255050/2021/PS-PEM-C_I

BHEL	**PRE-QUALIFICATION REQUIREMENTS**	PE-PQ-426-145-I001 REVISION NO. 01 DATE 02.03.2021 SHEET NO. 1 OF 1

ENQUIRY NO: (To be filled by PG)

PROJECT: 1X 660 MW PANKI TPS

PACKAGE: **ULTRASONIC FLOW METER**

1.0	
a.	Bidder should be Original equipment manufacturer (OEM) for ULTRASONIC FLOW METER.
b.	In case bidder is not OEM, evaluation shall be done as following: 1. If bidder happens to be Indian subsidiaries of foreign OEM, then the credentials of the foreign OEM can also be considered for meeting PQR. 2. If bidder happens to be Authorized channel partner or having a valid collaboration agreement / licensing agreement with some other company or being a Joint Venture Company, then the credentials of collaborator / licensing company / Principal company /JV partner can also be considered for meeting PQR as per scope of the work. If bidder(s) qualifies on the basis of credentials of his principal/JV partner/Collaborator etc., then the principal/JV partner/Collaborator shall be responsible for overall design vetting and warranty/guarantee of the package. The scope matrix indicating respective roles including design vetting, manufacturing of critical component and warranty/guarantee, shall be furnished by bidder.
2.0	The Product being offered by the Bidder shall have at least one year's satisfactory operation prior to 02.11.2015 in one power station, having unit rating of 500 MW or above. Copy of minimum **1 (One)** Performance Certificate from end user / customer specifying that product has been in service successfully for **1 (One)** year from date of commissioning (on or before 02.11.2014). The certificate should clearly indicate date of commissioning, date of issue of certificate and name/designation of the certificate issuer. Copy of purchase order & technical parameter to be attached along with the performance certificate.
3.0	Supplier to furnish experience list of last 5 years indicating customer name, purchase order reference, item supplied & year of supply to establish the continuity of business.
4.0	Documents to be submitted by bidder in English. If documents submitted by bidder are in language other than English, a self-attested English Translated document should also be submitted.
5.0	Notwithstanding anything stated above, BHEL reserves the right to assess the capabilities and capacity of the bidders/collaborators to perform the contract, should the circumstances warrant such assessment in the overall interest of BHEL.

PREPARED BY	REVIEWED BY	APPROVED BY
3/3/21	03/03/21 03.03.2021	3/3/21
NEHA JAIN Deputy Manager-C&I	SACHIN SRIVASTAVA / S S BANSALA Sr. Manager/ DGM C&I	DIPESH PALIT DH-C&I

UTTAR PRADESH RAJYA VIDYUT NIGAM LTD

1X660 MW PANKI TPS

TECHNICAL SPECIFICATION
FOR
ULTRASONIC FLOWMETER

VOLUME II-B
(SECTION-A,C &D)

SPECIFICATION No: PE-TS-426-145-I916

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

CONTENTS

VOL-IIB

	TECHNICAL SPECIFICATION **FOR** **ULTRASONIC FLOWMETER** **1X 660 MW PANKI TPS**	SPEC NO.: **PE-TS-426-145-I916** VOLUME II B SECTION A

SECTION – A

SCOPE OF ENQUIRY

	TECHNICAL SPECIFICATION FOR ULTRASONIC FLOWMETER 1X 660 MW PANKI TPS	SPEC NO.: **PE-TS-426-145-I916** VOLUME II B SECTION A

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 1X660 MW PANKI 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)Unpriced schedule of prices

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 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 representative 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 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.

SECTION-C

1)SPECIAL TECHNICAL REQUIREMENT
2)CUSTOMER SPECIFICATION
3)DATASHEET A & B
4)QUALITY PLAN
5)BOQ-MAIN SUPPLY

	TECHNICAL SPECIFICATION FOR ULTRASONIC FLOW METER 1 X 660 MW PANKI TPS	SPEC NO.: PE-TS-426-145-I916
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		SECTION C

SECTION-C

SPECIAL TECHNICAL REQUIREMENTS

	TECHNICAL SPECIFICATION FOR ULTRASONIC FLOWMETER	SPEC NO.: **PE-TS-426-145-I916**
		VOLUME II B
	1X660 MW PANKI TPS	SECTION C

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 and Unpriced format enclosed in Section-C of Volume IIB, to be signed and stamped and submitted with the bid.

2.0 Bidder Presence is required for 4 days 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**

a) Duly filled, signed and stamped datasheet- A & B attached in Section-C of this Specification
b) Signed and stamped Unpriced format
c) Signed and stamped QP in BHEL's format attached in Section-C of this Specification
d) Documents pertaining to PQR

(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.

