



Ref. Enquiry No.: PE/PG/RTC/E-6353/2019

Dated: 16/01/2020

TENDER ENQUIRY THROUGH E-PROCUREMENT

DUE DATE
27/01/2020
BY 02:00PM

SUBJECT: TENDER ENQUIRY FOR RATE CONTRACT OF FLOW ELEMENT- NOZZLE AS PER TECHNICAL SPECIFICATION NO. PE-TS-20-145-I 105B

OUR REF: TENDER ENQUIRY NO: PE/PG/RTC/ E-6353/2019, DTD-16/01/2020

Dear Sir/ Ma'am,

We are pleased to invite your offer for subject package in two parts strictly as per "Instructions to Bidders" mentioned at page no. 1 to 15 of GCC Rev. 07. Please upload your best quotation/ offer on <https://bhel.abcpocure.com> for the requirement strictly as per schedule of price format before above mentioned due date & time. The details of the tender enquiry are as mentioned below:

Sl. No	Description for which Rate Contract is desired	Tentative Quantity	Delivery required
1	FLOW ELEMENT- NOZZLE - Refer Technical Specification no. PE-TS-20-145-I105B for detailed description.	As per BOQ cum price schedule in Annexure-I, cumulative for the Prospective Projects as per Annexure-III	"Within Four (04) months from the date of availability of branch pipes or Four months from date of CAT-1 approval of Primary drawing/documents, whichever is later. In case of date of CAT-1 approval of Primary drawing/documents is later than the date of availability of all branch pipes then for delay analysis, any delay in submission/re-submission of Primary drawing/documents shall be reduced from the given delivery period of 04 months. Delay in BHEL's comments/approval beyond 18 days shall also be considered for delay analysis. In case of date of availability of branch pipes is later than date of cat 1 approval of Primary drawing/documents, then for delay analysis submission/re-submission time of Primary drawing/document shall not be considered" Drg. Sch. for Vendors: R-0 within 14 days from PO & subsequent revisions incorporating all the BHEL comments within 10 days of comments received from BHEL. BHEL shall furnish comments / approval on each submission within 18 days from receipt. O&M MANUAL for Flow Nozzles: within 30 days of issuance of MDCC Note: a. The end period specified is for completion of the deliveries. Deliveries to start progressively so as to meet the completion schedule. b. The delivery conditions specified are for contractual LD purposes, however BHEL may ask for early deliveries without any compensation thereof. c. Non-applicable drawings shall be decided during execution of the package. d. Wherever schedule of drawings/documents submission / re-submission is stipulated in the Technical Specifications, same shall be superseded by delivery specified in NIT.

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Your best quotation/offer for the above requirement, in line with our terms and conditions, should be submitted online via e-procurement system. It shall be the responsibility of the bidder to ensure that the Tender is submitted on or before the due date by 2 p.m. Part-I bids shall be opened at 3 p.m. on the due date in the presence of authorized representatives of the bidders, who may like to be present.

Note: -

1. Please note that Part Supplies offered for tender BOQ shall disqualify the bidder's offer.
2. Documents and Credential as per Technical PQR, Techno Commercial Bids should be uploaded on the e-procurement portal.

Please refer GCC Rev-07, which is available on <https://www.bhelpem.com/Documents/GCC/GCCRev07.pdf>. You are requested to kindly download the same.

1. Rate contract, on firm price basis, is proposed for 2 years from placement of Rate Contract PO with a provision for further extension after review on mutual consent.
Rate contract is proposed to be done with 2 vendors in ratio of 70:30 value wise at L1 FOR site price for this package. Splitting of RC among 2 vendors may be changed during project ordering process if any vendor in RC is not approved by customer (i.e. BHEL may place order on any of the vendor in RC up to total applicable RC value in case of non-availability of customer approval for other vendor in RC). However, order for a project shall not be split.
2. L1 Rates shall be counter offered to all bidders who participated in Price Bid Opening/RA for 30% value and in case acceptance of counter offer received from more than one vendor then **acceptance shall be considered as per FINAL Price Bid Opening / Reverse Auction Ranking (as applicable)**. If none accepts L1 rates, RC shall be done with L1 vendor for 100% value.
3. Quantity is divisible & hence in line with cl. no. 3 (b) of make in India Circular ref: No. P-45021/2/2017-PP (BE-II) dtd 28/05/18 issued by Ministry of Commerce and Industry, Govt. of India, If L 1 bid is not from a local supplier, 50% of the order quantity shall be awarded to L 1. Thereafter, the lowest bidder among the local suppliers, will be invited to match the L 1 price for the remaining 50% quantity subject to the local supplier's quoted price falling within the margin of purchase preference, and contract for that quantity shall be awarded to such local supplier subject to matching the L 1 price. In case such lowest eligible local supplier fails to match the L 1 price or accepts less than the offered quantity, the next higher local supplier within the margin of purchase preference shall be invited to match the L 1 price for remaining quantity and so on, and contract shall be awarded accordingly. In case some quantity is still left uncovered on local suppliers, then such balance quantity may also be ordered on the L 1 bidder.
In such case further counter-offering for 70:30 as mentioned at point no. 2 shall not be applicable. However, if L1 bid is from local supplier or local supplier is not in the range of margin of purchase preference then further counter-offering for 70:30 shall be applicable as mentioned at point no. 2.
4. As per make in India Circular ref: No. P-45021/2/2017-PP (BE-II) dtd 28/05/18, the Margin of Purchase Preference shall be 20%.
5. For Flow Element-Nozzle package, the Local content shall be 70%. Standard Performa for self-certification of local content by bidders enclosed with NIT & same shall be submitted along with your offer.
6. Rate Contract is proposed to be finalized on total lump sum basis. However, there is % allocation weightage against BOQ quantity of each item which shall be used for arriving at price break up and same will also ensure that item rates of L1 bidder will be lowest for each items compared with other bidders' rate.

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7. Bidders to note the following: -

- Evaluation is proposed on Ex Works + Freight basis.
- Bidder to give single % of freight charges considering anywhere in India in the freight column. Bidders have to give same % of freight for each line item.
- Bidders to mention applicable GST rate on (total Ex. works + freight) in the specified cells of price schedule. However, may please note that GST shall not be considered in evaluation.
- Though evaluation is proposed on Ex Works + Freight, but there is % allocation weightage against BOQ quantity of each item which shall be used for arriving at price break up. Bidders need to give only their total ex works price for given BOQ at the specific cells that has been kept opened in the price schedule available in the e-procurement portal (Grand Total ex works price). Price mentioned anywhere else in BOQ or price uploaded anywhere else in the e-procurement portal shall not be taken in cognizance.
- Rest of the prices shall be derived by BHEL in line with allocation fixed for each item. There is formula applied in price schedule form available in e-procurement portal. As soon as bidder fills the cells for Total Ex works, freight percentage and GST percentage, rest values for e.g. unit ex works – item wise, total ex works – item wise, FOR site price – item wise will filled automatically. Bidders can also validate and cross check the same by using Check Formula button.
- For better clarity to the bidders where value is to be filled is kept open in price form at e-procurement portal and for other columns it will be locked which denotes shall be derived by BHEL as per allocation fixed against each item.
- HSN Code furnished by Engineering has been mentioned in Price Schedule.
- Incomplete offer shall be summarily rejected.
- Pre-Qualifying Requirements (PQR): All the bidders (registered/ non-registered) will be asked to submit documents fulfilling PQR (technical & financial) requirements along with the bid & their further evaluation shall be done accordingly.
- Bidders to note that their bid shall be conditional subject to qualify PQR (technical) by registered vendors & non-registered vendors have to qualify PQR (technical) & get registered with PEM for the package.
- CIF is not applicable for the package.
- Quantity variation for the package is +30%.

TERMS AND CONDITIONS:

- Procurement of the subject package shall be done through e-procurement.
- Enquiry No., due date etc. must be legibly super scribed on the offers as per "Instructions to Bidders" mentioned at page no. 1 to 15 of GCC Rev. 07.
- Offers should be uploaded in two parts online at <https://bhel.abcpurchase.com> as follows:
 - Part-I Bid: - Documents and Credential as per Technical PQR and Techno-Commercial offer (along with un-priced copy of un-priced bid and un-priced schedule of Technical-Commercial Deviation).
 - Part II Bid: - Bidders need to give only their total ex works price for given BOQ at the specific cells that has been kept opened in the price schedule available in the e-procurement portal (Grand Total ex works price). Price mentioned anywhere else in BOQ or price uploaded anywhere else in the e-procurement portal shall not be taken in cognizance.
- Bidder to note that this is a conditional Tender enquiry and the price bid (Part-II) opening/RA participation shall be subject to following condition:
 - Techno-commercial qualification/recommendation of bidder by the BHEL-PEM
- Terms and conditions: -

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- a) Part I bid will be opened on date & time mentioned in the NIT or subsequent corrigenda/amendments, if any.
- b) Techno-commercial offer of only those bidders shall be evaluated who will meet the Technical pre-qualifying requirement of the tender.
6. Bidders shall submit their offers meeting the requirements of the following tender documents and other Terms and Conditions included in this Enquiry Letter:
- ANNEXURE-I of GCC Rev. 07: Letter to be furnished by the Bidders.
 - ANNEXURE-II: DEVIATION SHEET (COST OF WITHDRAWAL) - To be furnished by the Bidders
- All the above Tender Documents shall automatically become a part of the Order/Contract after its finalisation.
7. Vendors shall quote in accordance with the requirements mentioned in the tender documents. In case of deviations (Technical/ Commercial), the same shall be highlighted separately giving Clause references along with the Cost of withdrawal of Deviations as per Annexure-II to GCC Rev 07 of "DEVIATION SHEET (COST OF WITHDRAWAL)" along with reasons for taking such deviations
- Bidder to note all the points mentioned in "Notes" of Annexure-II to GCC Rev 07.**
8. **Please note the following:**
- a. Price format is enclosed for compliance.
 - b. SCC enclosed for compliance.
 - c. GCC Rev-07 enclosed for compliance.
 - d. GCC Rev-07 is available on <https://www.bhelpem.com/Documents/GCC/GCCRev07.pdf>. You are requested to kindly download the same.
9. Tenders shall be submitted strictly in accordance with the requirements of the above tender documents.
10. Standard pre-printed terms & conditions of the tenderers shall not be considered valid.
11. Validity of offer shall be as per Clause No. 7.0, "Instructions to Bidders" of GCC Rev 07.
12. Unsolicited fresh/revised Price Bids shall not be entertained.
13. Purchaser shall be under no obligation to accept the lowest or any other tender and shall be entitled to accept or reject any/all tender(s) in part or full without assigning any reason whatsoever.
14. Late tenders will be rejected.
15. Tenders and all correspondence thereof, shall be addressed to the undersigned by name & designation and sent at the following address:

Mr. I P SINGH, DGM/CMM
M/s Bharat Heavy Electricals Ltd.,
Project Engineering Management,
Power Project Engineering Institute,
HRD & ESI Complex,
Plot No 25, Sector-16 A, Noida-201301
Kind Attn: I P SINGH/ CMM
E-MAIL: indra.pal.singh@bhel.in
Ph. No. 0120-4368749 ,9818989654

