भारत सरकार
अन्तरिक्ष विभाग
सतीश धवन अन्तरिक्ष केन्द्र
शार
श्रीहरिकोटा रेंज डा.घ.524 124,
नेल्लूर जिल्ला, आंध्र., भारत
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Government of India
Department of Space
Satish Dhawan Space Centre
SHAR
Sriharikota Range P.O. 524 121,
Nellore Dist., A.P., India
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NOTICE INVITING TENDER
NO. SDSC SHAR/Sr.HPS/PT/SMPC/UNIT-2/49/2022-2023

On behalf of President of India, Sr. Head Purchase and Stores, SDSC SHAR, SRIHARIKOTA invites **on line quotations** for the following:

Sl No	Ref. No.	Description	Qty.
01	SDSC SHAR/SMPC-U2 PURCHASE/ SH2022001248 01 [Two Part basis]	SUPPLY, ERECTION, TESTING & COMMISSIONING OF WATER CIRCULATION SYSYEM FOR MIXING FACILITIES	1 LOT

Last Date for downloading of tender documents : 02.11.2022 at 12:00 hrs.
Due date for bid clarification online : 26.10.2022 at 16:00 hrs.
Due Date for submission of bids online : 02.11.2022 at 12:00 hrs.
Due Date for opening of tenders : 02.11.2022 at 12:05 hrs.

Instructions to Tenderers:

Tender fee & EMD not applicable for tenders submitted through EGPS

01. For full details/scope of work and terms and conditions etc., please see the enclosed annexures.

02. **Interested tenderers can download the e-tender from ISRO e-procurement website https://eproc.isro.gov.in and submit the offer online in the e-procurement portal.**

03. Tender documents are also available on ISRO website www.isro.gov.in, ISRO e-procurement website https://eproc.isro.gov.in and SDSC SHAR, Sriharikota website www.shar.gov.in. The same can be downloaded and offer shall be submitted online in the e-procurement portal.

04. Tenderers shall submit their offers within the given time as specified above and last moment rush for bid submission shall be avoided. Request for new vendor approval shall be submitted online and the same shall be intimated by mail (mentioned in the tender document) referring the tender number.

05. Sr. Head, Purchase and Stores, SDSC-SHAR, Sriharikota reserves the right to accept or reject any/or all the quotations.

Sr. Head, Purchase and Stores
Satish Dhawan Space Centre, Sriharikota

Date: 13.10.2022

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE
SATISH DHAWAN SPACE CENTRE SHAR SRIHARIKOTA (SDSC SHAR)
NELLORE

Tender for Supply, erection, testing and commissioning of Water Circulation System for Mixing Facilities (Bldg. Nos. 683, 684, 686 & 687), SPAG.

Bids to be submitted online

Tender No.: SDSC SHAR/SMPC-U2 PURCHASE/SH202200124801 dated 13-10-2022

A. Tender Details

Tender No :	**SDSC SHAR/SMPC-U2 PURCHASE/SH202200124801**
Tender Date :	**13-10-2022**
Tender Classification:	**GOODS**
Purchase Entity :	**SMPC-U2 PURCHASE**
Centre :	**SATISH DHAWAN SPACE CENTRE SHAR SRIHARIKOTA (SDSC SHAR)**

Supply, erection, testing and commissioning of Water Circulation System for Mixing Facilities

Report ID: GEM/GARPTS/13102022/L8D7CF5N9G63
Price Bid opening date mentioned in the Tender document is tentative. However, Price bid will be opened after completion of Technical evaluation. The same will be notified to technically qualified bidders.

A.1 Tender Schedule

Bid Submission Start Date :	**13-10-2022 18:00**
Bid Clarification Due Date :	**26-10-2022 16:00**
Bid Submission Due Date :	**02-11-2022 12:00**
Bid Opening Date :	**02-11-2022 12:05**
Price Bid Opening Date :	**11-11-2022 14:00**