	TECHNICAL SPECIFICATION FOR ULTRASONIC FLOW METER 1 X 660 MW PANKI TPS	SPEC NO.: PE-TS-426-145-I916
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		SECTION C

SECTION-C

Customer Specifications

2.12.05 DUAL PATH TRANSIT TIME CLAMP-ON ULTRASONIC FLOW METER

The flow meters shall be of proven reliability, accuracy and repeatability requiring a minimum of maintenance. They shall comply with relevant international standards and shall be subject to owner's approval.

All accessories required for mounting/erection of this instrument shall be furnished, erected and installed 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 specification requirements.

TECHNICAL REQUIREMENTS

Type	Transit time Clamp On Ultrasonic meter
Mounting Style	Dual path with two sets of transducers on the same pipe
Flow measurement	Instantaneous Flow rate as well as totalized flow
Power supply	230 V AC from UPS.
Outputs: Analog Current Binary Communication ports	 Isolated 4-20mA linear outputs for each path Contact relay outputs, 2 NO + 2 NC for alarm RS 232 C digital Hand held terminal port
Display/Indication	Flow meter with LCD screen backlight based local display and keypad If required, transmitter shall be suitably located away from the sensor for better access and visibility.
Recording / Totalizing/Logging Facilities	Yes. Should be able to compute cumulative flow over intervals selectable by owner i.e., daily, weekly, monthly etc. The data shall be stored in the memory of flow computer for access in future
Software features	Compensation for any cross path errors. Programming, configuration, shall be possible from front panel.
Diagnostics	False signal tolerance , power supply failure etc
Protection class	IP-65 'or better, Weather protection against direct sunlight, rain etc for Flow .' meter and suitable for Cooling water for Transducer
Accuracy	+/- 1%
Electrical connection	Plug and socket
Pipe location	Underground
Accessories	All mounting hardware required like clamping fixtures, mechanism to remove the transducers online, interconnecting cables etc All weather canopy for protection from direct sunlight and direct rain. Material of all fittings shall be SS 316.

	TECHNICAL SPECIFICATION FOR ULTRASONIC FLOW METER 1 X 660 MW PANKI TPS	SPEC NO.: PE-TS-426-145-I916
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SECTION-C

DATA SHEETS - A&B

INDEX

Sl no.	Service Description	KKS number	ASSEMBLY TYPE	UNIT OF MEASUREMENT	Total Quantity
1	CWP DISCH HEADER TO CONDENSER	10PAB11BP001	UFT	NOS.	1
2	CW RETURN HEADER TO FOREBAY	10PAB30BP001	UFT	NOS.	1
3	ACWP DISCH HEADER LINE	10PAB50BP001	UFT	NOS.	1
4	RAW WATER INTAKE PUMP DISCHARGE HEADER LINE	10GAD10CF011	UFT	NOS.	1
5	AHP MAKE-UP PUMP DISCHARGE HEADER LINE	10GAD24CF01	UFT	NOS.	1
6	RAW WATER PUMP DISCHARGE HEADER LINE	10GAD28CF011	UFT	NOS.	1

FORM NO. PEM-6666-0

BHEL	**DATA SHEET FOR UTRASONIC FLOW TRANSMITTER 1 x 660 MW PANKI TPS**	SPEC NO.: PE-TS-426-145-I916

Tag No.: 10PAB11BP001

DATA SHEET – A & B

DATA SHEET – A			DATA SHEET – B (TO BE FILLED BY VENDOR)
GENERAL	PROJECT	**1 X 660 MW PANKI TPS**	
	TAG NO.	10PAB11BP001	
	QUANTITY	ONE (01)	
	SERVICE:	CWP DISCH HDR TO CONDENSER	
	MAKE : MODEL	Bidder to indicate	
TECHNICAL	TYPE	■ TRANSIT TIME CLAMP-ON ■ 2 PAIRS/SETS OF TRANS-RECEIVERS (DUAL PATH WITH 2 SETS OF TRANSDUCER)	
	FLOW MEASUREMENT	■Instantaneous Flow Rate ■ Totalized Flow ■ Velocity	
	OUTPUT	Isolated 4-20 mA DC linear output for each path	
	ACCURACY	± 1.0 %	
	REPEATABILITY	±0.2% of calibration span	
	RANGEABILITY	400:1	
	LOAD RESISTANCE	MIN. 500 OHM	
	CONTACT RELAY OUTPUT	2 NO + 2 NC	
	DISPLAY/INDICATION	Flow meter with LCD screen backlight based local display & keypad.	
	OPERATING VOLTAGE	■ 230V AC	
	PROTECTION CLASS	IP-65 or better for both Transmitter & Sensors	
	ENCLOSURE MATERIAL	■ COMPATIBLE FOR COASTAL AREA	
	MOUNTING	SS316 Chain or Strap Including Fittings	
	ELECTRICAL CONNECTION	■ PLUG-IN SOCKET	
	COMMUNICATION PORTS	1)RS 232 C digital.2) Hand held terminal Port	
	SOFTWARE	1)Compensation for any cross path errors. 2)Programming and Configuration from front panel	
	DIAGNOSTIC FEATURE	1) False signal Tolerance 2) Power supply failure	
	RECORDING /LOGGING	■ YES, should be able to compute cumulative flow over intervals selectable by owner. The data shall be stored in the memory of digital computer for access in future.	
	SEA WORTHY PACKING	■ YES	
PROCESS DATA	RATE OF FLOW (T/HR)	NORMAL : 83300 TPH MAXIMUM: 100000 TPH	
	UPSTREAM WORKING PRESS (Kg/cm2g)	2.6 Kg/cm2(g)	
	DESIGN PRESS (Kg/cm2g)	6.0 Kg/cm2(g)	
	NORMAL TEMP (Deg C)	33.0 Deg C	
	MAXIMUM TEMP (Deg C)	60.0 Deg C	
	PIPE LOCATION	■ UNDERGROUND ☐ OVERGROUND	
PIPE LINE DATA	PIPE SIZE (OD x THK) mm	3840 x 14	
	PIPE MATERIAL	CARBON STEEL AS PER IS-2062 Gr. B ROLLED AND BUTT WELDED CONFIRIMNG TO IS:3589 Gr. 410	
	AVAILABLE PIPE STRAIGHT LENGTH	UPSTREAM : 10D DOWNSTREAM : 5D	