Mr. N C SHARMA, DY MGR/CMM
M/s Bharat Heavy Electricals Ltd.,
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16. **PRE-QUALIFICATION REQUIREMENT:** - Bidders to note that their bid shall be conditional subject to qualify PQR by registered vendors & non-registered vendors have to qualify PQR & get registered with PEM for the package. **For registration in PEM "Bidders needs to apply & get registered for subject package with PEM before P-2 (price bid opening) & hence you need to apply online for registration on PEM web portal & have to enclose acknowledgement with the bid documents else their bid may not be considered for evaluation"**
Procurement directly from the manufacturers/suppliers shall be preferred. However, if the OEM/ Principal insists on engaging the services of an agent, such agent shall not be allowed to represent more than one manufacturer/ supplier in the same tender. Moreover, either the agent could bid on behalf of the manufacturer/supplier or the manufacturer/ supplier could bid directly but not both. In case bids are received from both the manufacturer/supplier and the agent, bid received from the agent shall be ignored.
17. Bidder has to submit "NO DEVIATION CERTIFICATE FOR COMMERCIAL TERMS AND CONDITIONS AS PER GCC (07), SCC AND NIT". In case of deviations, bidder to clearly mention the same with their techno-commercial offer.
18. All the above Tender Documents shall automatically become a part of the Order/Contract after its finalization.
19. All corrigenda, addenda, amendments, time extensions, clarifications etc. to the tender will be hosted on BHEL websites only (www.bhelpem.com, www.bhel.com & <https://bhel.abcpocure.com> under subject tender reference. Bidders are requested to visit our websites from time to time to keep themselves updated. **Bidders may go through the Sellers' manual & Help documents provided on E-Procurement Portal website & obtain required Digital Signature Certificate (Class-III) for participating in the subject Tender.**
20. Inspection shall be done by BHEL/ END CUSTOMER/Third party Agency (finalized by BHEL).
21. Delivery terms for dispatches shall be FOR Dispatch Station.
22. This enquiry is subject to Conditions/ limits if any imposed in PMD / Vendor registration.
23. Non- registered bidder to submit the credentials required for Registration in BHEL PEM: -
"Online Registration Portal is operational in BHEL. Non-registered Vendors, who wish to apply for registration with BHEL-PEM, have to apply through Online Registration Portal available at <https://supplier.bhel.in/>. All credentials and/or documents duly signed and stamped related to registration has to be uploaded on the website and submit the application for registration. One set of hard copy of the filled-up SRF downloaded from Online Registration Portal duly signed and stamped has to be submitted."
24. Purchaser reserves the right to split up the scope of the tender enquiry and place the orders for different scope/ items with different bidders and also increase or decrease the quantity.
25. BHEL reserves the right to go for Reverse Auction (RA) (Guidelines as available on www.bhel.com) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. Bidders to give their acceptance with the offer for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA.
Link for Detailed guidelines of reverse auction 2016 to be followed as:
http://www.bhel.com/vender_registration/pdf/Guidelines%20for%20Reverse%20Auction-2016.pdf

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IMPORTANT INSTRUCTION TO BIDDERS IN CASE OF REVERSE AUCTION

"The Bidders have to quote the Single Price (i.e. Total Ex-works + Freight) (excl. GST) in Reverse Auction. Price are to be inclusive of Packing & Forwarding charges, all the routine & type tests as per tender scope, Freight as applicable, including loading (if any). De-loading (if any) shall be done in line with NIT terms".

- If any bidder has mentioned the term Not Applicable / Not required / Not Quoted in BHEL price format. The bidder needs to substantiate the same. If the same item will be required in future for the system same will be supplied free of cost.
- L1 bidder will have to submit Bank Guarantee for each POs (irrespective of value) which will be placed under the Rate Contract finalised through this tender considering RC as original contract as per format mentioned in Annexure-III of GCC Rev 07
- All other terms and conditions shall be as per GCC Rev 07 and Special Conditions of Rate Contract as per attached Annexure-II.

Thanking you,
Yours faithfully,
For and on behalf of BHEL

N C Sharma/Dy. Manager
(Name & Signature of official)

Enclosure:

- Enquiry Terms & Conditions
- Price Format- Annexure I
- RC-SCC – ANNEXURE II
- Prospective Project List – Annexure III
- Technical PQR-Annexure-IV
- Technical Specifications

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ANNEXURE- I

RATE CONTRACT OF FLOW ELEMENT-NOZZLE

ENQ. REF: PE/PG/RTC/ E-6353/2019, DTD-16/01/2020 - PRICE SCHEDULE- FLOW ELEMENT-NOZZLE

NAME OF VENDOR-

SL NO	PIPE SIZE (INCH)	ITEM DESCRIPTION	UOM	TENTATIVE QUANTITY	HSN CODE	UNIT EX-WORKS PRICE (DULY PACKED) IN PERCENTAGE OF TOTAL EX WORKS PRICE OF NOZZLE GIVEN AT SL NO-P OF COUNMN 10	UNIT EX-WORKS PRICE (DULY PACKED) (INR)	TOTAL EX-WORKS PRICE (DULY PACKED) IN PERCENTAGE OF TOTAL EX WORKS PRICE OF NOZZLE GIVEN AT SL NO-P OF COUNMN 10	TOTAL EX- WORKS PRICE (DULY PACKED) (INR)	FREIGHT CHARGES WITHOUT GST @ % OF TOTAL EX WORKS (INR)	APPLICABLE GST RATE % ON (TOTAL EX WORKS + FREIGHT) (INR)	TOTAL F.O.R SITE PRICE (INR)
1	2	3	4	5	6	7	8	9	10	11	12	13
A	SCHEDULE OF PRICES for Complete Nozzle assembly of nozzle material SS316, pipe material SA106GRB / SA106GRC (Design Press upto :75 Kg/cm2) with tappings and accessories like Nipples (SS316) , Pressure Take off points etc.											
A.1	03"(80 NB)	DATASHEET NO. DS-1	NOS.	1	9026	0.06462	Derived	0.06462	Derived	% TO BE QUOTED	% TO BE QUOTED	Derived
A.2	04" (100 NB)		NOS.	16	9026	0.06914	Derived	1.10627	Derived			Derived
A.3	06" (150 NB)		NOS.	1	9026	0.08362	Derived	0.08362	Derived			Derived
A.4	08" (200 NB)		NOS.	1	9026	0.12798	Derived	0.12798	Derived			Derived
A.5	10" (250 NB)		NOS.	33	9026	0.15174	Derived	5.00726	Derived			Derived
A.6	12" (300 NB)		NOS.	21	9026	0.22301	Derived	4.68330	Derived			Derived
A.7	14" (350 NB)		NOS.	4	9026	0.25469	Derived	1.01878	Derived			Derived
A.8	16" (400 NB)		NOS.	68	9026	0.34523	Derived	23.47580	Derived			Derived
A.9	18" (450 NB)		NOS.	29	9026	0.47633	Derived	13.81370	Derived			Derived
A.10	20" (500 NB)		NOS.	10	9026	0.61222	Derived	6.12220	Derived			Derived
B	CALIBRATION CHARGES for Complete Nozzle assembly: nozzle material SS316, pipe material SA106GRB / SA106GRC (Design Press upto :75 Kg/cm2) with tappings and accessories like Nipples (SS316) , Pressure Take off points etc.											
B.1	03"(80 NB)		NOS.	1	9083	0.06336	Derived	0.06336	Derived			Derived
B.2	04" (100 NB)		NOS.	7	9083	0.03802	Derived	0.26611	Derived			Derived
B.3	06" (150 NB)		NOS.	1	9083	0.05069	Derived	0.05069	Derived			Derived
B.4	08" (200 NB)		NOS.	1	9083	0.06336	Derived	0.06336	Derived			Derived

B.5	10" (250 NB)	DATASHEET NO. DS-1	NOS.	7	9083	0.07920	Derived	0.55439	Derived		% TO BE QUOTED	Derived
B.6	12" (300 NB)		NOS.	9	9083	0.12672	Derived	1.14047	Derived			Derived
B.7	14" (350 NB)		NOS.	3	9083	0.12672	Derived	0.38016	Derived			Derived
B.8	16" (400 NB)		NOS.	16	9083	0.12672	Derived	2.02750	Derived			Derived
B.9	18" (450 NB)		NOS.	10	9083	0.14784	Derived	1.47838	Derived			Derived
B.10	20" (500 NB)		NOS.	3	9083	0.15206	Derived	0.45619	Derived			Derived
C	SCHEDULE OF PRICES for Complete Nozzle assembly of nozzle material SS316, pipe material SA106GRB / SA106GRC (Design Press upto :415 Kg/cm2) with tappings and accessories like Nipples (SS316) , Pressure Take off points etc.											
C.1	14" (350 NB)	DATASHEET NO. DS-2	NOS.	1	9026	0.26901	Derived	0.26901	Derived	% TO BE QUOTED	% TO BE QUOTED	Derived
C.2	20" (500 NB)		NOS.	1	9026	0.51430	Derived	0.51430	Derived			Derived
C.3	22" (550 NB)		NOS.	5	9026	0.63310	Derived	3.16549	Derived			Derived
C.4	24" (600 NB)		NOS.	10	9026	0.78358	Derived	7.83575	Derived			Derived
C.5	28" (700 NB)		NOS.	1	9026	0.94461	Derived	0.94461	Derived			Derived
D	CALIBRATION CHARGES for Complete Nozzle assembly: nozzle material SS316, pipe material SA106GRB / SA106GRC (Design Press upto :415 Kg/cm2) with tappings and accessories like Nipples (SS316) , Pressure Take off points etc.											
D.1	14" (350 NB)	DATASHEET NO. DS-2	NOS.	1	9083	0.12672	Derived	0.12672	Derived		% TO BE QUOTED	Derived
D.2	20" (500 NB)		NOS.	1	9083	0.15840	Derived	0.15840	Derived			Derived
D.3	22" (550 NB)		NOS.	3	9083	0.07920	Derived	0.23760	Derived			Derived
D.4	24" (600 NB)		NOS.	3	9083	0.19008	Derived	0.57023	Derived			Derived
D.5	28" (700 NB)		NOS.	1	9083	0.20725	Derived	0.22176	Derived			Derived
E	SCHEDULE OF PRICES for Complete Nozzle assembly of nozzle material A182F91, pipe material SA335 P91 with tappings and accessories like Nipples (SS316) , Pressure Take off points etc.											
E.1	08" (200 NB)	DATASHEET NO. DS-3	NOS.	2	9026	0.51430	Derived	1.02860	Derived	% TO BE QUOTED	% TO BE QUOTED	Derived
E.2	10" (250 NB)		NOS.	2	9026	0.70438	Derived	1.40875	Derived			Derived
E.3	12" (300 NB)		NOS.	1	9026	0.84693	Derived	0.84693	Derived			Derived
E.4	14" (350 NB)		NOS.	2	9026	0.98809	Derived	1.97618	Derived			Derived
F	CALIBRATION CHARGES for Complete Nozzle assembly: Nozzle material A182F91, pipe material SA335 P91 with tappings and accessories like Nipples (SS316) , Pressure Take off points etc.											
F.1	08" (200 NB)	DATASHEET NO. DS-3	NOS.	2	9083	0.12672	Derived	0.25344	Derived		% TO BE QUOTED	Derived
F.2	10" (250 NB)		NOS.	1	9083	0.12672	Derived	0.12672	Derived			Derived
F.3	12" (300 NB)		NOS.	1	9083	0.12672	Derived	0.12672	Derived			Derived