B. Tender Attachments

NA

Instructions To Vendors

1. STANDARD TERMS & CONDITIONS

1. Tele No.08623-225174/226048
Fax No.08623-225170/22-5028

e-Mail ID : hps@shar.gov.in, nair_binu@shar.gov.in, satyach@shar.gov.in
1. Instruction to Indigenous Suppliers:
a) Payment Terms shall be as specified in RFP. If not specifically mentioned Our Normal payment term is 100% within 30 days after receipt and acceptance of the item at our site. Please confirm acceptance in your quotation.
b) GST/IGST: Please specify GST percentage, if any, in your offer. Please mention HSN/SAC code in your offer and Our GST No. is. 37AAAGS1366J1Z1.
c) Purchase / Price preference to MSEs
Purchase/Price preference will be applicable to the product reservation admissible to the Micro and Small Enterprises. Purchase/Price Preference shall be extended to the MSEs under the Public Procurement Policy for MSEs formulated under the Micro, Small and Medium Enterprises Development Act, 2006. The participating MSEs in a tender, quoting price within the band of L-1 + 15% may also be allowed to supply a portion of the requirement by bringing down their price to the L-1 price, in a situation where L-1 price is from someone other than an MSE. Such MSEs may be allowed to supply up to 25% of the total tendered value. In case of more than one such eligible MSE, the supply will be shared equally.
Micro & Small Enterprises which have technical capability to deliver the goods & Services as per prescribed technical & quality specifications and may not be able to meet the qualification criterion relating to prior experience-prior turnover may be relaxed as per guidelines issued by Ministry of MSMEs & as amended from time to time.
Interested vendors shall specifically claim the benefit with supporting documents.
d) Purchase / Price preference to Make-in-India Products: Preference shall be given to Class 1 local supplier as defined in public procurement (Preference to Make in India), Order 2017 as amended from time to time and its subsequent Orders/Notifications issued by concerned Nodal Ministry for specific Goods/Products. If the bidder wants to avail the Purchase preference, the bidder must upload a certificate from the OEM regarding the percentage of the local content and the details of locations at which the local value addition is made along with their bid, failing which no purchase preference shall

be granted. In case the bid value is more than Rs 10 Crore, the declaration relating to percentage of local content shall be certified by the statutory auditor or cost auditor, if the OEM is a company and by a practicing cost accountant or a chartered accountant for OEMs other than companies as per the Public Procurement (preference to Make-in-India) order 2017 date 04.06.2020. Only Class-I and Class-II Local suppliers as per MII order dated 04.06.2020 will be eligible to bid. Non Local supplies as per MII order dated 04.06.2020 are not eligible to participate. However, eligible micro and small enterprises will be allowed to participate. In case Buyer has selected Purchase Preference to Micro and Small Enterprises clause in the bid, the same will get precedence over this clause.

2. Instruction to Foreign Suppliers:

a) Payment Terms shall be as specified in RFP. If not specifically mentioned Our normal payment term is SIGHT DRAFT, Please confirm acceptance in your offer, if you insist for L/C, and all bank charges shall be to your account. Confirm acceptance.

b) Please specify whether any export clearance is required in case of an order on you.

c)Warranty/Guarantee applicable for the item shall be mentioned in your offer

d)Special Certification for packing Material : as per Plant Quarantine (Regulation of Control into India) Order 2003, Articles packed with packing material of plant origin viz., hay, straw, wood shavings, wood chips, saw dust, wood waste, wooden pallets, Dunn age Mats, wooden packages, coir pith, pear or sphagnum moss etc., will be allowed entry by Customs only with a Phytosanitary Certificate. In case if a Purchase Order, if you propose to us any of the above material for packing such a certificate issued by your local Plant Quarantine Authority shall be furnished.

e) Confirm whether any Export License is required and for which End User Certificate is to be provided by us, in case of an Order on you. (Enclose format for EUC, if applicable)

f) Either Indian Agent on behalf of the foreign principals or the foreign principal directly can quote against this order, but not both. In either case an Indian agent cannot represent more than one principal against the same tender.

g) In case the quote is in INR we prefer to execute the same on HSS Basis and for which Concessional Customs duty as per Notification no.50/2017 Customs dated 30.06.2017,Serial No.539(A) as amended by Notification no.05/2018 dated 25.01.2018. In case the quote is on Indian Rupee (Outside High Sea Sale), the price shall include taxes and duties if any. We shall not able to provide any duty or tax exemption/concession certificates. If the item quote is of USA make, please quote for all-inclusive price since we prefer to get the item on FOR destination basis.

h) Any bidder from a country which shares a land border with India will be eligible to bid in any procurement whether of goods, services (including consultancy services and non-consultancy services) or works (including turnkey projects) only if the bidder is registered with Competent Authority as specified in Office Memorandum no.F.No.6/18/2019-PPD, Ministry of Finance, Department of Expenditure, Public Procurement Division dated 23rd July 2020. All the conditions mentioned in the above OM is applicable for this tender.