FORM NO. PEM-6666-0

BHEL	**DATA SHEET FOR UTRASONIC FLOW TRANSMITTER 1 x 660 MW PANKI TPS**	SPEC NO.: PE-TS-426-145-I916

Tag No.: 10PAB30BP001

DATA SHEET – A & B

DATA SHEET – A			DATA SHEET – B (TO BE FILLED BY VENDOR)
GENERAL	PROJECT	**1 X 660 MW PANKI TPS**	
	TAG NO.	10PAB30BP001	
	QUANTITY	ONE (01)	
	SERVICE:	CW RETURN HEADER TO COOLING TOWER	
	MAKE : MODEL	Bidder to indicate	
TECHNICAL	TYPE	■ TRANSIT TIME CLAMP-ON ■ 2 PAIRS/SETS OF TRANS-RECEIVERS (DUAL PATH WITH 2 SETS OF TRANSDUCER)	
	FLOW MEASUREMENT	■Instantaneous Flow Rate ■ Totalized Flow ■ Velocity	
	OUTPUT	Isolated 4-20 mA DC linear output for each path	
	ACCURACY	± 1.0 %	
	REPEATABILITY	±0.2% of calibration span	
	RANGEABILITY	400:1	
	LOAD RESISTANCE	MIN. 500 OHM	
	CONTACT RELAY OUTPUT	2 NO + 2 NC	
	DISPLAY/INDICATION	Flow meter with LCD screen backlight based local display & keypad.	
	OPERATING VOLTAGE	■ 230V AC	
	PROTECTION CLASS	IP-65 or better for both Transmitter & Sensors	
	ENCLOSURE MATERIAL	■ COMPATIBLE FOR COASTAL AREA	
	MOUNTING	SS316 Chain or Strap Including Fittings	
	ELECTRICAL CONNECTION	■ PLUG-IN SOCKET	
	COMMUNICATION PORTS	1)RS 232 C digital.2) Hand held terminal Port	
	SOFTWARE	1)Compensation for any cross path errors. 2)Programming and Configuration from front panel	
	DIAGNOSTIC FEATURE	1) False signal Tolerance 2) Power supply failure	
	RECORDING /LOGGING	■ YES, should be able to compute cumulative flow over intervals selectable by owner. The data shall be stored in the memory of digital computer for access in future.	
	SEA WORTHY PACKING	■ YES	
PROCESS DATA	RATE OF FLOW (T/HR)	NORMAL : 89125 TPH MAXIMUM: 107860 TPH	
	UPSTREAM WORKING PRESS (Kg/cm2g)	1.9 Kg/cm2(g)	
	DESIGN PRESS (Kg/cm2g)	6.0 Kg/cm2(g)	
	NORMAL TEMP (Deg C)	40.5 Deg C	
	MAXIMUM TEMP (Deg C)	60.0 Deg C	
	PIPE LOCATION	■ UNDERGROUND ☐ OVERGROUND	
PIPE LINE DATA	PIPE SIZE (OD x THK) mm	3840 x 14	
	PIPE MATERIAL	CARBON STEEL AS PER IS-2062 Gr. B ROLLED AND BUTT WELDED CONFIRIMNG TO IS:3589 Gr. 410	
	AVAILABLE PIPE STRAIGHT LENGTH	UPSTREAM : 10D DOWNSTREAM : 5D	