F.4	14" (350 NB)		NOS.	1	9083	0.14784	Derived	0.14784	Derived			Derived
G	SCHEDULE OF PRICES for Complete Nozzle assembly of nozzle material SS316, pipe material SA335 P91 with tappings and accessories like Nipples (SS316) , Pressure Take off points etc.											
G.1	06" (150 NB)	DATASHEET NO. DS-4	NOS.	1	9026	0.19750	Derived	0.19750	Derived	% TO BE QUOTED	% TO BE QUOTED	Derived
G.2	08" (200 NB)		NOS.	7	9026	0.23974	Derived	1.67819	Derived			Derived
G.3	10" (250 NB)		NOS.	4	9026	0.26086	Derived	1.04345	Derived			Derived
G.4	12" (300 NB)		NOS.	10	9026	0.34006	Derived	3.40061	Derived			Derived
H	CALIBRATION CHARGES for Complete Nozzle assembly: Nozzle material SS316, pipe material SA335 P91 with tappings and accessories like Nipples (SS316) , Pressure Take off points etc.											
H.1	06" (150 NB)	DATASHEET NO. DS-4	NOS.	1	9083	0.06336	Derived	0.06336	Derived		% TO BE QUOTED	Derived
H.2	08" (200 NB)		NOS.	2	9083	0.06336	Derived	0.12672	Derived			Derived
H.3	10" (250 NB)		NOS.	1	9083	0.12672	Derived	0.12672	Derived			Derived
H.4	12" (300 NB)		NOS.	1	9083	0.09504	Derived	0.09504	Derived			Derived
I	SCHEDULE OF PRICES for Complete Nozzle assembly of nozzle material SS316, pipe material SA335 P92 with tappings and accessories like Nipples (SS316) , Pressure Take off points etc.											
I.1	08" (200 NB)	DATASHEET NO. DS-5	NOS.	7	9026	0.32422	Derived	2.26954	Derived	% TO BE QUOTED	% TO BE QUOTED	Derived
I.2	12" (300 NB)		NOS.	10	9026	0.38758	Derived	3.87578	Derived			Derived
I.3	14" (350 NB)		NOS.	4	9026	0.40342	Derived	1.61367	Derived			Derived
J	CALIBRATION CHARGES for Complete Nozzle assembly: Nozzle material SS316, pipe material SA335 P92 with tappings and accessories like Nipples (SS316) , Pressure Take off points etc.											
J.1	08" (200 NB)	DATASHEET NO. DS-5	NOS.	3	9083	0.06336	Derived	0.19008	Derived		% TO BE QUOTED	Derived
J.2	12" (300 NB)		NOS.	2	9083	0.09504	Derived	0.19007	Derived			Derived
J.3	14" (350 NB)		NOS.	1	9083	0.10137	Derived	0.10137	Derived			Derived
K	SCHEDULE OF PRICES for Complete Nozzle assembly of nozzle material SS316, pipe material SA335 P22 with tappings and accessories like Nipples (SS316) , Pressure Take off points etc.											
K.1	06" (150 NB)	DATASHEET NO. DS-6	NOS.	1	9026	0.19260	Derived	0.19260	Derived	% TO BE QUOTED	% TO BE QUOTED	Derived
K.2	08" (200 NB)		NOS.	1	9026	0.19260	Derived	0.19260	Derived			Derived
L	CALIBRATION CHARGES for Complete Nozzle assembly: nozzle material SS316, pipe material SA335 P22 with tappings and accessories like Nipples (SS316) , Pressure Take off points etc.											
L.1	06" (150 NB)	DATASHEET NO. DS-6	NOS.	1	9083	0.06420	Derived	0.06420	Derived		% TO BE QUOTED	Derived
L.2	08" (200 NB)		NOS.	1	9083	0.06420	Derived	0.06420	Derived			Derived
M	SCHEDULE OF PRICES for Complete Nozzle assembly of nozzle material SS316, pipe material SA312TP304 with tappings and accessories like Nipples (SS316) , Pressure Take off points etc											
M.1	04" (100 NB)		NOS.	1	9026	0.06914	Derived	0.06914	Derived			Derived

M.2	14" (350 NB)	DATASHEET NO. DS-7	NOS.	1	9026	0.25469	Derived	0.25469	Derived	% TO BE QUOTED	% TO BE QUOTED	Derived
M.3	18" (450 NB)		NOS.	1	9026	0.47645	Derived	0.47645	Derived			Derived
M.4	20" (500 NB)		NOS.	1	9026	0.61222	Derived	0.61222	Derived			Derived
N	CALIBRATION CHARGES for Complete Nozzle assembly: nozzle material SS316, pipe material SA312TP304 with tappings and accessories like Nipples (SS316) , Pressure Take off points etc											
N.1	04" (100 NB)	DATASHEET NO. DS-7	NOS.	1	9083	0.03801	Derived	0.03801	Derived		% TO BE QUOTED	Derived
N.2	14" (350 NB)		NOS.	1	9083	0.12672	Derived	0.12672	Derived			Derived
N.3	18" (450 NB)		NOS.	1	9083	0.14784	Derived	0.14784	Derived			Derived
N.4	20" (500 NB)		NOS.	1	9083	0.15206	Derived	0.15206	Derived			Derived
O	Additional Items: Nipple											
O.1	NIPPLE 25Nb , SS316 , 250mm long, SCH XXS		NOS.	50	9026	0.00235	Derived	0.11770	Derived	% TO BE QUOTED		Derived
O.2	NIPPLE 25Nb , SS316 , 1000mm long, SCH XXS		NOS.	50	9026	0.00749	Derived	0.37450	Derived			Derived
O.3	NIPPLE 25Nb , SS316 ,250mm long, SCH 80		NOS.	170	9026	0.00113	Derived	0.19260	Derived			Derived
P	GRAND TOTAL (A+B+C+D+E+F+G+H+I+J+K+L+M+N+O)							100.0	TO BE QUOTED = Rs X	Derived	Derived	Derived = Rs Y

Note:-

1. Bidder to note that evaluation shall be on Grand Total Ex works price + Freight charges, however, Bidder to quote grand total Ex works of the flow element mentioned at sl. A to M (Rs X) only as per the BOQ above. The item wise break up of Ex works prices (unit as well as total) for all the items in the BOQ shall be derived as per the formulae indicated above by BHEL. Bidder also need to indicate taxes percentage in the respective column and freight percentage of Ex works value considering delivery anywhere in India in the freight column.

2. Rate contract shall be decided on the basis of grand Total Ex works price + Freight charges of Total BOQ

3. Bidder to quote single % Freight for the BOQ supply items.

4. Value is to be filled only where "to be quoted" is mentioned and for other columns where "derived" is mentioned same shall be derived by BHEL as per % allocation fixed against each item

5. Prices shall remain firm during contract execution.

6. For any clarification please refer Technical Specification No-PE-TS-20-145-I 105B

7. Root valves and expanders are in BHEL's scope of supply.



BHEL / PEM / CMM
SPECIAL CONDITIONS OF RATE CONTRACT

ENQ. REF: PE/PG/RTC/ E-6353/2019, DTD-16/01/2020

ANNEXURE- II: SPECIAL CONDITION OF RATE CONTRACT FOR FLOW ELEMENT-NOZZLE

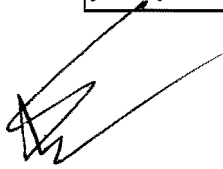
1. BHEL/PEM intends to enter into Rate Contract for supply of the tendered items for a period of two years. The Rate Contract shall come into force from the date of issue of Purchase order for Rate Contract. Validity for ordering shall be two years from the purchase order for Rate Contract.
2. Details of consignee and project site information for dispatch of material shall be intimated at the time of placement of PO for specific project after finalization of RC.
3. Transit Insurance is in BHEL scope.
4. The items will be required against respective projects. Exact quantities and Project information shall be intimated while placing order for a specific project based on the Rate Contract.
5. The prices shall remain firm (except for those items in which PVC is applicable as per NIT) during the period of two years with a provision for further extension after review on mutual consent.
6. Inspection of materials shall be carried out by BHEL/CQA and or by Customer or by an authorized agency at manufacture's works before dispatch, if required. Dispatch of material to be done, only after receipt of BHEL/Customer MDCC. It is responsibility of vendor to for obtain Material Dispatch Clearance Certificate (MDCC) from BHEL or Customer as required before dispatch of material.

Vendor shall give inspection call on BHEL-CQS web site to applicable inspection agency with a copy of inspection call to BHEL-PEM for arranging Customer participation (if applicable) in inspection / Joint inspection on the proposed date with an advance notice of 15 working days. Inspection charges shall be paid by BHEL-PEM.

Items have to be manufactured as per specification and supplied strictly in accordance with the approved BHEL / Customer's Drawings & Quality Plan. The items/ test certificate of items, which for any reason are not acceptable to BHEL / Customer, shall be required to be retested. No extra charge shall be payable on those account by BHEL.

7. Mode of dispatch shall be by road through Schedule Bank/BHEL (PEM) approved transporters.
8. Other terms and conditions shall be as per Standard Technical specification no, GCC Rev 07 & Enquiry letter.
9. This enquiry is subject to Conditions/ limits if any imposed in PMD/ Vendor registration.
10. Tentative quantity is given in enquiry.
11. Bidders to submit offer for RC of said items ONLINE via e-Procurement System only. Bidder to upload tender documents complete in all respects duly signed & stamped on each and every page by the authorized signatory of the bidder as a token of acceptance of all the terms and conditions of tender.
12. The Bidder along with its associate/ collaborators/ sub-contractors/ sub-vendor/ consultants/ service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL web site <http://www.bhel.com> and shall immediately bring to the notice of BHEL Management about any fraud as soon as it comes to their notice.

ANNEX-III: ENQ. REF: PE/PG/RTC/ E-6353/2019, DTD- 16/01/2020 TENTATIVE PROJECT LIST	
SL NO.	TENTATIVE PROJECT LIST
1	Uppur (2x800 MW)
2	Udangudi (2x660 MW)
3	Bhusawal (1x660 MW)
4	Patratu (3x800 MW)
5	Sagardighi (1x660 MW)
6	Khurja (2X660 MW)
7	Talcher (2x660 MW)
8	Yadradri (5x800 MW)
Note- <i>Project list is indicative only, BHEL may ask for delivery anywhere in India for any of the project added in the prospective project/ existing projects during RC period.</i>	



	PRE-QUALIFICATION REQUIREMENTS FOR VENDOR REGISTRATION	PE-PQ-999-145-1002
		REVISION NO. 05 DATE 02.02.2018
		SHEET NO. 1 OF 1

PACKAGE: FLOW NOZZLE

1.0	a. Supplier should be Original equipment manufacturer (OEM) for FLOW NOZZLE. b. In case supplier is not OEM, evaluation shall be done as follows: 1. If supplier happens to be Indian subsidiaries of foreign OEM, then the credentials of the foreign OEM can also be considered for meeting PQR. 2. If supplier 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. The scope matrix shall include their respective roles including design vetting, manufacturing of critical component and warranty/guarantee. If supplier(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.
2.0	The Product being offered by the Supplier should be in use successfully in power plant or any other industrial application for at least 1 (One) year. Supplier to submit either of following supporting documents for the product: a. Copy of minimum 1 (One) Performance Certificate from end user / customer certifying that product has been running satisfactorily for 1 (One) year from date of commissioning to the date of application. 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. OR b. Copy of repeat orders from minimum 2 (Two) different purchasers. Order received by supplier from same purchaser with a gap of minimum 2 (Two) years shall be considered as repeat order. Copy of technical parameters for each order to be attached.
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	Supplier to submit all documents in English. If documents submitted by supplier are in language other than English, a self-attested English Translated document should also be submitted.

Note: Bidder to ensure that Third party/customer issued certificates being submitted as proof of PQR qualification should have verifiable details of document/certificate issuing authority such as name as designation of issuing authority and its organization contact number and e-mail id etc. In case the same not found available, Purchaser has right to reject such document from evaluation.

On Letter head of Company

Ref.....

Date.....

To,

Bharat Heavy Electricals Limited

PEM, PPEI Building, Plot No 25,

Sector -16A, Noida (U.P)-201301

Subject: - Certification regarding local content

Reference: Tender Enquiry No-.....

Name of Package:

Dear Sir,

We hereby certify that items offered by us of(package name).....for.....(Project Name/Rate contract)..... meets the requirement of minimum local content in line with Cl. No..... of NIT No..... dated..... and the Public Procurement (Preference to Make in India), Order 2017 dated-15.06.2017, 28.05.2018 & 29.05.2019.

