARE DIAGNOSTIC FEATURE RECORDING /LOGGING	<input checked="" type="checkbox"/> ULTRASONIC – CLAMP ON <input checked="" type="checkbox"/> TWO PATH <input checked="" type="checkbox"/> 2 SETs OF SENSORS <input checked="" type="checkbox"/> Instantaneous Flow Rate <input checked="" type="checkbox"/> Totalized Flow Isolated 4-20 mA DC linear output $\pm 1\%$ of reading $\pm 0.3\%$ of reading 400:1 MIN. 500 OHM <input checked="" type="checkbox"/> YES 2 NO + 2 NC Flow meter with LCD screen backlight based local display and keypad. <input checked="" type="checkbox"/> 230V AC <input checked="" type="checkbox"/> 24 VDC <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES (Volumetric flow) IP-68 (Submersible) <input checked="" type="checkbox"/> SS <input checked="" type="checkbox"/> DIE CAST ALUMINIUM SS Chain or Strap or Welded <input checked="" type="checkbox"/> CABLE GLAND RS 232 C <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES	
PROCESS DATA	RATE OF FLOW (T/HR) UPSTREAM WORKING PRESS (Kg/cm2g) DESIGN PRESS (Kg/cm2g) NORMAL TEMP (Deg C) MAXIMUM TEMP (Deg C) PIPE LOCATION	NORMAL : 3006 TPH MAXIMUM : 3908 TPH 1.0 Kg/cm2(g) 10 Kg/cm2(g) 33.0 Deg C 60.0 Deg C <input checked="" type="checkbox"/> UNDERGROUND <input type="checkbox"/> OVERGROUND	
PIPE LINE DATA	PIPE SIZE (OD x THK) mm PIPE MATERIAL AVAILABLE PIPE STRAIGHT LENGTH	914 x 10 CARBON STEEL UPSTREAM : 10D DOWNSTREAM : 5D	

	DATA SHEET FOR ULTRASONIC FLOW METER 5x800 MW YADADRI TPS		SPEC NO.: PE-TS-417-145-I916	
			VOLUME II B	
			SECTION D	
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Tag No. : 92PAB10BP001		DATA SHEET – A & B	
DATA SHEET – A			DATA SHEET – B (TO BE FILLED BY VENDOR)
GENERAL	PROJECT TAG NO. QUANTITY SERVICE : MAKE : MODEL	5x800 MW YADADRI TPS 92PAB10BP001 ONE (01) CW MAKE UP DISCHARGE HEADER FOR STAGE-II Bidder to indicate	
TECHNICAL	TYPE FLOW MEASUREMENT OUTPUT ACCURACY REPEATABILITY RANGEABILITY LOAD RESISTANCE HART COMPATIBILITY CONTACT RELAY OUTPUT DISPLAY/INDICATION OPERATING VOLTAGE TOTALIZING FACILITIES VELOCITY MEASUREMENT FLOW MEASUREMENT PROTECTION CLASS ENCLOSURE MATERIAL MOUNTING ELECTRICAL CONNECTION COMMUNICATION PORTS SOFTWARE DIAGNOSTIC FEATURE RECORDING /LOGGING	<input checked="" type="checkbox"/> ULTRASONIC – CLAMP ON <input checked="" type="checkbox"/> TWO PATH <input checked="" type="checkbox"/> 2 SETs OF SENSORS <input checked="" type="checkbox"/> Instantaneous Flow Rate <input checked="" type="checkbox"/> Totalized Flow Isolated 4-20 mA DC linear output $\pm 1\%$ of reading $\pm 0.3\%$ of reading 400:1 MIN. 500 OHM <input checked="" type="checkbox"/> YES 2 NO + 2 NC Flow meter with LCD screen backlight based local display and keypad. <input checked="" type="checkbox"/> 230V AC <input checked="" type="checkbox"/> 24 VDC <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES (Volumetric flow) IP-68 (Submersible) <input checked="" type="checkbox"/> SS <input checked="" type="checkbox"/> DIE CAST ALUMINIUM SS Chain or Strap or Welded <input checked="" type="checkbox"/> CABLE GLAND RS 232 C <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> YES	
PROCESS DATA	RATE OF FLOW (T/HR) UPSTREAM WORKING PRESS (Kg/cm2g) DESIGN PRESS (Kg/cm2g) NORMAL TEMP (Deg C) MAXIMUM TEMP (Deg C) PIPE LOCATION	NORMAL : 5043 TPH MAXIMUM : 6556 TPH 0.5 Kg/cm2(g) 10 Kg/cm2(g) 33.0 Deg C 60.0 Deg C <input checked="" type="checkbox"/> UNDERGROUND <input type="checkbox"/> OVERGROUND	
PIPE LINE DATA	PIPE SIZE (OD x THK) mm PIPE MATERIAL AVAILABLE PIPE STRAIGHT LENGTH	914 x 10.0 CARBON STEEL UPSTREAM : 10D DOWNSTREAM : 5D	