FORM NO. PEM-6666-0

BHEL	**DATA SHEET FOR UTRASONIC FLOW TRANSMITTER 1 x 660 MW PANKI TPS**	SPEC NO.: PE-TS-426-145-I916

Tag No.: 10PAB50BP001

DATA SHEET – A & B

DATA SHEET – A			DATA SHEET – B (TO BE FILLED BY VENDOR)
GENERAL	PROJECT	**1 X 660 MW PANKI TPS**	
	TAG NO.	10PAB50BP001	
	QUANTITY	ONE (01)	
	SERVICE:	ACWP DISCHARGE HEADER	
	MAKE : MODEL	Bidder to indicate	
TECHNICAL	TYPE	■ TRANSIT TIME CLAMP-ON ■ 2 PAIRS/SETS OF TRANS-RECEIVERS (DUAL PATH WITH 2 SETS OF TRANSDUCER)	
	FLOW MEASUREMENT	■Instantaneous Flow Rate ■ Totalized Flow ■ Velocity	
	OUTPUT	Isolated 4-20 mA DC linear output for each path	
	ACCURACY	± 1.0 %	
	REPEATABILITY	±0.2% of calibration span	
	RANGEABILITY	400:1	
	LOAD RESISTANCE	MIN. 500 OHM	
	CONTACT RELAY OUTPUT	2 NO + 2 NC	
	DISPLAY/INDICATION	Flow meter with LCD screen backlight based local display & keypad.	
	OPERATING VOLTAGE	■ 230V AC	
	PROTECTION CLASS	IP-65 or better for both Transmitter & Sensors	
	ENCLOSURE MATERIAL	■ COMPATIBLE FOR COASTAL AREA	
	MOUNTING	SS316 Chain or Strap Including Fittings	
	ELECTRICAL CONNECTION	■ PLUG-IN SOCKET	
	COMMUNICATION PORTS	1)RS 232 C digital.2) Hand held terminal Port	
	SOFTWARE	1)Compensation for any cross path errors. 2)Programming and Configuration from front panel	
	DIAGNOSTIC FEATURE	1) False signal Tolerance 2) Power supply failure	
	RECORDING /LOGGING	■ YES, should be able to compute cumulative flow over intervals selectable by owner. The data shall be stored in the memory of digital computer for access in future.	
	SEA WORTHY PACKING	■ YES	
PROCESS DATA	RATE OF FLOW (T/HR)	NORMAL : 6075 TPH MAXIMUM: 7900 TPH	
	UPSTREAM WORKING PRESS (Kg/cm2g)	3.7 Kg/cm2(g)	
	DESIGN PRESS (Kg/cm2g)	7.5 Kg/cm2(g)	
	NORMAL TEMP (Deg C)	36.0 Deg C	
	MAXIMUM TEMP (Deg C)	60.0 Deg C	
	PIPE LOCATION	■UNDERGROUND ☐OVERGROUND	
PIPE LINE DATA	PIPE SIZE (OD x THK) mm	1118 x 10	
	PIPE MATERIAL	CARBON STEEL AS PER IS-2062 Gr. B ROLLED AND BUTT WELDED CONFIRIMNG TO IS:3589 Gr. 410	
	AVAILABLE PIPE STRAIGHT LENGTH	UPSTREAM : 10D DOWNSTREAM : 5D	