We further confirms that details of location at which the local value addition is made will be our registered works at(address of the works)

Yours very truly

..... (authorized signatory of company)

..... (firm name)

authorized signatory
of company

TECHNICAL SPECIFICATION
FOR

FLOW-NOZZLE
Assembly with Accessories

(RATE CONTRACT)

VOLUME II-B

SECTION C & D

SPECIFICATION No. **PE-TS-20-145-I 105B**



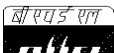
BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT DIVISION
NOIDA, INDIA

	Technical specification for Flow Nozzle Assembly with Accessories (RATE CONTRACT)		SPEC NO.: PE-TS-20-145-I105B
			VOLUME II B
	REV. NO. 00		DATE 24.12.19

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15 	Technical specification for Flow Nozzle Assembly with Accessories (RATE CONTRACT)	SPEC NO.: PE-TS-20-145-I105B	
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SECTION – C

- **SPECIFIC TECHNICAL REQUIREMENTS**
 - **CUSTOMER's SPECIFICATION**
 - **DATA SHEETS – A**
 - **DATA SHEETS – C**
 - **BOQ-MAIN SUPPLY**
 - **BOQ-SPARES**



Technical specification for
Flow Nozzle Assembly with Accessories
(RATE CONTRACT)

SPEC NO.: PE-TS-20-145-I105B

VOLUME II - B

SECTION C

REV. NO. 00

DATE : 24.12.19

SHEET 1 OF 5

SPECIFIC TECHNICAL REQUIREMENTS

- 1.0** This specification is intended for finalization of rate contract between BHEL PEM and Bidder. Standard technical detail as indicated in the specification shall be agreed upon between BHEL PEM and Bidder. Project specific technical detail shall be made available to the bidder along with project specific enquiry after PO placement of rate contract.
- 2.0** This specification covers the Design, Manufacture, Calibration (at approved labs), Inspection and testing at manufacturer's works, proper packing for transportation and delivery to site of the complete Nozzle assembly along with accessories, Mandatory Spares as mentioned in different sections of this specification.
- 3.0** **The bids shall be evaluated as per NIT. Ordering shall be done separately for each project.**
- 4.0** The quality plan enclosed forms the minimum requirement but not limited to be adhered to by the bidder.

5.0 GENERAL TECHNICAL INSTRUCTIONS

- i. 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.
- ii. The omission of specific reference to any component / accessory necessary for the proper performance of the equipment's shall not relieve the supplier of the responsibility of providing such facilities to complete the supply within the quoted prices.
- iii. BHEL's / Customer representatives shall be given access to the shop in which the equipment's are being manufactured or tested and all test records shall be made available to them.
- iv. 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.
- v. **The bidder to quote for items as per price schedule attached. The quantity as mentioned in the BOQ is only for evaluation purpose. However actual ordered quantity may vary from project to project throughout the year.**
- vi. During rate contract in force; any other BHEL unit may also make use of rates if their specification is identical to spec of rate contract.
- vii. Inspection shall be carried out in line with pre-approved drawings/data sheet/QP during detailed engineering stage of respective project..
- viii. Quality plan to be duly signed and stamped and to be furnished along with the bid as a token of acceptance. **Any deviation w.r.t Quality Plan shall not be acceptable and bid / offer shall be rejected.**



Technical specification for
Flow Nozzle Assembly with Accessories
(RATE CONTRACT)

SPEC NO.: PE-TS-20-145-1105B

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SHEET 2 OF 5

- ix. Wherever in data sheet more than one options are marked, bidder to note that one option shall be selected by BHEL for a specific project and the same shall be supplied by bidder without any commercial implication with respect to rate contract.
- x. Scope of supply shall include complete flow element nozzle assembly along with accessories like nipples and Mandatory Spares as indicated in the specification.

6.0 Bidder to note that thickness of the pipe for various sizes may vary from project to project. Same shall be informed during project specific order. No commercial implication shall be acceptable for the same. Typical pipe sizes are indicated in Annexure – A for reference only.

7.0 Bidder to note that the branch pipe supplied by BHEL, may have tolerance as per ASTM standard (i.e. OD 1% (Max. 4 mm), wall thickness 12.5%). Bidder to comply with these tolerance variations without any commercial implication.

8.0 For vertical installation of Nozzles (if any), the S-bend impulse pipe shall be supplied by bidder without any commercial implication. The same shall be informed by BHEL during project specific order.

9.0 Process pressure, temperature & flow may vary for a particular service from project to project. Bidder to comply with these process parameters without any commercial implication. However maximum possible design pressure & temperature are indicated in the respective datasheet of each nozzle in Section-D Datasheet A&B of this specification.

10.0 Extra pressure tapping (in addition to three pairs of tapping) shall be provided in case to case basis for a specific project (if required) by the bidder without any commercial implication. Associated accessories for this particular extra tapping like nipple / blind plug (stub) shall be supplied by the bidder as per the unit price quoted in the price format.

11.0 If extra Nipples etc are to be provided, same shall be supplied by the bidder as per the unit price quoted in the price format.

12.0 Bidder to note that CALIBRATION TEST is required to be conducted on one per type per size for a specific project and the requirement shall be informed during project specific order. BHEL reserves the right to withdraw the calibration test for any project based on customer requirements. Payments against calibration test shall be made only if the same is conducted.



Technical specification for
Flow Nozzle Assembly with Accessories
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SHEET 3 OF 5

13.0 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 rate contract. For all the type tests, "Type Test Certificates" shall be furnished. Certificate shall not be older than 5 years.

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.

14.0 Sea worthy packing (if applicable) for a specific project shall be provided by the bidder without any commercial implication. Same shall be informed by BHEL during project specific order. Inspection of the sea worthy packing shall be done as per the project specific sea worthy packing specification by Customer/BHEL/BHEL appointed Inspection party.

15.0 Refer Section-D Equipment specification for Code & Standards, Technical requirements, Tests & Inspection, Drawings & Documents, Packing, Marking & Applicable Datasheets.

16.0 The service description indicated in respective datasheets 1 to 7 are for reference only. The actual service description for each datasheet shall be informed during project execution after selection based on pipe size, design/process parameters & accessories requirements.

#

ANNEXURE - A

DATA SHEET	NB	OD X THK (mm)	Pipe material
DATA SHEET-1	500 NB	508 x 9.53	SA106 Gr B/C
	500 NB	508 x 12.7	
	450 NB	457 x 12.7	
	450 NB	457 x 9.53	
	400 NB	406.4 x 12.7	
	400 NB	406.4 x 9.53	
	350 NB	355.6 x 12.7	
	350 NB	355.6 x 9.53	
	300 NB	323.9 x 12.7	
	300 NB	323.9 x 9.53	
	250 NB	273 x 6.35	
	250 NB	273 X 9.27	
	200 NB	219.1 X 12.7	
	200 NB	219.1 X 6.35	
	150 NB	168.3 X 5.6	
	100 NB	114.3 x 6.02	
	80 NB	88.9 X 3.96	
DATA SHEET-2	700 NB	ID 559 X 72	SA106 Gr B/C
	600 NB	610 X 82	
	600 NB	ID 445 X 76	
	600 NB	ID 450 X 68	
	550 NB	559 X 72	
	550 NB	ID 405 X 70	
	550 NB	ID 405 X 68	
	550 NB	ID 405 X 66	
	500 NB	508 X 48	
	350 NB	368 X 40	

DATA SHEET-3	200 NB	219.1 X 45	SA335 P91
	350 NB	ID 210 X 61	
	350 NB	ID 170 X 47	
	300 NB	323.9 X 48	
	200 NB	219.1 X 34	
DATA SHEET-4	300 NB	ID 200 X 57	SA335 P91
	300 NB	323.9 x 48	
	250 NB	ID 170 X 48	
	200 NB	219.1 X 45	
	200 NB	219.1 X 34	
	150 NB	168.3 X 27.5	
DATA SHEET-5	350 NB	ID 210 X 61	SA335 P92
	300 NB	323.9 X 48	
	300 NB	ID 200 X 57	
	200 NB	219.1 X 47	
DATA SHEET-6	200 NB	219.1 X 40	SA335 P22
	150 NB	168.3 X 27.5	
DATA SHEET-7	500 NB	508 X 5.54	SS ASTM A312 GR 304
	450 NB	457 X 4.78	
	350 NB	355.6 X 4.78	
	100NB	114.3 X 3.05	

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Technical specification for
Flow Nozzle Assembly with Accessories
(RATE CONTRACT)

SPEC NO.: PE-TS-20-145-I105B

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CUSTOMER'S SPECIFICATION

Same shall be informed by BHEL during project specific order (if any)

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Technical specification for
Flow Nozzle Assembly with Accessories
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DATA SHEETS - A

बी एच ई एल 	Technical specification for Flow Nozzle Assembly with Accessories (RATE CONTRACT)		SPECIFICATION NO.: PE-TS-20-145-I105B	
			VOLUME IIB	
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Tag No.: AS PER DATA SHEET "I" OF THE PRICE FORMAT

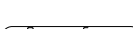
Data Sheet No.-1

DATA SHEET – A		
ELEMENT	SERVICE MAKE : MODEL TYPE STANDARD * DESIGN MATERIAL BETA RATIO BORE DIAMETER	SHALL BE FURNISHED DURING PROJECT BIDDER TO FURNISH DURING PROJECT [■] ASME PTC 19.5 / [■] ISO 5167 LONG RADIUS : HIGH BETA SS316 ~ 0.7 BIDDER TO FURNISH DURING PROJECT
END CONNECTION	TYPE BRANCH PIPE BRANCH PIPE MATERIAL TAPPING LOCATION NUMBER OF TAPPINGS * NIPPLE : SIZE/MATL/RATING/QTY	BUTT WELD END YES (FREE ISSUE BY BHEL) SAME AS PIPE MATERIAL D&D/2 : ON PIPE 3 PAIR 25NB / SS316 / SCH.80 / 12 NOS. : 250mm LONG
PROCESS DATA	FLUID * FLOW (T/HR) PRESSURE (KG/CM ² (A)) TEMPERATURE (DEG. C.) MAX. ALLOWABLE PRESS LOSS DESIGN PRESS : TEMP DIFF. PRESS AT MAX FLOW	[■] STEAM / [■] CONDENSATE MAX. NORMAL MINIMUM SHALL BE FURNISHED DURING PROJECT 75 Kg/cm ² : 415 DEG C BIDDER TO FURNISH DURING PROJECT
PIPE LINE DATA	PIPE SIZE (OD X THK) mm PIPE MATERIAL * BORE DIAMETER MIN. AVAILABLE STRAIGHT LENGTH UPSTREAM:DOWNSTREAM * FLOW DIRECTION *	<u>AS PER PRICE SCHEDULE</u> [■] SA106 GR B / [■] SA106 GR C BIDDER TO FURNISH DURING PROJECT 15D 10D : 5D [■] HORIZONTAL / [■] VERTICAL
OTHER DATA	IBR CERTIFICATION * APPROX. WEIGHT OF ASSEMBLY	[■] REQUIRED / [■] NOT REQUIRED BIDDER TO FURNISH DURING PROJECT
PACKING	SEA WORTHY PACKING *	[■] YES / [■] NO
* Project specific data shall be informed by BHEL during project ordering		

BIDDER TO QUOTE IN COLUMN "I" OF PRICE FORMAT FOR DETAILS SPECIFIED ABOVE

BIDDER TO NOTE THE FOLLOWING FOR EACH NOZZLE ASSEMBLY:

- Nipples to be provided by bidder for extra pair of tappings also. Price for the same shall be as per unit price quoted in the price schedule.
- Blind plug (also called as stub) material shall be same as pipe material for spare pair of tapping.
- All accessories, including blind plug (stub), shall be considered by the bidder and shall have IBR Certification, as applicable (indicated in respective Data Sheets).
- Approximately 70 Nos. of Flow Nozzles in Data Sheet-1 may require IBR Certification.
- S-bend to be considered for vertical flow direction / main steam process requirement.