Common terms to Indigenous and foreign suppliers:

3.Warranty

You shall provide applicable warranty for the items offered by you without fail. For the applicable period you shall provide necessary warranty certificate.

4.Performance Bank Guarantee

Towards the performance of the systems during the warranty period you shall submit a performance bank guarantee equivalent to 3% of the order value to cover the warranty period. This PBG shall be interest free and the same shall be returned to you on successful completion of all contractual obligations. The said PBG shall have a further claim period of 2 months.

5.Security Deposit

On acceptance of the order, you shall submit an interest free amount equivalent to 3% of the total contract/order value towards security deposit. This security deposit is collected towards the performance of the Contract. The said Security Deposit shall be submitted either in the form of Bank Guarantee/Demand Draft/FDR receipts duly endorsed in the name of the centre. The Security Deposit will be returned to you on successful completion of the Contractual obligations; failing which it shall be forfeited/adjusted.

6.Offer Validity

Your offer shall be valid for 120 days in case of 2 part / 90 days in case of single part from the date of tender opening. In case you offer validity is less than the mentioned above, the said offer is liable for rejection which may please be noted.

7.Liquidated Damages:

If you fail to deliver the ordered items satisfactorily within the time specified or any extension thereof, Liquidated Damage @ 0.5%(zero point five percent) of the order value or part thereof the un-delivered items for each calendar weeks of delay shall be recovered from your bill. However total Liquidated Damage shall not exceed 10% (ten percent) of the order value.

FORCE MAJEURE:

Should a part or whole work covered under this contract be delayed in delivery/completion of work due to reasons of Force majeure which shall include legal lockouts, strikes, riots, civil commotion, fire, accidents, quarantines, epidemic, acts of God & War, stoppage of deliveries by the Government , freight embargoes etc; the delivery period/completion of work referred to in this Contract shall be extended by a period not in excess of duration of such Force Majeure. The occurrence shall be notified by either party within reasonable time.

8.Offers received through post, courier, fax or email will not be considered.

9. Technical and commercial bid (Part-I) shall not contain any price details. Optional accessories or other price details, if any shall be uploaded in Supporting documents related to Price Bid, to be opened along with Price Bid.

10. In respect of FIM being issued, the fabricator shall submit Bank Guarantee for equivalent sum compulsorily. In case, submission of Bank Guarantee is not possible, the reasons there for shall be clearly mentioned. However, for such cases the fabricators at their cost shall secure such FIM through

Insurance Policy with Director, SDSC SHAR as beneficiary. In case of PSU and Government Organization, Indemnity Bond in lieu of Bank Guarantee is acceptable. Balance FIM/Scrap, if any shall be returned along with the supply of the items. Please confirm acceptance in your quotation.

11. SDSC SHAR shall have the right to place part order among the parties for the items for which they are the lowest.

12. Arbitration:

In the event of any dispute/s, difference/s or claim/s arising out of or relating to the interpretation and application of the Contract, such dispute/s or difference/s or claim/s shall be settled amicably by mutual consultations of the good Offices of the respective Parties and recognizing their mutual interests attempt to reach a solution satisfactory to both the parties. If such a resolution is not possible, within 30 days from the date of receipt of written notice of the existence of such dispute/s, then the unresolved dispute/s or difference/s or claim/s shall be referred to the Sole Arbitrator appointed by the Parties by mutual consent in accordance with the rules and procedures of Arbitration and Conciliation Act 1996 as amended from time to time. The arbitration shall be conducted in Bengaluru in the Arbitration and Conciliation Centre Bengaluru (Domestic and International) as per its rules and regulations. The expenses for the Arbitration shall be shared equally or as may be determined by the Arbitrator. The considered and written decision of the Arbitrator shall be final and binding between the Parties. The applicable language for Arbitration shall be English only.