FORM NO. PEM-6666-0

BHEL	**DATA SHEET FOR UTRASONIC FLOW TRANSMITTER 1 x 660 MW PANKI TPS**	SPEC NO.: PE-TS-426-145-I916

Tag No.: 10GAD10CF011

DATA SHEET – A & B

DATA SHEET – A			DATA SHEET – B (TO BE FILLED BY VENDOR)
GENERAL	PROJECT	**1 X 660 MW PANKI TPS**	
	TAG NO.	10GAD10CF011	
	QUANTITY	ONE (01)	
	SERVICE:	RAW WATER INTAKE PUMP DISCHARGE HEADER	
	MAKE : MODEL	Bidder to indicate	
TECHNICAL	TYPE	■ TRANSIT TIME CLAMP-ON ■ 2 PAIRS/SETS OF TRANS-RECEIVERS (DUAL PATH WITH 2 SETS OF TRANSDUCER)	
	FLOW MEASUREMENT	■Instantaneous Flow Rate ■ Totalized Flow ■ Velocity	
	OUTPUT	Isolated 4-20 mA DC linear output for each path	
	ACCURACY	± 1.0 %	
	REPEATABILITY	±0.2% of calibration span	
	RANGEABILITY	400:1	
	LOAD RESISTANCE	MIN. 500 OHM	
	CONTACT RELAY OUTPUT	2 NO + 2 NC	
	DISPLAY/INDICATION	Flow meter with LCD screen backlight based local display & keypad.	
	OPERATING VOLTAGE	■ 230V AC	
	PROTECTION CLASS	IP-65 or better for both Transmitter & Sensors	
	ENCLOSURE MATERIAL	■ COMPATIBLE FOR COASTAL AREA	
	MOUNTING	SS316 Chain or Strap Including Fittings	
	ELECTRICAL CONNECTION	■ PLUG-IN SOCKET	
	COMMUNICATION PORTS	1)RS 232 C digital.2) Hand held terminal Port	
	SOFTWARE	1)Compensation for any cross path errors. 2)Programming and Configuration from front panel	
	DIAGNOSTIC FEATURE	1) False signal Tolerance 2) Power supply failure	
	RECORDING /LOGGING	■ YES, should be able to compute cumulative flow over intervals selectable by owner. The data shall be stored in the memory of digital computer for access in future.	
	SEA WORTHY PACKING	■ YES	
PROCESS DATA	RATE OF FLOW (T/HR)	NORMAL : 2850 TPH MAXIMUM: 3705 TPH	
	UPSTREAM WORKING PRESS (Kg/cm2g)	1.8 Kg/cm2(g)	
	DESIGN PRESS (Kg/cm2g)	10.0 Kg/cm2(g)	
	NORMAL TEMP (Deg C)	33.0 Deg C	
	MAXIMUM TEMP (Deg C)	60.0 Deg C	
	PIPE LOCATION	■ UNDERGROUND ☐OVERGROUND	
PIPE LINE DATA	PIPE SIZE (OD x THK) mm	711 x 8	
	PIPE MATERIAL	CARBON STEEL AS PER IS-2062 Gr. B ROLLED AND BUTT WELDED CONFIRIMNG TO IS:3589 Gr. 410	
	AVAILABLE PIPE STRAIGHT LENGTH	UPSTREAM : 10D DOWNSTREAM : 5D	

FORM NO. PEM-6666-0

BHEL	**DATA SHEET FOR UTRASONIC FLOW TRANSMITTER 1 x 660 MW PANKI TPS**	SPEC NO.: PE-TS-426-145-I916

Tag No.: 10GAD24CF011

DATA SHEET – A & B

DATA SHEET – A			DATA SHEET – B (TO BE FILLED BY VENDOR)
GENERAL	PROJECT	**1 X 660 MW PANKI TPS**	
	TAG NO.	10GAD24CF011	
	QUANTITY	ONE (01)	
	SERVICE:	AHP MAKE-UP PUMP DISCHARGE HEADER	
	MAKE : MODEL	Bidder to indicate	
TECHNICAL	TYPE	■ TRANSIT TIME CLAMP-ON ■ 2 PAIRS/SETS OF TRANS-RECEIVERS (DUAL PATH WITH 2 SETS OF TRANSDUCER)	
	FLOW MEASUREMENT	■Instantaneous Flow Rate ■ Totalized Flow ■ Velocity	
	OUTPUT	Isolated 4-20 mA DC linear output for each path	
	ACCURACY	± 1.0 %	
	REPEATABILITY	±0.2% of calibration span	
	RANGEABILITY	400:1	
	LOAD RESISTANCE	MIN. 500 OHM	
	CONTACT RELAY OUTPUT	2 NO + 2 NC	
	DISPLAY/INDICATION	Flow meter with LCD screen backlight based local display & keypad.	
	OPERATING VOLTAGE	■ 230V AC	
	PROTECTION CLASS	IP-65 or better for both Transmitter & Sensors	
	ENCLOSURE MATERIAL	■ COMPATIBLE FOR COASTAL AREA	
	MOUNTING	SS316 Chain or Strap Including Fittings	
	ELECTRICAL CONNECTION	■ PLUG-IN SOCKET	
	COMMUNICATION PORTS	1)RS 232 C digital.2) Hand held terminal Port	
	SOFTWARE	1)Compensation for any cross path errors. 2)Programming and Configuration from front panel	
	DIAGNOSTIC FEATURE	1) False signal Tolerance 2) Power supply failure	
	RECORDING /LOGGING	■ YES, should be able to compute cumulative flow over intervals selectable by owner. The data shall be stored in the memory of digital computer for access in future.	
	SEA WORTHY PACKING	■ YES	
PROCESS DATA	RATE OF FLOW (T/HR)	NORMAL : 1750 TPH MAXIMUM: 2275 TPH	
	UPSTREAM WORKING PRESS (Kg/cm2g)	3.3 Kg/cm2(g)	
	DESIGN PRESS (Kg/cm2g)	10.0 Kg/cm2(g)	
	NORMAL TEMP (Deg C)	33.0 Deg C	
	MAXIMUM TEMP (Deg C)	60.0 Deg C	
	PIPE LOCATION	■ UNDERGROUND ☐ OVERGROUND	
PIPE LINE DATA	PIPE SIZE (OD x THK) mm	610 x 8	
	PIPE MATERIAL	CARBON STEEL AS PER IS-2062 Gr. B ROLLED AND BUTT WELDED CONFIRIMNG TO IS:3589 Gr. 410	
	AVAILABLE PIPE STRAIGHT LENGTH	UPSTREAM : 10D DOWNSTREAM : 5D	