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Tag No. : AS PER DATA SHEET "II" OF THE PRICE FORMAT

Data Sheet No.-2

DATA SHEET – A		
ELEMENT	SERVICE MAKE : MODEL TYPE STANDARD * DESIGN MATERIAL BETA RATIO BORE DIAMETER	SHALL BE FURNISHED DURING PROJECT BIDDER TO FURNISH DURING PROJECT [■] ASME PTC 19.5 / [■] ISO 5167 LONG RADIUS : HIGH BETA SS316 ~ 0.7 BIDDER TO FURNISH DURING PROJECT
END CONNECTION	TYPE BRANCH PIPE BRANCH PIPE MATERIAL TAPPING LOCATION NUMBER OF TAPPINGS NIPPLE : SIZE/MATL/RATING/QTY	BUTT WELD END YES (FREE ISSUE BY BHEL) SAME AS PIPE MATERIAL D&D/2 : ON PIPE 3 PAIR 25NB / SS316 / SCH.XXS / 12 NOS : 1000mm LONG
PROCESS DATA	FLUID FLOW (T/HR) PRESSURE (KG/CM ² (A)) TEMPERATURE (DEG. C.) MAX. ALLOWABLE PRESS LOSS DESIGN PRESS : TEMP DIFF. PRESS AT MAX FLOW	FEEDWATER MAX. NORMAL MINIMUM SHALL BE FURNISHED DURING PROJECT 415 Kg/cm ² : 320 DEG C BIDDER TO FURNISH DURING PROJECT
PIPE LINE DATA	PIPE SIZE (OD X THK) mm PIPE MATERIAL BORE DIAMETER MIN. AVAILABLE STRAIGHT LENGTH UPSTREAM:DOWNSTREAM * FLOW DIRECTION	<u>AS PER PRICE SCHEDULE</u> SA106 GR C BIDDER TO FURNISH DURING PROJECT 15D 10D : 5D HORIZONTAL
OTHER DATA	IBR CERTIFICATION APPROX. WEIGHT OF ASSEMBLY	REQUIRED BIDDER TO FURNISH DURING PROJECT
PACKING	SEA WORTHY PACKING *	[■] YES / [■] NO
* Project specific data shall be informed by BHEL during project ordering		

BIDDER TO QUOTE IN COLUMN "II" OF PRICE FORMAT FOR DETAILS SPECIFIED ABOVE

BIDDER TO NOTE THE FOLLOWING FOR EACH NOZZLE ASSEMBLY:

- Nipples to be provided by bidder for extra pair of tappings also. Price for the same shall be as per unit price quoted in the price schedule.
- Blind plug (also called as stub) material shall be same as pipe material for spare pair of tapping.
- All accessories, including blind plug (stub), shall be considered by the bidder and shall have IBR Certification, as applicable (indicated in respective Data Sheets).

	Technical specification for Flow Nozzle Assembly with Accessories (RATE CONTRACT)	SPECIFICATION NO.: PE-TS-20-145-I105B	
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Tag No. : AS PER DATA SHEET “III” OF THE PRICE FORMAT

Data Sheet No.-3

DATA SHEET – A		
ELEMENT	SERVICE MAKE : MODEL TYPE STANDARD * DESIGN MATERIAL BETA RATIO BORE DIAMETER	SHALL BE FURNISHED DURING PROJECT BIDDER TO FURNISH DURING PROJECT [■] ASME PTC 19.5 / [■] ISO 5167 LONG RADIUS : HIGH BETA A182 F91 ~ 0.7 BIDDER TO FURNISH DURING PROJECT
END CONNECTION	TYPE BRANCH PIPE BRANCH PIPE MATERIAL TAPPING LOCATION NUMBER OF TAPPINGS NIPPLE : SIZE/MATL/RATING/QTY	BUTT WELD END YES (FREE ISSUE BY BHEL) SAME AS PIPE MATERIAL D&D/2 : ON PIPE 3 PAIR 25NB / SS316 / SCH.XXS / 12 NOS. : 1000mm LONG
PROCESS DATA	FLUID FLOW (T/HR) PRESSURE (KG/CM ² (A)) TEMPERATURE (DEG. C.) MAX. ALLOWABLE PRESS LOSS DESIGN PRESS : TEMP DIFF. PRESS AT MAX FLOW	STEAM MAX. NORMAL MINIMUM SHALL BE FURNISHED DURING PROJECT 297 Kg/cm ² : 608 DEG C BIDDER TO FURNISH DURING PROJECT
PIPE LINE DATA	PIPE SIZE (OD X THK) mm PIPE MATERIAL BORE DIAMETER MIN. AVAILABLE STRAIGHT LENGTH UPSTREAM:DOWNSTREAM * FLOW DIRECTION	<u>AS PER PRICE SCHEDULE</u> SA 335 P91 BIDDER TO FURNISH DURING PROJECT 15D 10D : 5D HORIZONTAL
OTHER DATA	IBR CERTIFICATION APPROX. WEIGHT OF ASSEMBLY	REQUIRED BIDDER TO FURNISH DURING PROJECT
PACKING	SEA WORTHY PACKING *	[■] YES / [■] NO
* Project specific data shall be informed by BHEL during project ordering		

BIDDER TO QUOTE IN COLUMN “III” OF PRICE FORMAT FOR DETAILS SPECIFIED ABOVE

BIDDER TO NOTE THE FOLLOWING FOR EACH NOZZLE ASSEMBLY:

- Nipples to be provided by bidder for extra pair of tappings also. Price for the same shall be as per unit price quoted in the price schedule.
- Blind plug (also called as stub) material shall be same as pipe material for spare pair of tapping.
- All accessories, including blind plug (stub), shall be considered by the bidder and shall have IBR Certification, as applicable (indicated in respective Data Sheets).
- S-bend to be considered for vertical flow direction / main steam process requirement.

	Technical specification for Flow Nozzle Assembly with Accessories (RATE CONTRACT)		SPECIFICATION NO.: PE-TS-20-145-I105B	
			VOLUME IIB	
			SECTION C	
			REV. NO.	00
			DATA : 24.12.19	

Tag No. : AS PER DATA SHEET “IV” OF THE PRICE FORMAT	Data Sheet No.-4
--	------------------

DATA SHEET – A		
ELEMENT	SERVICE MAKE : MODEL TYPE STANDARD * DESIGN MATERIAL BETA RATIO BORE DIAMETER	SHALL BE FURNISHED DURING PROJECT BIDDER TO FURNISH DURING PROJECT [■] ASME PTC 19.5 / [■] ISO 5167 LONG RADIUS : HIGH BETA SS316 ~ 0.7 BIDDER TO FURNISH DURING PROJECT
END CONNECTION	TYPE BRANCH PIPE BRANCH PIPE MATERIAL TAPPING LOCATION NUMBER OF TAPPINGS NIPPLE : SIZE/MATL/RATING/QTY	BUTT WELD END YES (FREE ISSUE BY BHEL) SAME AS PIPE MATERIAL D&D/2 : ON PIPE 3 PAIR 25NB / SS316 / SCH.XXS / 12 NOS.: 1000mm LONG
PROCESS DATA	FLUID FLOW (T/HR) PRESSURE (KG/CM ² (A)) TEMPERATURE (DEG. C.) MAX. ALLOWABLE PRESS LOSS DESIGN PRESS : TEMP DIFF. PRESS AT MAX FLOW	STEAM MAX. NORMAL MINIMUM SHALL BE FURNISHED DURING PROJECT 297 Kg/cm ² : 608 DEG C BIDDER TO FURNISH DURING PROJECT
PIPE LINE DATA	PIPE SIZE (OD X THK) mm PIPE MATERIAL BORE DIAMETER MIN. AVAILABLE STRAIGHT LENGTH UPSTREAM:DOWNSTREAM * FLOW DIRECTION	<u>AS PER PRICE SCHEDULE</u> [■] SA 335 P91 BIDDER TO FURNISH DURING PROJECT 15D 10D : 5D HORIZONTAL
OTHER DATA	IBR CERTIFICATION APPROX. WEIGHT OF ASSEMBLY	REQUIRED BIDDER TO FURNISH DURING PROJECT
PACKING	SEA WORTHY PACKING *	[■] YES / [■] NO
* Project specific data shall be informed by BHEL during project ordering		

BIDDER TO QUOTE IN COLUMN “IV” OF PRICE FORMAT FOR DETAILS SPECIFIED ABOVE

BIDDER TO NOTE THE FOLLOWING FOR EACH NOZZLE ASSEMBLY:

- Nipples to be provided by bidder for extra pair of tappings also. Price for the same shall be as per unit price quoted in the price schedule.
- Blind plug (also called as stub) material shall be same as pipe material for spare pair of tapping.
- All accessories, including blind plug (stub), shall be considered by the bidder and shall have IBR Certification, as applicable (indicated in respective Data Sheets).
- S-bend to be considered for vertical flow direction / main steam process requirement.

बी एच ई एल 	Technical specification for Flow Nozzle Assembly with Accessories (RATE CONTRACT)		SPECIFICATION NO.: PE-TS-20-145-I105B	
			VOLUME IIB	
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			REV. NO.	00
			DATA : 24.12.19	

Tag No. : AS PER DATA SHEET “V” OF THE PRICE FORMAT		Data Sheet No.-5
DATA SHEET – A		
ELEMENT	SERVICE MAKE : MODEL TYPE STANDARD * DESIGN MATERIAL BETA RATIO BORE DIAMETER	SHALL BE FURNISHED DURING PROJECT BIDDER TO FURNISH DURING PROJECT [■] ASME PTC 19.5 / [■] ISO 5167 LONG RADIUS : HIGH BETA SS316 ~ 0.7 BIDDER TO FURNISH DURING PROJECT
END CONNECTION	TYPE BRANCH PIPE BRANCH PIPE MATERIAL TAPPING LOCATION NUMBER OF TAPPINGS NIPPLE : SIZE/MATL/RATING/QTY	BUTT WELD END YES (IN BHEL SCOPE) SAME AS PIPE MATERIAL D&D/2 : ON PIPE 3 PAIR 25NB / SS316 / SCH.XXS / 12 NOS.: 1000mm LONG
PROCESS DATA	FLUID FLOW (T/HR) PRESSURE (KG/CM² (A)) TEMPERATURE (DEG. C.) MAX. ALLOWABLE PRESS LOSS DESIGN PRESS : TEMP DIFF. PRESS AT MAX FLOW	STEAM MAX. NORMAL MINIMUM SHALL BE FURNISHED DURING PROJECT 297 Kg/cm2 : 608 DEG C BIDDER TO FURNISH DURING PROJECT
PIPE LINE DATA	PIPE SIZE (OD X THK) mm PIPE MATERIAL BORE DIAMETER MIN. AVAILABLE STRAIGHT LENGTH UPSTREAM:DOWNSTREAM * FLOW DIRECTION	<u>AS PER PRICE SCHEDULE</u> [■] SA 335 P91 BIDDER TO FURNISH DURING PROJECT 15D 10D : 5D HORIZONTAL
OTHER DATA	IBR CERTIFICATION APPROX. WEIGHT OF ASSEMBLY	REQUIRED BIDDER TO FURNISH DURING PROJECT
PACKING	SEA WORTHY PACKING *	[■] YES / [■] NO
* Project specific data shall be informed by BHEL during project ordering		

BIDDER TO QUOTE IN COLUMN “V” OF PRICE FORMAT FOR DETAILS SPECIFIED ABOVE

BIDDER TO NOTE THE FOLLOWING FOR EACH NOZZLE ASSEMBLY:

- Nipples to be provided by bidder for extra pair of tappings also. Price for the same shall be as per unit price quoted in the price schedule.
- Blind plug (also called as stub) material shall be same as pipe material for spare pair of tapping.
- All accessories, including blind plug (stub), shall be considered by the bidder and shall have IBR Certification, as applicable (indicated in respective Data Sheets).
- S-bend to be considered for vertical flow direction / main steam process requirement.