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	<p>Technical specification for Ultrasonic Flow meters</p> <p>5X800MW STPP Yadadri</p>	SPEC NO.: PE-TS-417-145-I916	
		DOCUMENT NO	
		VOLUME	II B
		SECTION	C
		ISSUE NO	
		REV. NO.	00
		DATE : 21.03.2022	

SECTION – C


QUALITY PLAN

<div><div>QUALITY PLAN FOR ULTRASONIC FLOWMETER</div></div> <div>PEM :: C&I</div>										QUALITY PLAN NO.: PE-VO-417-145-I918			
										VOLUME IIB			
										SECTION D			
										REV. NO. 01		DATE: 08.05.19	
										SHEET 2		OF 2	
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 (Degree of Protection, Material & Accessories)	Certificate of Compliance, Warranty Certificate,	Major V	Visual	As applicable	Technical documents/Approved documents	Technical catalogue/Approved documents	Technical catalogue/Approved documents	S/ M	S/ M	B, C	
2	Visual Check (Dimension, Finish, Make, Model No., Serial No., Tag Details, Cable Entry Check)	Mechanical Major		Visual	100%	Technical catalogue/Approved documents	Technical catalogue/Approved documents	Technical catalogue/Approved documents	S/ M	M, B	B, C	
3	Functional test & power ON & CALIBRATION TEST	Electrical Major		Visual	100%	Functional test report for meter & transducer	Approved documents	Technical catalogue/Approved documents	S/ M	M, B	B, C	
4	HART Communication	Electrical	Major	---	100%	Technical catalogue/Approved documents	Technical catalogue/Approved documents	Technical catalogue/Approved documents	S/ M	M, B	B, C	

Reference document no. is PE-V0-417-145-I902 (DATA SHEET, CALCULATION, BOQ/BOM & GA DRAWING for Ultrasonic Flow Meter)

LEGEND:	^{\$} P - Agency Performing the Test. W - Agency Witnessing the Test. V - Agency Verifying the Test.	B - BHEL M - Manufacturer S - Sub-vendor	C - TSGENCO / TSGENCO TPIA
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	<p>Technical specification for ULTRASONIC FLOW METERS 1 X 660 MW BHUSAWAL STPP, UNIT-6</p>	SPEC NO.: PE-TS-415-145-I916
		DOCUMENT NO.
		VOLUME II B
		SECTION C
		REV. NO. 00

SECTION – C

BOQ


5 X 800MW STPP YADADRI						
BOQ FOR ULTRASONIC FLOW TRANSMITTER						
[A] COMPLETE ULTRASONIC FLOW TRANSMITTER ASSEMBLIES :						
S. No.	TAG NO.	SERVICE	MEDIUM	QTY for Station	Line size	Pipe Material
1	PAB10BP001	CW SUPPLY HEADER TO CONDENSER	CW	7	3980 x 22.0	CARBON STEEL
2	PCB61BP001	CW BLOWDOWN HEADER	CW	6	219.1 x 6.0	CARBON STEEL
3	PCB10BP001	ACW HEADER	ACW	7	813 x 8.0	CARBON STEEL
4	91PAB05BP001	TO INLET OF SIDE STREAM FILTRATION HEADER OF STAGE-I	CW	2	1016 x 10	CARBON STEEL
5	91PAB05BP002	TO OUTLET OF SIDE STREAM FILTRATION HEADER OF STAGE-I	CW	1	1422 x 14.2	CARBON STEEL
6	92PAB05BP001	TO INLET OF SIDE STREAM FILTRATION HEADER OF STAGE-II	CW	1	1219 x 10	CARBON STEEL
7	92PAB05BP002	TO OUTLET OF SIDE STREAM FILTRATION HEADER OF STAGE-II	CW	1	1625 x 14.2	CARBON STEEL
8	91GAD10BP001	RAW WATER DISCH HDR FLOW ST-I	RAW WTR	2	1118 X 10.0	CARBON STEEL
9	92GAD10BP001	RAW WATER DISCH HDR FLOW ST-II	RAW WTR	2	1422 x 12.0	CARBON STEEL
10	92GAD11BP001	ASH WATER PUMP DISCHARGE FLOW ST-II	ASH WTR	1	914 x 10.0	CARBON STEEL
11	92PAB10BP001	CW MAKE UP PUMPS DISCH HDR FLOW ST-II	CW M/U WTR	1	914 x 10.0	CARBON STEEL
TOTAL QUANTITY FOR STATION				31		
[B] SERVICES :						
1	Charges of Supervision of Erection & Commissioning at site (Including lodging & boarding, Local Conveyence at site) per Manday (Excluding Travel Time)			31		
2	Lump sum price for travel (Per Visit) including ticket ,Visa/ Insurance (as applicable), intermediary stay Including travel time			6		