FORM NO. PEM-6666-0

BHEL	**DATA SHEET FOR UTRASONIC FLOW TRANSMITTER 1 x 660 MW PANKI TPS**	SPEC NO.: PE-TS-426-145-I916

Tag No.: 10GAD28CF011

DATA SHEET – A & B

DATA SHEET – A			DATA SHEET – B (TO BE FILLED BY VENDOR)
GENERAL	PROJECT	**1 X 660 MW PANKI TPS**	
	TAG NO.	10GAD28CF011	
	QUANTITY	ONE (01)	
	SERVICE:	RAW WATER PUMP DISCHARGE HEADER	
	MAKE : MODEL	Bidder to indicate	
TECHNICAL	TYPE	■ TRANSIT TIME CLAMP-ON ■ 2 PAIRS/SETS OF TRANS-RECEIVERS (DUAL PATH WITH 2 SETS OF TRANSDUCER)	
	FLOW MEASUREMENT	■Instantaneous Flow Rate ■ Totalized Flow ■ Velocity	
	OUTPUT	Isolated 4-20 mA DC linear output for each path	
	ACCURACY	± 1.0 %	
	REPEATABILITY	±0.2% of calibration span	
	RANGEABILITY	400:1	
	LOAD RESISTANCE	MIN. 500 OHM	
	CONTACT RELAY OUTPUT	2 NO + 2 NC	
	DISPLAY/INDICATION	Flow meter with LCD screen backlight based local display & keypad.	
	OPERATING VOLTAGE	■ 230V AC	
	PROTECTION CLASS	IP-65 or better for both Transmitter & Sensors	
	ENCLOSURE MATERIAL	■ COMPATIBLE FOR COASTAL AREA	
	MOUNTING	SS316 Chain or Strap Including Fittings	
	ELECTRICAL CONNECTION	■ PLUG-IN SOCKET	
	COMMUNICATION PORTS	1)RS 232 C digital.2) Hand held terminal Port	
	SOFTWARE	1)Compensation for any cross path errors. 2)Programming and Configuration from front panel	
	DIAGNOSTIC FEATURE	1) False signal Tolerance 2) Power supply failure	
	RECORDING /LOGGING	■ YES, should be able to compute cumulative flow over intervals selectable by owner. The data shall be stored in the memory of digital computer for access in future.	
	SEA WORTHY PACKING	■ YES	
PROCESS DATA	RATE OF FLOW (T/HR)	NORMAL : 1975 TPH MAXIMUM: 2570 TPH	
	UPSTREAM WORKING PRESS (Kg/cm2g)	3.3 Kg/cm2(g)	
	DESIGN PRESS (Kg/cm2g)	10.0 Kg/cm2(g)	
	NORMAL TEMP (Deg C)	33.0 Deg C	
	MAXIMUM TEMP (Deg C)	60.0 Deg C	
	PIPE LOCATION	■ UNDERGROUND ☐ OVERGROUND	
PIPE LINE DATA	PIPE SIZE (OD x THK) mm	610 x 8	
	PIPE MATERIAL	CARBON STEEL AS PER IS-2062 Gr. B ROLLED AND BUTT WELDED CONFIRIMNG TO IS:3589 Gr. 410	
	AVAILABLE PIPE STRAIGHT LENGTH	UPSTREAM : 10D DOWNSTREAM : 5D	

	TECHNICAL SPECIFICATION FOR ULTRASONIC FLOW METER 1 X 660 MW PANKI TPS	SPEC NO.: **PE-TS-426-145-I916** VOLUME II B SECTION C

SECTION-C

QUALITY PLAN

255050/2021/PS-PEM-C_I

	MANUFACTURER / BIDDER / SUPPLIER NAME & ADDRESS	QUALITY PLAN : STANDARD QUALITY PLAN		SPEC. NO :	DATE:
		CUSTOMER :		QP NO.: PE-QP-999-145-I 011, Rev.00	DATE: 18.01.2021
		PROJECT:		PO NO.:	DATE:
		ITEM: ULTRASONIC FLOW METER	SYSTEM: C&I	SECTION:	SHEET 1 OF 2