	Technical specification for Flow Nozzle Assembly with Accessories (RATE CONTRACT)		SPECIFICATION NO.: PE-TS-20-145-I105B	
			VOLUME IIB	
			SECTION C	
			REV. NO.	00
			DATA : 24.12.19	

Tag No. : AS PER DATA SHEET “VI” OF THE PRICE FORMAT

Data Sheet No.-6

DATA SHEET – A		
ELEMENT	SERVICE MAKE : MODEL TYPE STANDARD * DESIGN MATERIAL BETA RATIO BORE DIAMETER	SHALL BE FURNISHED DURING PROJECT BIDDER TO FURNISH DURING PROJECT [■] ASME PTC 19.5 / [■] ISO 5167 LONG RADIUS : HIGH BETA SS316 ~ 0.7 BIDDER TO FURNISH DURING PROJECT
END CONNECTION	TYPE BRANCH PIPE BRANCH PIPE MATERIAL TAPPING LOCATION NUMBER OF TAPPINGS NIPPLE : SIZE/MATL/RATING/QTY EXPANDER : SIZE/MATL/RATING/QTY	BUTT WELD END YES (IN BHEL SCOPE) SAME AS PIPE MATERIAL D&D/2 : ON PIPE 3 PAIR 25NB / SS316 / SCH.XXS / 12 NOS. : 1000mm LONG 15NBx25NB / SS316 / CLASS 9000 / 6 NOS. : 50.8mm LONG
PROCESS DATA	FLUID FLOW (T/HR) PRESSURE (KG/CM ² (A)) TEMPERATURE (DEG. C.) MAX. ALLOWABLE PRESS LOSS DESIGN PRESS : TEMP DIFF. PRESS AT MAX FLOW	STEAM MAX. NORMAL MINIMUM SHALL BE FURNISHED DURING PROJECT 190 Kg/cm ² : 545 DEG C BIDDER TO FURNISH DURING PROJECT
PIPE LINE DATA	PIPE SIZE (OD X THK) mm PIPE MATERIAL BORE DIAMETER MIN. AVAILABLE STRAIGHT LENGTH UPSTREAM:DOWNSTREAM * FLOW DIRECTION	<u>AS PER PRICE SCHEDULE</u> SA 335 P22 BIDDER TO FURNISH DURING PROJECT 15D 10D : 5D HORIZONTAL
OTHER DATA	IBR CERTIFICATION APPROX. WEIGHT OF ASSEMBLY	REQUIRED BIDDER TO FURNISH DURING PROJECT
PACKING	SEA WORTHY PACKING *	[■] YES / [■] NO
* Project specific data shall be informed by BHEL during project ordering		

BIDDER TO QUOTE IN COLUMN “VI” OF PRICE FORMAT FOR DETAILS SPECIFIED ABOVE

BIDDER TO NOTE THE FOLLOWING FOR EACH NOZZLE ASSEMBLY:

- Nipples to be provided by bidder for extra pair of tappings also. Price for the same shall be as per unit price quoted in the price schedule.
- Blind plug (also called as stub) material shall be same as pipe material for spare pair of tapping.
- All accessories, including blind plug (stub), shall be considered by the bidder and shall have IBR Certification, as applicable (indicated in respective Data Sheets).
- S-bend to be considered for vertical flow direction / main steam process requirement.

बी एच ई एल 	Technical specification for Flow Nozzle Assembly with Accessories (RATE CONTRACT)		SPECIFICATION NO.: PE-TS-20-145-I105B	
			VOLUME IIB	
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			REV. NO.	00
			DATA : 24.12.19	

Tag No. : NOZZLE ASSEMBLY AS PER DATA SHEET “VII” OF THE PRICE FORMAT	Data Sheet No.-7	
DATA SHEET – A		
ELEMENT	SERVICE MAKE : MODEL TYPE STANDARD * DESIGN MATERIAL BETA RATIO BORE DIAMETER	SHALL BE FURNISHED DURING PROJECT BIDDER TO FURNISH DURING PROJECT ☐ ASME PTC 19.5 / ☐ ISO 5167 LONG RADIUS : HIGH BETA SS316 ~ 0.7 BIDDER TO FURNISH DURING PROJECT
END CONNECTION	TYPE BRANCH PIPE BRANCH PIPE MATERIAL TAPPING LOCATION NUMBER OF TAPPINGS NIPPLE : SIZE/MATL/RATING/QTY EXPANDER : SIZE/MATL/RATING/QTY	BUTT WELD END YES (IN BHEL SCOPE) SAME AS PIPE MATERIAL D&D/2 : ON PIPE 3 PAIR 25NB / SS316 / SCH.80 / 12 NOS : 250mm LONG 15NBx25NB / SS316 / CLASS 3000 / 6 NOS.: 50.8mm LONG
PROCESS DATA	FLUID FLOW (T/HR) PRESSURE (KG/CM ² (A)) TEMPERATURE (DEG. C.) MAX. ALLOWABLE PRESS LOSS DESIGN PRESS : TEMP DIFF. PRESS AT MAX FLOW	DM WATER MAX. NORMAL MINIMUM SHALL BE FURNISHED DURING PROJECT 15 Kg/cm ² : 60 DEG C BIDDER TO FURNISH DURING PROJECT
PIPE LINE DATA	PIPE SIZE (OD X THK) mm PIPE MATERIAL BORE DIAMETER MIN. AVAILABLE STRAIGHT LENGTH UPSTREAM:DOWNSTREAM * FLOW DIRECTION	<u>AS PER PRICE SCHEDULE</u> SA 312 TP304 BIDDER TO FURNISH DURING PROJECT 15D 10D : 5D HORIZONTAL
OTHER DATA	IBR CERTIFICATION APPROX. WEIGHT OF ASSEMBLY	NOT REQUIRED BIDDER TO FURNISH DURING PROJECT
PACKING	SEA WORTHY PACKING *	☐ YES / ☐ NO
* Project specific data shall be informed by BHEL during project ordering		
<u>BIDDER TO QUOTE IN COLUMN “VII” OF PRICE FORMAT FOR DETAILS SPECIFIED ABOVE</u> <u>BIDDER TO NOTE THE FOLLOWING FOR EACH NOZZLE ASSEMBLY:</u> A) Blind plug (also called as stub) material shall be same as pipe material for spare tapping. B) All accessories including blind plug (stub) shall be considered by the bidder and shall have IBR Certification, as applicable (indicated in respective Data Sheets). C) S-bend to be considered for vertical flow direction / main steam process requirement.		

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Technical specification for
Flow Nozzle Assembly with Accessories
(RATE CONTRACT)

SPEC NO.: PE-TS-20-145-I105B

VOLUME II B

SECTION C

REV. NO. 00

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DATA SHEET - C

बी एच ई एल BHEL	Technical specification for Flow Nozzle Assembly with Accessories (RATE CONTRACT)		SPECIFICATION NO.: PE-TS-20-145-I105B	
			VOLUME IIB	
			SECTION C	
			REV. NO. 00	DATE : 26.12.19

Tag No.

DATA SHEET – C (TO BE FILLED BY VENDOR)		
ELEMENT	SERVICE MAKE : MODEL TYPE STANDARD * DESIGN MATERIAL BETA RATIO BORE DIAMETER	
END CONNECTION	TYPE BRANCH PIPE BRANCH PIPE MATERIAL TAPPING LOCATION NUMBER OF TAPPINGS NIPPLE : SIZE/MATL/RATING/QTY	
PROCESS DATA	FLUID FLOW (T/HR) PRESSURE (KG/CM ² (A)) TEMPERATURE (DEG. C.) MAX. ALLOWABLE PRESS LOSS DESIGN PRESS : TEMP DIFF. PRESS AT MAX FLOW	MAX. NORMAL MINIMUM
PIPE LINE DATA	PIPE SIZE (OD X THK) mm PIPE MATERIAL BORE DIAMETER MIN. AVAILABLE STRAIGHT LENGTH UPSTREAM:DOWNSTREAM FLOW DIRECTION	
OTHER DATA	IBR CERTIFICATION APPROX. WEIGHT OF ASSEMBLY	
PACKING	SEA WORTHY PACKING	

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Technical specification for
Flow Nozzle Assembly with Accessories
(RATE CONTRACT)

SPEC NO.: PE-TS-20-145-I105B

VOLUME II B

SECTION C

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BILL OF QUANTITY - MAIN SUPPLY

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Technical specification for
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 (RATE CONTRACT)

SPEC NO.: PE-TS-20-145-I105B

VOLUME II B

SECTION C

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BILL OF QUANTITY-SPARES

[A] LIST OF COMMISSIONING SPARES

(As specified in each datasheet)

[B] LIST OF MANDATORY SPARES

NONE



Technical specification for
Flow Nozzle Assembly with Accessories
(RATE CONTRACT)

SPEC NO.: PE-TS-20-145-I105B

VOLUME II B

SECTION D

REV. NO. 00

DATE : 24.12.19

SECTION – D

EQUIPMENT SPECIFICATION



Technical specification for
Flow Nozzle Assembly with Accessories
(RATE CONTRACT)

SPEC NO.: PE-TS-20-145-I105B

VOLUME II B

SECTION D

REV. NO. 00

DATE : 24.12.19

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 flow nozzles along with Branch pipes for use in Utility/Captive Power Station/Combined Cycle Station.

2.0 CODES AND STANDARDS

2.1 All the equipment specified herein shall comply with the requirements of the latest issue of the relevant National and International standards.

2.2 The Design and Materials used for the components shall also comply with the relevant National and International standards.

2.3 As a minimum requirement, ASME PTC 19.5 / ISO 5167 standard shall be complied with for Flow Nozzles.

3.0 TECHNICAL REQUIREMENTS

The flow nozzles shall be used as the primary flow sensing elements. These sensing elements shall provide a safe and reliable means of creating differential pressures for use in flow measurements.

3.1 Flow Nozzles

The Flow nozzle assemblies shall conform to the following requirements unless specified otherwise in the corresponding data sheets.

3.1.1 Type : The Flow nozzles shall be of long radius, weld in type (suitable for welding with the associated branch pipe). The design and manufacture of the flow nozzles shall be as per ASME PTC 19.5 / ISO 5167. The data sheet enclosed specifies the requirements of each flow nozzle assembly. The bidder shall calculate the Beta ratio and validate suitability of the selected design for the specified application. Vent holes, if required for the specified duty shall be located at the top and drain holes at the bottom of the nozzle.

3.1.2 Material : The Flow nozzles shall be constructed of stainless steel type SS 316/ F91 /F 92 as indicated in the data sheets A & B .

3.1.3 Assembly : The Flow nozzles shall be supplied as complete assemblies, along with duly machined branch pipes, having proper end connection for welding on to the associated pipe at site. Welding shall be done as per the relevant ANSI practice in line with the main piping.

Each flow nozzle assembly shall be provided with minimum three pairs of pressure tapping with blind plug (stub), suitable for the service conditions. D & D/2 pressure tapping shall be provided on the branch pipe.

Extra pressure tapping (other than the three tapping's mentioned above) shall be provided in case to case basis for a specific project (if required) by the bidder without any commercial implication. Associated accessories for this particular extra tapping like nipple and blind plug (stub) shall be considered as per the unit price quoted by the bidder in the price format.

Each flow nozzle assembly will also be provided with a suitable nameplate, with tag number and duty.



Technical specification for
Flow Nozzle Assembly with Accessories
(RATE CONTRACT)

SPEC NO.: PE-TS-20-145-I105B

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SECTION D

REV. NO. 00

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3.1.4 Branch pipe:

The branch pipe for mounting the flow Nozzle will be supplied as a free issue item by BHEL. However the successful bidder shall collect the branch pipe from any of BHEL Units or Site, to be intimated by the BHEL during contract stage. The vendor shall be responsible for proper transportation from the above collection point, machining of the branch pipe and welding the flow nozzle inside the branch pipe. Acquiring of IBR certification if required shall also be the responsibility of the successful bidder. **Bidder to note that the branch pipe supplied by BHEL, may have tolerance as per ASTM standard (i.e. OD 1% (Max. 4 mm), wall thickness 12.5%). The cost of all such activities shall be included by the bidder in the offer and no commercial implication shall be accepted for the same.**

3.1.5 While machining the ID to maintain uniform internal diameter, care shall be taken to ensure the minimum thickness of the branch pipe as per IBR regulations.

3.1.6 **Edge preparation details shall be as per Annexure-B (Drawing No. 3-80-300-19825)**

4.0 TESTS & INSPECTION

4.1 The equipment covered under this specification shall be subject to vendor's quality plan to be approved by the purchaser before start of manufacturing. To ensure that quality is in-built in each equipment the quality assurance system manual indicating the system followed by the vendor shall be submitted to purchaser for his review.

4.2 The quality plan forming part of this specification shall be the minimum requirements for the vendor's quality plan to be submitted with the offer. The vendor shall give at least 15 days written notice to purchaser for witnessing the tests/inspection at various stages. The expenses for all such tests/inspection shall be to manufacturer's account except for the expenses of purchaser's representatives witnessing the tests. The purchaser shall attend such tests/inspection within 15 days failing which the manufacturer may proceed with the tests which shall be deemed to have been made in purchaser's presence and shall furnish relevant test certificates to the purchaser.

4.3 One flow nozzle of each type and size of a specific service shall be tested and calibrated by the bidder at customer's approved laboratory, within his quoted price. Details of the calibration test i.e., type of test, equipments employed etc. shall be submitted in the bid.