755619/2022/PS-PEM-C I

	<p>Technical specification for Ultrasonic Flow meters</p> <p>5X800MW STPP Yadadri</p>	SPEC NO.: PE-TS-417-145-I916	
		DOCUMENT NO	
		VOLUME	II B
		SECTION	D
		ISSUE NO	
		REV. NO.	00
		DATE : 21.03.2022	

SECTION – D

EQUIPMENT SPECIFICATION

	TECHNICAL SPECIFICATION FOR ULTRASONIC FLOW METER	SPEC NO.: PE-SS-999-145-I027	
		VOLUME	II B
		SECTION	D
		REV. NO.	00
		SHEET	1 OF 4

1.0 SCOPE

This specification covers the Design, Manufacture, 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 0-60°C and Relative Humidity of 0-95% unless specified otherwise in volume IIB Section-B or Section-C though not specifically asked for.

All accessories required for mounting/erection of these instruments shall be furnished as necessary for completeness of the system though not specifically asked for. Also the equipment shall include necessary cables, flexible conduits, junction boxes required for the purpose.


Flow meters shall be provided with suitable environment protection devices/structures such that they shall be suitable for continuous operation in the operating environment of a coal fired utility station without any loss of function or departure from the specifications requirements.

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. Clamp-on transducers are clamped onto the outside of the pipe and never come into contact with the process fluid. HART Compatibility for the transmitter shall be provided.

3.2 Accessories:

All mounting hardware like clamping fixtures, mechanism to remove the sensors on line, interconnecting cables 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.

	TECHNICAL SPECIFICATION FOR ULTRASONIC FLOW METER	SPEC NO.: PE-SS-999-145-I027	
		VOLUME	II B
		SECTION	D
		REV. NO.	00
		SHEET	2 OF 4

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.

5.3 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 along with 2 CDs after award of contract for owner approval:

- Technical data sheet for each UFM & accessories in the pro forma enclosed under Data Sheet-B.
- Assembly drawing of each type of flow UFM complete with all accessories indicating detailed dimensions, B.O.M. and weights.
- Installation drawings for the flow elements.
- Quality Plan duly signed and stamped.



TECHNICAL SPECIFICATION FOR ULTRASONIC FLOW METER

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

VOLUME II B

SECTION D

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SHEET 3 OF 4

v. Calculation Sheet.

7.2 For Information

- i. Storage and Commissioning Instruction
- ii. All relevant catalogues for the models of the UFM as well as accessories finalized.
- iii. O&M manuals

7.3 Final documentation for a project specific contract:

Final documentation shall contain 10 sets with 2 CDROMS of each of the following:

- i. Verified test certificates.
- ii. Approved Quality Plan
- iii. Calibrations Reports
- iv. Quality Inspection Report
- v. Operation & Maintenance Manuals for Flow Element Assemblies and all the accessories (Containing storage & commissioning instructions).

8.0 PACKING & MARKING

8.1 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.

8.2 Each assembly shall be identified with the following information.

- Tag No.
- Service.
- Line size & thickness.
- Direction of flow.

9.0 APPLICABLE DATA SHEETS

This document shall be read in conjunction with Data Sheet - A & B.