SNo.	Component & Operations	Characteristics	Class	Type of Check	Quantum of check		Reference document	Acceptance norms	Format of record	Agency				Remarks
1	2	3	4	5	6		7	8	9	*	**			10
					M	C/N				D	M	C	N	
1.00	**RAW MATERIAL**													
1.1	Electronic Housing	Chemical Property	MAJOR	Visual	100%	-	Approved Drg / data Sheet	Technical catalogue/ Approved documents	Technical catalogue/ Approved documents	√	P	V	--	
1.2	Cable gland	Chemical Property	MAJOR	Visual	100%	-	Approved Drg / data Sheet	Technical catalogue/ Approved documents	Technical catalogue/ Approved documents	√	P	V	--	
1.3	Mounting Material					-	Mfr. Standard	Technical catalogue/ Mfr. Standard		√	P	V	--	
2.00	**IN PROCESS INSPECTION**													
2.1	Standard Certificates	Certificate of Compliance, Warranty Certificate,	MAJOR	Visual	100%	As applicable	Technical documents/ Approved documents	Technical catalogue/ Approved documents	Technical catalogue/ Approved documents	√	P,V	V	-	
2.2	Visual Check	Mechanical	MAJOR	Visual	100%	-	Technical catalogue/ Approved documents	Technical catalogue/ Approved documents	Technical catalogue/ Approved documents	-	P	V	-	
2.3	Calibration	Electrical	CRITICAL	Measurement	1 / type per size	1 / type per size	Tech Spec.	Tech Spec.	Test Certificate / Inspection Report	√	P	V		Refer Note-3
3.00	**FINAL INSPECTION**													
3.1	**Complete Assembly**	Overall dimension and end connection	MAJOR	Measurement	100%	-	Approved Drg / data Sheet	Technical catalogue/ Approved documents	Inspection Report	√	P,W	V		
		Marking–Tag No., direction of flow	MINOR	Visual	100%	-	Approved Drg / data Sheet	Technical catalogue/ Approved documents	Inspection Report	√	P,W	V		

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No:			
	Sign & Date	Name		Sign & Date	Name	Seal			Sign & Date	Name	Seal
Prepared by:		Neha Jain	Checked by:		Kunal Gandhi			Reviewed by:			
Reviewed by:		Sachin Srivastava / S.S.Bansala	Reviewed by:		Ritesh Kumar Jaiswal			Approved by:			

	MANUFACTURER / BIDDER / SUPPLIER NAME & ADDRESS	QUALITY PLAN : STANDARD QUALITY PLAN		SPEC. NO :	DATE:
		CUSTOMER :		QP NO.: PE-QP-999-145-I 011, Rev.00	DATE: 18.01.2021
		PROJECT:		PO NO.:	DATE:
		ITEM: ULTRASONIC FLOW METER	SYSTEM: C&I	SECTION:	SHEET 2 OF 2

3.2	**Functional Test**													
3.21	Functional test & power ON	Electrical	MAJOR	Visual	100%	-	Functional test report for meter & transducer	Approved documents	Technical catalogue/Approved documents	-	P	V	-	
3.22	HART Communication	Electrical	MAJOR	---	100%	-	Technical catalogue/ Approved documents	Technical catalogue/ Approved documents	Technical catalogue/ Approved documents	-	-	V	-	
4.00	**PACKING & DISPATCH**	Soundness of Packing against transit damage	MAJOR	Visual	100%	-	Mfr. Standard	Technical catalogue/ Mfr. Standard		--	P	W	---	Refer Note-4

NOTES:

1. BHEL reserves the right to conduct repeat tests, if required.
2. Protection Class shall be IP-65 or better or as per approved datasheet.
3. CALIBRATION Test to be carried out at NABL approved laboratory.
4. Following to be noted for packing:
   (a) Shall be packed suitably in order to avoid damage during transit and also during storage at site.
   (b) Photographs of Ultrasonic Flow Meter duly placed inside the wooden box just before final packing.
   (c) Photographs of the packing (with LR No.) as per approved packing procedure (if applicable) just before dispatch.
   (d) Clearance for dispatch will be given only after receipt of the photos
   (e) Sea worthy packing shall be provided, if called for in the Data sheets. Acceptance Norms shall be in line with the Technical Specification.
5. Project specific QP will be prepared based on customer requirement.
6. In case of foreign supplier, all test certificates shall be furnished by the supplier, duly witnessed/verified by supplier TPIA.
7. The latest revisions/year of issue of all the standard indicated in the QP shall be referred.
8. Quantum of check by BHEL/BHEL nominated inspection agency shall be indicated during project specific enquiry.

LEGEND:

* RECORDS, INDENTIFIED WITH "TICK"(√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION, **D:** DOCUMENTATION.

** **M**: SUPPLIER/ MANUFACTURER/ SUB-SUPPLIER, **C**: MAIN SUPPLIER/ BHEL/ THIRD INSPECTION AGENCY, **N**: CU**S**TOMER, **P**: PERFORM, **W**: WITNESS, **V:** VERIFICATION, AS APPROPRIATE.