4.4 Each branch pipe shall be inspected by the purchaser after the completion of machining and prior to welding of the nozzle. This test will include dimensional checks, surface smoothness checks etc.

4.5 IBR certification, if required for the specified service shall be obtained by the successful bidder from the concerned authority for submission to the purchaser.

4.6 The Standard QP is included in this specification to enable bidder to understand the extent of inspection and testing requirements to execute this job. The successful bidder has to follow the agreed QP, taking care of customer requirements and submit QP for final approval by BHEL / Customer.



Technical specification for
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(RATE CONTRACT)

SPEC NO.: PE-TS-20-145-I105B

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SECTION D

REV. NO. 00

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5.0 DRAWINGS & DOCUMENTS

5.1 For RATE CONTRACT:

Following documents shall be submitted:

- a) Quality plan duly signed and stamped.
- b) Datasheet A & B duly signed and stamped.
- c) Unpriced bid format of Price Schedule.

5.2 After the award of project specific contract:

The documentation as listed below to be submitted, separately for respective projects.

5.2.1 for approval:

1. Technical data sheets for each flow nozzle and accessories, in the proforma enclosed under Data sheet-B.
2. The calculation of proper flow nozzle bore for the process conditions indicated in the data sheet.
3. Assembly drawing of each type of flow nozzle complete with all accessories indicating detailed dimensions, B.O.M. and weights.
4. Detailed dimensional drawings of each flow nozzle, flow nozzles, branch pipes, pressure connections, nipples etc.
5. Installation drawings for the flow elements.
6. Quality Plan duly signed and stamped.
7. Edge preparation details.
8. Differential pressure vs flow curve for each Nozzle.

5.2.2 for information:

1. Storage & commissioning instructions.
2. All relevant catalogues for the models of the Nozzle Assemblies as well as accessories finalized.
3. O&M manuals.



Technical specification for
Flow Nozzle Assembly with Accessories
(RATE CONTRACT)

SPEC NO.: PE-TS-20-145-I105B

VOLUME II B

SECTION D

REV. NO. 00

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5.3 Final documentation for a project specific contract:

Final documentation separately for respective projects shall contain 5 sets with 2 CD-ROMS of each of the following:

1. Category –I & IV Approved final drawings/data sheets, sizing calculations, DP vs Flow Curve for each nozzle.
2. Verified test certificates.
3. Approved Quality Plan
4. Calibrations Reports
5. Quality Inspection Report
6. Operation & Maintenance Manuals for Flow Element Assemblies and all the accessories (Containing storage & commissioning instructions).

6.0 PACKING & MARKING

6.1 **Packing:** Each nozzle assembly and the associated accessories shall be packed properly with adequate protection against friction, stresses, vibrations and shocks during transportation. Each packing shall have markings as per Purchase Order / Special Condition of the Contract (SCC).

6.2 **Marking:** Each flow element assembly shall be identified with the following information:

- Tag Number
- Service
- Element Material
- Beta ratio
- Line size & thickness
- Direction of flow

7.0 APPLICABLE DATA SHEET FORMS

This document shall be read with one or more of the following data sheet forms:

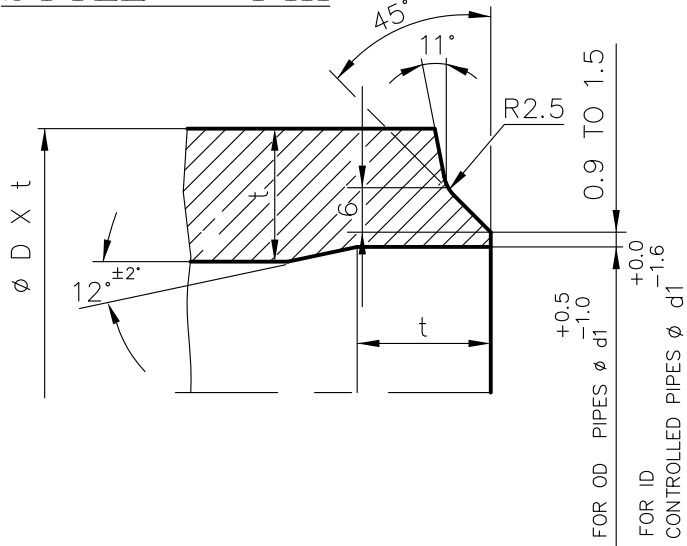
- Data sheet A&B for Flow NOZZLE: Data sheet no. DS-"X" (X== 1 to 7)

CAUTION THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LTD. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

3-80-300-19825

DRAWING No.

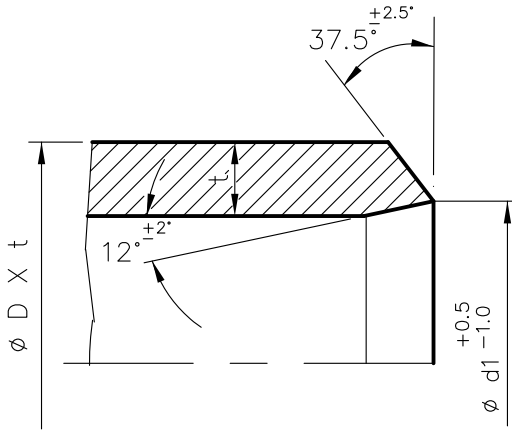
STYLE - P_m



NOTES: -

01. USE FOR SA106GRC PIPES WHEN $t \geq 70.0$ mm.
02. FOR OD MISMATCHING REF. FIGURE-P_a
03. FOR FITTINGS USE STYLE-P.

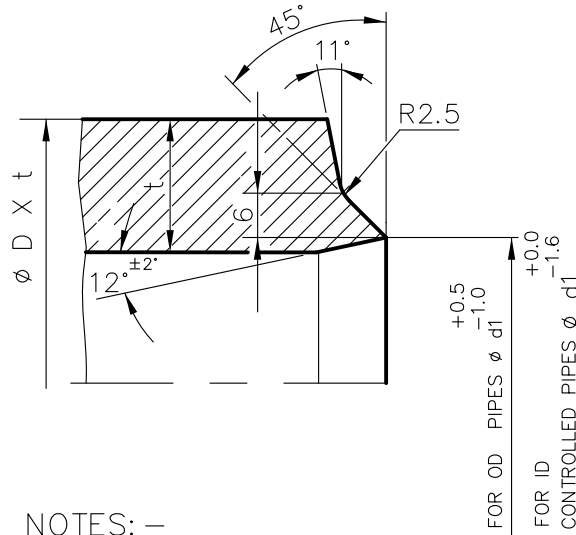
STYLE - D_L



NOTES: -

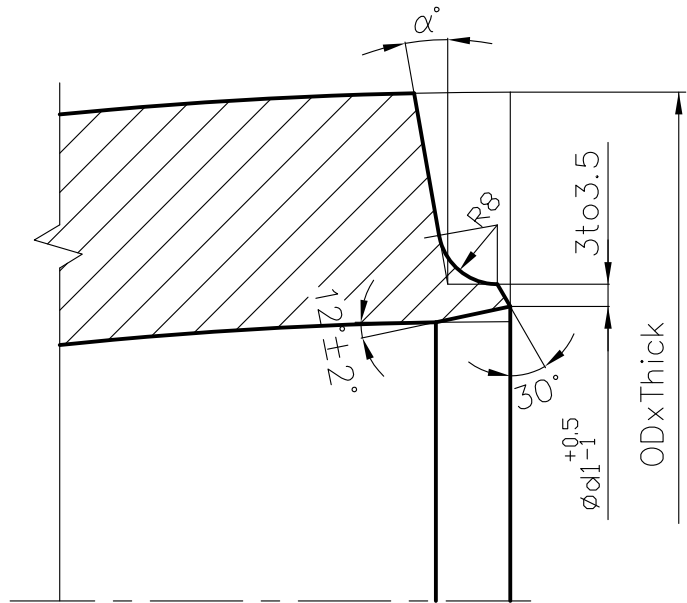
01. USE FOR P91 / P92 PIPES AND FITTINGS WHEN $t < 14.2$ mm (ALL OD/ID).

STYLE - P_L



NOTES: -

01. USE FOR P91 / P92 PIPES AND FITTINGS
 - i) WHEN THICKNESS IS ≥ 14.2 mm AND < 20 mm FOR ALL OD/ID.
 - ii) WHEN THICKNESS ≥ 20 mm AND OD < 219.1 mm.
02. FOR OD MISMATCHING REF. FIGURE-P_a



01. USE FOR P91 / P92 FITTINGS
02. REFER STYLE-D_L FOR THICKNESS < 14.2 mm FOR ALL OD/ID.
03. REFER STYLE-P_L
 - i) WHEN THICKNESS IS ≥ 14.2 mm AND < 20 mm FOR ALL OD/ID.
 - ii) WHEN THICKNESS ≥ 20 mm AND OD < 219.1 mm.
04. $\alpha = 6^\circ$ FOR WALL THICKNESS ≥ 20 mm AND ≤ 30 mm
05. $\alpha = 10^\circ$ FOR WALL THICKNESS > 30 mm.
06. FIGURE-Xf IS APPLICABLE FOR ALL BUTT WELDED FITTINGS NOT COVERED IN NOTES 02 & 03

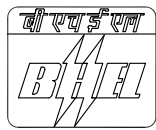
FIGURE-Xf

NOTE :

01. FOR GENERAL NOTES AND NOTES FOR WELDING REFER SHEET 1 OF 2.

TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT

STANDARD



BHARAT HEAVY ELECTRICALS LTD.,
PIPING CENTRE, MADRAS

DRN	NAME	SIGN	DATE	NO OF ITEMS
CHD	P SURESH		07.12.16	
APPD	R SESHAGIRI		07.12.16	
	C KARUNAKARAN		07.12.16	

DEPT.	GRADE OF UN TOL DIM	SCALE	WEIGHT (Kg).	NAME OF ORIGINAL ORGANISATION	ITEM No.
CODE	C/M/F				

TITLE	CARD CODE	DRAWING No.	REV
EDGE PREPARATION DETAILS	U 01	3-80-300-19825 SHEET 2 OF 2	04



EDGE PREPARTION AND WELD END DIAMETER (d_1 VALUES)