Work under the Contract shall be continued by the CONTRACTOR during the pendency of arbitration proceedings, without prejudice to a final adjustment in accordance with the decision of the Arbitrator unless otherwise directed in writing by the DEPARTMENT or unless the matter is such that the works cannot be possibly continued until the decision (whether final or interim) of the Arbitrator is obtained.

2. General Instructions to Vendor

1. Instructions to tenderers

TeleNo.08623-225174/226048
Fax No.08623-225170

e-Mail ID : hps@shar.gov.in, nair_binu@shar.gov.in, satyach@shar.gov.in

1. Interested tenderers may, at their option, login to https://eproc.vssc.gov.in and submit your offers.

2. TENDER FEE IS NOT APPLICABLE.

3. EARNEST MONEY DEPOSIT IS NOT APPLICABLE IF NOT MENTIONED IN THE RFP SPECIFICATION.

4. Indian agents while quoting on behalf of their principals are requested to attach Principals original quote, necessary authorization letter from their Principals, copy of agency agreement etc. in their bid.

5. TWO PART BIDS: In case of Two part tender, price details shall not be uploaded in the Technical & Commercial Bids (Part I), failing to which the bid will be treated as INVALID.
6. The offer should be valid for a minimum period of 120 days for 2 part / 90 days for single part from the date of opening.
7. Due date & time: Sufficient time has been allotted for Bid submission. Vendors are requested to complete Bid submission well in advance. Last minute requests for due date extension citing server problems etc. will not be entertained. Bids will not be entertained after the due date and time.

7 (A). Request for the extension of the due date will not be considered.

8.
(a) Bid Opening for Public Tender: In case of Public Tender-Two Part Tenders: Technical and Commercial Bids will be opened on the first day specified for Tender opening. Interested vendors can attend the tender opening session to know the bidding details (Bidders presence is not mandatory to consider the quote for evaluation). Price Bid opening of the selected vendors will be scheduled later and it will be intimated to the selected Bidder (s).

(b) For Limited Tender: Bidders participation is not allowed.

9. Prices are required to be quoted according to the units indicated.

10. Preference will be given to those tenderers offering supplies from ready stocks and on the basis of FOR destination delivery at site.

11. (a) All available technical literature, catalogues and other data in support of the specifications and detail of the items should be furnished as attachments.

(b) Samples, if called for, should be submitted free of all charges by the tenderer and the Purchaser shall not be responsible for any loss or damage thereof due to any reason whatsoever. In the event of non-acceptance of tender, the tenderer will have to remove the samples at his own expense.

(c) Approximate net and gross weight of the items offered shall be indicated in your offer. If dimensions details are available the same should be indicated in your offer.

(d) Specifications: Stores offered should strictly conform to our specifications. Deviations, if any, should be clearly indicated by the tenderer in their quotation. The tenderer should also indicate the Make/Type number of the stores offered and provide catalogues, technical literature and samples wherever necessary. Test certificates wherever necessary should be attached. Whenever options are called for in our specifications, the tenderer should address all such options. Wherever specifically mentioned by us the tenderer could suggest changes to specifications with appropriate response for the same.

12. The purchaser shall be under no obligation to accept the lowest or any tender and reserves the right of acceptance of the whole or any part of the tender or portion of quantity offered and the tenderers shall supply the same at the rates quoted.

13. All amounts shall be indicated both in words as well as in figures. Where there is difference between amounts quoted in words and figures, amount quoted in words shall prevail.

14. The tenderer will be required to furnish a document containing the name of his bankers as well as the latest income-tax clearance certificate duly counter signed by the Income-tax Officer of the Circle concerned under the Seal of his office, if required by the Purchaser.

15. The Purchaser reserves the right to place order on the successful tenderers for additional quantity up to 25% of the quantity offered by them at the rates quoted.

16. Sr. Head, Purchase and Stores, SDSC SHAR SRIHARIKOTA reserves the right to accept or reject any bid in part or full without assigning any reason thereof.