BHEL							BIDDER/ SUPPLIER	FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No:			
	Sign & Date	Name		Sign & Date	Name	Seal			Sign & Date	Name	Seal
Prepared by:		Neha Jain	Checked by:		Kunal Gandhi			Reviewed by:			
Reviewed by:		Sachin Srivastava / S.S.Bansala	Reviewed by:		Ritesh Kumar Jaiswal			Approved by:			

	TECHNICAL SPECIFICATION FOR ULTRASONIC FLOW METER 1 X 660 MW PANKI TPS	SPEC NO.: PE-TS-426-145-I916
		VOLUME II B
		SECTION C

SECTION-C

BILL OF QUANTITY

	Technical specification for **ULTRASONIC FLOW METER** 1 X 660 MW PANKI TPS	SPECIFICATION NO. **PE-TS-426-145-I916** VOLUME **II-B** SECTION **C**

BILL OF QUANTITY-ULTRASONIC FLOWMETERS

S. No.	KKS	SERVICE/ ITEM DESCRIPTION	QTY	UNIT
1	10PAB11BP001	CWP DISCH HDR TO CONDENSER	1	NOS
2	10PAB30BP001	CW RETURN HEADER TO COOLING TOWER	1	NOS
3	10PAB50BP001	ACWP DISCHARGE HDR	1	NOS
4	10GAD10CF011	RAW WATER INTAKE PUMP DISCHARGE HEADER LINE	1	NOS
5	10GAD24CF011	AHP MAKE-UP PUMP DISCHARGE HEADER LINE	1	NOS
6	10GAD28CF011	RAW WATER PUMP DISCHARGE HEADER LINE	1	NOS
7	----------	SUPERVISION OF ERECTION & COMMISSIONING	4	MANDAYS

SECTION-D

EQUIPMENT SPECIFICATION

FORM NO. PEM-6666-0

	TECHNICAL SPECIFICATION FOR ULTRASONIC FLOW METER	SPEC NO.: PE-SS-999-145-I027
		VOLUME II B
		SECTION D

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 and shall be subject to owner's approval.

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 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. 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

FORM NO. PEM-6666-0

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

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.

FORM NO. PEM-6666-0

	TECHNICAL SPECIFICATION FOR ULTRASONIC FLOW METER	SPEC NO.: PE-SS-999-145-I027
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iv. Installation drawing.

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

FORM NO. PEM-6666-0

	TECHNICAL SPECIFICATION FOR ULTRASONIC FLOW METER	SPEC NO.: PE-SS-999-145-I027
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		SECTION D

PRINCIPLE OF MEASUREMENT

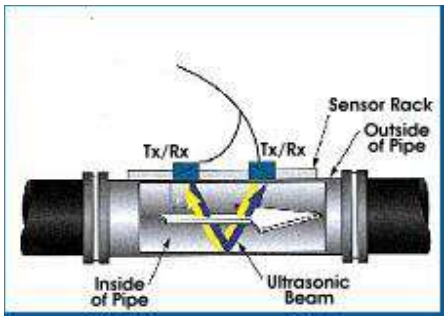

FIG.1

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)

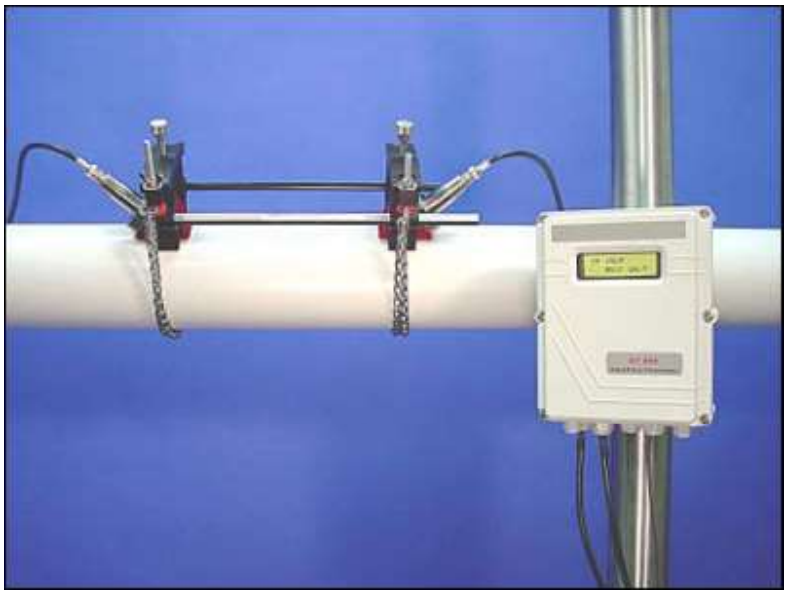

FIG.2

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