TP 062 05 99

PAGE-7

14.0	15.9	19.05	21.3	31.8	38.0	44.5	47.63	51.0	54.0	57.0	60.3	63.5	70.0	76.1	88.9	101.6	108.0	127	141.3	159	168.3	177.8	193.7	219.1	244.5	248.5	273	298.5	323.9	355.6	368	406.4	457.2	508	558.8	609.6	711.2	812.8			
1.8	10.4	12.3	15.4																																						
2.0	10.0	11.9	15.0	17.3																																					
2.3	9.4	11.3	14.4	16.7	26.8																																				
2.6	8.8	10.7	13.8	16.1	26.2	32.4	38.8	41.9	45.3	48.3																															
2.9	8.2	10.1	13.2	15.5	25.6	31.8	38.2	41.3	44.7	47.7	50.7	54.0	57.1	63.6	69.6																										
3.2	7.6	9.5	12.6	14.9	25.0	31.2	37.6	40.7	44.1	47.1	50.1	53.4	56.5	63.0	69.0	82.5																									
3.4	7.2	9.1	12.2	14.5	24.6	30.8	37.2	40.3	43.7	46.7	49.7	53.0	56.1	62.6	68.6	82.1																									
3.5	7.0	8.9	12.0	14.3	24.4	30.6	37.0	40.1	43.5	46.5	49.5	52.8	55.9	62.4	68.4	81.9																									
3.6	6.8	8.7	11.8	14.1	24.2	30.4	36.8	39.9	43.3	46.3	49.3	52.6	55.7	62.2	68.2	81.7	94.4	100.8																							
4.0		7.9	11.0	13.3	23.4	29.6	36.0	39.1	42.5	45.5	48.5	51.8	54.9	61.4	67.4	80.9	93.6	100.0	119.0																						
4.5			10.0	12.3	22.4	28.6	35.0	38.1	41.5	44.5	47.5	50.8	53.9	60.4	66.4	79.9	92.9	99.0	118.0	132.3	150.0	159.3																			
4.8				11.7	21.8	28.0	34.4	37.5	40.9	43.9	46.9	50.2	53.3	59.8	65.8	79.3	92.0	98.4	117.4	131.7	149.4	158.7																			
5.0				11.3	21.4	27.6	34.0	37.1	40.5	43.5	46.5	49.8	52.9	59.4	65.4	78.9	91.6	98.0	117.0	131.3	149.0	158.3	167.8																		
5.2					21.0	27.2	33.6	36.7	40.1	43.1	46.1	49.4	52.5	59.0	65.0	78.5	91.2	97.6	116.6	130.9	148.6	157.9	167.4																		
5.4					20.6	26.8	33.2	36.3	39.7	42.7	45.7	49.0	52.1	58.6	64.6	78.1	90.8	97.2	116.2	130.5	148.2	157.5	167.0	182.9																	
5.6					20.2	26.4	32.8	35.9	39.3	42.3	45.3	48.6	51.7	58.2	64.2	77.7	90.4	96.8	115.8	130.1	147.8	157.1	166.6	182.5																	
5.7					20.0	26.2	32.6	35.7	39.1	42.1	45.1	48.4	51.5	58.0	64.0	77.5	90.2	96.6	115.6	129.9	147.6	156.9	166.4	182.3																	
5.9					19.6	25.8	32.2	35.3	38.7	41.7	44.7	48.0	51.1	57.6	63.6	77.1	89.8	96.2	115.2	129.5	147.2	156.5	166.0	181.9	207.3																
6.0					19.4	25.6	32.0	35.1	38.5	41.5	44.5	47.8	50.9	57.4	63.4	76.9	89.6	96.0	115.0	129.3	147.0	156.3	165.8	181.7	207.1																
6.3					18.8	25.0	31.4	34.5	37.9	40.9	43.9	47.2	50.3	56.8	62.8	76.3	89.0	95.4	114.4	128.7	146.4	155.7	165.2	181.1	206.5	231.9	235.9	260.4													
6.6					18.2	24.4	30.8	33.9	37.3	40.3	43.3	46.6	49.7	56.2	62.2	75.7	88.4	94.8	113.8	128.1	145.8	155.1	164.6	180.5	205.9	231.3	235.3	259.8													
7.1					17.2	23.4	29.8	32.9	36.3	39.3	42.3	45.6	48.7	55.2	61.2	74.7	87.4	93.8	112.8	127.1	144.8	154.1	163.6	179.5	204.9	230.3	234.3	258.8	284.3	309.7											
7.5					16.4	22.6	29.0	32.1	35.5	38.5	41.5	44.8	47.9	54.4	60.4	73.9	86.6	93.0	112.0	126.3	144.0	153.3	162.8	178.7	204.1	229.5	233.5	258.0	283.5	308.9											
7.6					16.2	22.4	28.8	31.9	35.3	38.3	41.3	44.6	47.7	54.2	60.2	73.7	86.4	92.8	111.8	126.1	143.8	153.1	162.6	178.5	203.9	229.3	233.3	257.8	283.3	308.7											
8.0					15.4	21.6	28.0	31.1	34.5	37.5	40.5	43.8	46.9	53.4	59.4	72.9	85.6	92.0	111.0	125.3	143.0	152.3	161.8	177.7	203.1	228.5	232.5	257.0	282.5	307.9	339.6	352.0									
8.6					20.4	26.8	29.9	33.3	36.3	39.3	42.6	45.7	52.2	58.2	71.7	84.4	90.8	109.8	124.1	141.8	151.1	160.6	176.5	201.9	227.3	231.3	255.8	281.3	306.7	338.4	350.8										
8.8					20.0	26.4	29.5	32.9	35.9	38.9	42.2	45.3	51.8	57.8	71.3	84.0	90.4	109.4	123.7	141.4	150.7	160.2	176.1	201.5	226.9	230.9	255.4	280.9	306.3	338.0	350.4	388.8									
9.0					19.6	26.0	29.1	32.5	35.5	38.5	41.8	44.9	51.4	57.4	70.9	83.6	90.0	109.0	123.3	141.0	150.3	159.8	175.7	201.1	226.5	230.5	255.0	280.5	305.9	337.6	350.0	388.4									
10.0					17.6	24.0	27.1	30.5	33.5	36.5	39.8	42.9	49.4	55.4	68.9	81.6	88.0	107.0	121.3	139.0	148.3	157.8	173.7	199.1	224.5	228.5	253.0	278.5	303.9	335.6	348.0	386.4	437.2								
11.0					22.0	25.1	28.5	31.5	34.5	37.8	40.9	47.4	53.4	67.9	80.6	87.3	106.5	120.8	138.2	147.4	156.8	172.5	197.1	222.5	226.5	251.0	276.5	301.9	333.6	346.0	384.4	435.2	486.0								
12.0					20.0	23.1	26.5	29.5	32.5	35.8	38.9	45.4	51.4	65.9	78.6	85.9	104.7	118.9	136.4	145.6	155.0	170.8	195.1	220.5	224.5	249.0	274.5	299.9	331.6	344.0	382.4	433.2	484.0								
12.5					19.0	22.1	25.5	28.5	31.5	34.8	37.9	44.4	50.4	64.9	77.6	84.9	103.9	118.0	135.5	144.7	154.2	169.9	194.1	219.5	223.5	248.0	273.5	298.9	330.6	343.0	381.4	432.2	483.0	533.8							
14.0							22.5	25.5	28.5	31.8	34.9	41.4	47.4	63.5	76.1	82.4	101.2	115.4	132.9	142.1	151.5	167.3	194.2	219.5	223.5	247.8	273.2	298.5	333.0	342.4	380.6	431.1	481.7	532.2							
14.2							22.1	25.1	28.1	31.4	34.5																														

OUTSIDE DIA 'D'	STYLE 'I'	VIEW OF EDGE PREPARATION	OUTSIDE DIA 'D'	STYLE 'I'	
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15



Technical specification for
Flow Nozzle Assembly with Accessories
(RATE CONTRACT)

SPEC NO.: PE-TS-20-145-I105B

VOLUME II B

SECTION C

REV. NO. 00

DATE 24.12.19

QUALITY PLAN

 PEM :: C&I		STANDARD QUALITY PLAN FOR FLOW NOZZLE ASSEMBLY							QUALITY PLAN NO.: PE-QP-888-145-I105B			
									VOLUME IIB			
									SECTION D			
									REV. NO. 00		DATE: 17.01.15	
									SHEET 1		OF 3	
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	
1.0	RAW MATERIAL Flow Nozzle, pipe, adapter	Physical, Chemical properties	MA	Physical, Chemical tests	One / Heat	AP / DP / SP	AP / DP / SP	TC	3/2	---	2,1	Refer Note-1
		Ultrasonic testing (nozzle only)	MA	Ultrasonic test	100%	ASTMA388 & ANSI B 16.34	ASTMA388 & ANSI B 16.34	TC	3	2	1	
2.0	IN PROCESS											
2.1	Welding procedure specification (WPS)	Correctness	MA	Scrutiny	100%	IS:7307 / ASME IX	IS:7307 / ASME IX	Format of IS / ASME	3/2	---	2,1	IBR certification to be verified by BHEL, if applicable
2.2	Procedure Qualification Record(PQR) & Welders qualification	Weld soundness	MA	Physical test / Radiographic Test	IS:7307/ IS:7310/ ASME IX	IS:7307/ IS:7310/ ASME IX	IS:7307/ IS:7310/ ASME IX	Format of IS / ASME	3/2	2	1	
2.3	Weld FIT-UPS	Dimension, Alignment, Orientation.	MA	Measurement & Visual	100%	WPS/Approved drg.	WPS/Approved drg.	IR / Log Book	3/2	---	2	Refer Note-3
2.4	Weldments final run	1. Surface defects	MA	Penetrant Test	100%	IS:3658 / ASTM 165/ ASME VIII Div. I	ASTM. / 165ASME VIII Div I	IR / Log Book	3/2	2	1	
		2. Sub Surface defects(After PWHT)	MA	Radiographic Test	100%	ASME SEC. V	ASME SEC. VIII	IR	3/2	2	1	100% by Vendor, 10 % by BHEL Films to be reviewed by BHEL.

LEGEND: * CR - Critical characteristics IR - Inspection Reports DS – Data Sheet MR- Manufacturer records \$ P - Agency Performing the Test. 1 - BHEL
 MA - Major characteristics TC - Test Certificates SP – Tech. Spec. MS- Manufacturer standards W - Agency Witnessing the Test. 2 - Vendor
 MI - Minor characteristics AP – Approved Drawings/doc V - Agency Verifying the Test. 3 - Sub-vendor

 PEM :: C&I		STANDARD QUALITY PLAN FOR FLOW NOZZLE ASSEMBLY							QUALITY PLAN NO.: PE-QP-888-145-I105B			
									VOLUME	IIB		
									SECTION	D		
									REV. NO.	00	DATE: 17.01.15	
									SHEET	2	OF	3
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	
		3 Heat Treatment	MA	Review of HT Chart	100%	ASME SEC. VIII	ASME SEC. VIII	HT Chart	3/2	2	1	100% by Vendor, 10% by BHEL
2.5	1. Flow Nozzle (machined)	1. Dimensions	MA	Measurement	100%	AP / DS	AP / DS	IR	3/2	2	1	
		2. Profile	MA	Measurement	100%	AP / DS	AP / DS	IR	3/2	2	1	
		3. Surface finish	MA	Visual	100%	-----	Mirror finish.	IR / Mfd Records	3/2	2	1	
	2. Pipe, Adapter	1. Machining of pipe ID	MA	Measurement	100%	AP / DS	AP / DS	IR	3/2	2	1	
		2. Dimensions	MA	Measurement	100%	AP / DS	AP / DS	IR	3/2	2	1	
		3. Surface flaw on weld edge preparation (for shop welding)	MA	Penetrant Test	100%	ASTM 165/ IS-3658	ASTM 165/ IS-3658	IR /TC	3/2	2	1	
		4. IBR Clearance	MA	Review	100%	IBR Compliance	IBR Compliance	Form III C	3/2		1	
3.0	ROUTINE TEST	1. Leak tightness	CR	Hydraulic test(1.5 times Design pressure)	100%	AP / DS	No Leakage	Test Certificate	3/2	2,1	---	Minimum time duration of test shall be ½ hours.

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 PEM :: C&I		STANDARD QUALITY PLAN FOR FLOW NOZZLE ASSEMBLY							QUALITY PLAN NO.: PE-QP-888-145-I105B			
									VOLUME	IIB		
									SECTION	D		
									REV. NO.	00	DATE: 17.01.15	
									SHEET	3	OF	3
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	
		2. Calibration	CR	Measurement	1 per type per size	----	Tech Spec.	TC	2	---	1	Refer note-4
4.0	FINAL ASSEMBLY	1. Marking – Tag No., direction of flow	MI	Visual	100%	AP / DS	AP / DS	IR	2	---	1	Refer Note-2 before dispatch
		2. Workmanship, surface flaw on weld edge preparation on end of pipe (for site welding)	MA	Visual, Penetrant test	100%	ASTM165 / IS: 3658	No Surface Flaw	TC /IR	3/2	2	1	
		3. Overall Dimensions and end connection	MA	Measurement	100%	AP / DS	AP / DS	IR	3/2	2/1	---	
5.0	PACKING & DISPATCH	Soundness of Packing against transit damage	MA	Visual	100%	SP / MS	SP /MS		2	---	---	Refer Note-5

NOTE:

- Test Certificates to be verified by BHEL at final inspection stage. Positive Material Identification (PMI) testing shall be performed by vendor and same shall be witnessed by Customer/BHEL.
- Minimum 2 coats of primer paint to be applied before dispatch.
- In case of NTPC / LLOYDS / BHEL qualified welders available, then prequalification and WPS, PQR not required, only TC to be verified.
- CALIBRATION Test to be carried out at IIT-DELHI / FCRI or BHEL approved laboratory.
- Sea Worthy packing (if applicable) shall be provided by bidder without any commercial implication.
- Qualification records of the Vendors can be verified.

For P91 & P22 material welding should be continuously done. No interruptions shall be allowed.

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