17. Any bidder from a country which shares a land border with India will be eligible to bid in any procurement whether of goods, services (including consultancy services and non-consultancy services) or works (including turnkey projects) only if the bidder is registered with Competent Authority as specified in Office Memorandum no.F.No.6/18/2019-PPD, Ministry of Finance, Department of Expenditure, Public Procurement Division dated 23rd July 2020. All the conditions mentioned in the above OM is applicable for this tender.

18.Vendors are requested to register in National Public Procurement Portal i.e.,Government e-Market Place (GeM).

3. Tender- Two part Instructions

1. 1. This requirement can be quoted only through online e-procurement mode using ISRO portal https://eproc.isro.gov.in. No manual tender will be considered.

2. The vendors have to get themselves registered in above site to download the tender details. To register in above ISRO portal (https://eproc.isro.gov.in) the vendors need to have digital certificate The digital certificate can be obtained from any digital certifying authority like M/s (n)Code solutions; M/s Tata Consultancy Ltd., M/s Satyam Information System etc.
3. The parties are advised to download the tender and submit the bid on online at least two days prior to tender closing date to avoid last minute network problem. The due date shall not be extended due to network or computer related problems.
4. Tender fee is not applicable.

5. This being a two part tender i.e. Technical & Commercial Part and Price Part, the tenderer should not attach any documents containing Pricing information along with Technical & Commercial Bid. Normally we do not open PART-II (Price bid), if PART-I (Technical Offer) does not meet with our technical specification requirements. Price bid opening date mentioned in the tender document/ Schedule is tentative only. However, price bid opening will be made only after satisfactory completion of Part-I technical bid evaluation and with prior intimation to vendors.
6. Our Tender Enquiry contains technical requirements and specification. The detailed technical specification of your offer should be covered in the technical part. The Technical documents need to be attached online as a single PDF file without any prior information. The tender attachments containing Price details will be treated as unsolicited offers and rejected.
7. The quote should indicate quantity wise unit rate separately which have to be filled online. The Prices are to be mentioned both in figures as well as in words. The taxes, duties etc. are to be calculated and indicated in the column provided in online forms explicitly.
8. Bidders are expected to comply with the technical & commercial and other terms and conditions given in vendor specified terms of this tender. In case of any deviation, the reasons thereof should be clearly specified in the vendor specified terms column.
9. The vendors have to compulsorily submit the compliance statement online otherwise their offer will not be considered for further evaluation. Before entering the compliance statement, vendors are advised to refer the detailed specification provided in the Technical Write-up/ Drawings document. The specification offered by the vendors may also be indicated in the compliance statement wherever necessary.
10. The Technical Specification / Drawing / Product Catalogues / Works carried by vendor / Make offered etc. as a single PDF file without any financial details has to uploaded online mode by the vendor. This being TWO PART TENDER the PDF document uploaded should not contain any commercial/pricing details. If the attached PDF contains any pricing detail the offer will be treated as unsolicited and will be summarily rejected.
11. Original Equipment Manufacturer (OEM) or their representative can submit bid. Indian agents while quoting on behalf of their principals are requested to attach necessary authorization letter from their Principals in their bid.
12. Instructions on Indian Agent (if any):- Bidders are required to provide the following information in respect of their authorized Indian Agent, if any, alongwith technical bid as the same is mandatory as is required for consideration of the bid. Name, Address, Telephone no. , fax no., email of the Indian Agent including the contact person.
13. A letter from the OEM in the current date certifying that the said Indian Agent is their authorized Indian Agent and also indicating the responsibilities/role of the Indian Agent under the proposed purchase. Remuneration/service charges payable to the Indian Agent under the proposed purchase.
14. Offer validity: - In case of single part tender - the validity of offers/tenders should be 90 days. In case of two part tender - 120 days from the date of opening of Part-I bid and 60 days from the date of opening of Part-II bid. Tenders shorter than offer validity mentioned above will not be considered for evaluation.
15. Due date & time: Sufficient time has been allotted for Bid submission. Vendors are requested to complete Bid submission well in advance. Last minute requests for due date extension citing server

problems etc. will not be entertained. Bids will not be entertained after the due date and time.
17. The vendors may contact +91471 2565454/4574/2527/3753/3289 or eproc@vssc.gov.in for any technical assistance in bid submission.
18. Once the offer is submitted in on line mode by the vendor and bid submission period is over, vendor will not be able to provide revised offer.
19. Request for the extension of the due date will not be considered.
20. Tender which are not prepared in terms of these instructions are liable to be rejected.
21. Based on the response to the Tender Notice, SDSC SHAR reserves the right to change any milestone date of the tendering activity.
22. SDSC SHAR reserves the right to verify all claims made by the bidder.
23. Tender Opening : The Technical and Commercial Bid [Part-I] will be opened on the specified day mentioned in the schedule and in case any further clarification/ discussion are required, such clarification/discussion shall be called for before opening the Price Bid.
24. The exact date and time of opening of price bid of successful tenderers will be intimated later (in case of Public Tender).
25. Tenderers can participate in the said tender opening to know the details on for which, the representative of the firm shall be duly authorized by Competent Authority. Against proper authorization only such representatives shall be allowed to attend the tender opening (only in case of public tender). Tenderer Presence is not mandatory to consider the Quote for evaluation.
26. SDSC SHAR, SRIHARIKOTA reserves the right to accept or reject any/or all the tenders in part or full without assigning any reasons thereof.
27. Vendors are requested to register in National Public Procurement Portal i.e.,Government e-Market Place (GeM).

C. Bid Templates

C.1 Technical Bid - Supply, erection, testing and commissioning of Water Circulation System for Mixing Facilities (Bldg. Nos. 683, 684, 686 & 687), SPAG.

1. Water circulation system for Mixer Facilities-Supply of items as per the tender document

Item specifications for Water circulation system for Mixer Facilities

Sl No	Specification	Value	Compliance	Offered Specification	Remark
1	As per attached tender document	As per attached tender document	Yes / No / Explain		

Document : Tender document

2. Water circulation system for Mixer Facilities - Erection, Testing and commissioning as per the tender document

Item specifications for Water circulation system for Mixer Facilities

Sl No	Specification	Value	Compliance	Offered Specification	Remark
1	As per attached tender document	As per attached tender document	Yes / No / Explain		

Common Specifications (Applicable for all items)

Sl No	Specification	Value	Compliance	Offered Specification	Remark
1	As per Tender document attached	As per Tender document attached	Yes / No / Explain		

Supporting Documents required from Vendor

1. Warantee certificates for bought-out equipments shall be transferred to SDSC and supply

2. Tenderer shall furnish all the documents indicated in tender document. All the documents to be filled, signed and uploaded in ISRO e-procurement portal.

3. Price bid shall contain schedule of prices and shall be filled in ISRO e-procurement portal. No

deviations, terms and conditions etc. shall be as stipulated in price bid (Price Bid Related)

4. Annual turnover of Rs. 300 Lakhs for the last three financial years

5. Documentary proof for 2 nos. of Purchase orders of contract value of Rs. 120 Lakhs each

6. Documentary proof for 1 no. of Purchase order of contract value of Rs. 200 Lakhs

7. Make-In-India (MII) certificate indicating percentage of local content and details of location where value addition is made, in line with Order No. P-45021/2/2017-PP (BE-II) dated 16.09.2020

8. MSME certificate, if applicable

9. Compliance to GFR 144 (XI) as per Order No. F.No.6/18/2019-PPD dated 23.07.2020 issued by Ministry of Finance regarding restrictions on procurement from a bidder of a country which shares a land border with India.

5 additional documents can be uploaded by the vendor

C.2 Commercial Terms / Bid

Sl. No.	Description	Compliance	Vendor Terms
1	As per tender document attached	Yes / No / Explain	
2	GST AND OTHER COSTS, IF ANY: Percentage of applicable GST for the quoted items shall be indicated along with SAC/HSN Code.	Yes / No / Explain	
3	DELIVERY TERM: FOR SRIHARIKOTA	Yes / No / Explain	
4	DELIVERY PERIOD: Please refer Clause 3.10 in Section-A of RFP for detailed delivery schedule and confirm your acceptance.	Yes / No / Explain	
5	PAYMENT TERM: Please refer Clause 3.9 A and 3.9 B in Section-A of RFP for detailed payment term and confirm your acceptance either for 3.9 A OR 3.9 B.	Yes / No / Explain	
6	LIQUIDATED DAMAGES (LD): In case of delay in total scope of work beyond the stipulated delivery period, Liquidated Damage will be levied @ 1/2% per week or part there of subject to a maximum of 10% of of the delayed portion.	Yes / No / Explain	
7	WARRANTY: Please refer Clause 5.11 in Section-A of RFP for detailed Warranty and confirm your acceptance.	Yes / No / Explain	
8	PERFORMANCE BANK GUARANTEE (PBG): A Bank Guarantee for 3% of the order value shall be provided along with supply towards the performance of the system. The Bank Guarantee should be from a Nationalized / Scheduled Bank in Rs.100/- non-judicial stamp paper valid till the successful completion of warranty period plus 60 days. This will not carry any interest and shall be returned to you after successful completion of warranty period against your request. In case of non-performance/poor performance the Bank Guarantee shall be forfeited.	Yes / No / Explain	

9	SECURITY DEPOSIT: A Bank Guarantee for the faithful execution of the contract / PO for 3% of the order value shall be provided immediately within 10 days after receipt of the order towards the performance of the contract. The Bank Guarantee should be from a Nationalized / Scheduled Bank in Rs.100 non-judicial stamp paper valid till the completion of the total scope of work as per the order plus 60 days. This will not carry any interest and shall be returned to you after successful completion of full scope of work against your request. In case of non-performance/poor performance the Bank Guarantee shall be forfeited. If you are not submitted the BG within the specified period, this order is liable to be cancelled.	Yes / No / Explain	
10	COMBINED BANK GUARANTEE: In case, if You are unable to provide two separate BGs, i.e., one for SD and one for PBG, You can submit a combined BG for SD & PBG for 3% of the Order value valid till the completion of total contractual obligation (i.e. Delivery period plus Erection period, Testing period, Commissioning period Warranty period plus 60 days). Please confirm.	Yes / No / Explain	
11	INSURANCE: Being a Govt. Of India Dept., Insurance is not required at our cost. Please ensure the safe delivery of the ordered item with proper transport worthy pack.	Yes / No / Explain	
12	VALIDITY OF OFFER: The validity of offers/tenders should be 90 days from the date of opening of Part-I bid. Tenders shorter than offer validity mentioned above will not be considered for evaluation.	Yes / No / Explain	
13	Compliance to the Technical specifications shall be mentioned.	Yes / No / Explain	
14	Please furnish Contact details i.e. valid E-mail id, Mobile no/ Landline no. etc. for further communication.	Yes / No / Explain	

15	Purchase preference to Micro and Small Enterprises (MSEs): Purchase preference to Micro and Small Enterprises (MSEs): Purchase preference will be given to MSEs as defined in Public Procurement Policy for Micro and Small Enterprises (MSEs) Order, 2012 dated 23.03.2012 issued by Ministry of Micro, Small and Medium Enterprises and its subsequent Orders/Notifications issued by concerned Ministry. If the bidder wants to avail the Purchase preference, the bidder must be the manufacturer of the offered product in case of bid for supply of goods. Traders are excluded from the purview of Public Procurement Policy for Micro and Small Enterprises. In respect of bid for Services, the bidder must be the Service provider of the offered Service. Relevant documentary evidence in this regard shall be uploaded along with the bid in respect of the offered product or service. If L-1 is not an MSE and MSE Seller (s) has/have quoted price within L-1 plus 15% (Selected by Buyer) of margin of purchase preference/price band defined in relevant policy, such Seller shall be given opportunity to match L-1 price and contract will be awarded for 25% (selected by Buyer) percentage of total QUANTITY. Please specify whether you belong to MSE or not. If YES, supporting documents shall be uploaded.	Yes / No / Explain	

16	Make-In-India (MII) Clause: For this procurement, provisions contained in Public Procurement (Preference to Make in India), Order 2017 issued by Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce & Industries vide letter No. P-45021/2/2017-PP(BE-II) dated 16.09.2020 & directives related shall be followed. Accordingly, you are requested to indicate the percentage of local content in the material, clearly mentioning the details of location(s) at which value addition is made in line with clause 9 to O.M dated 16.09.2020 referred above. It may be noted that Local Content shall not include services such as Transportation, Insurance, Installation, Commissioning, Training and after sales service support like AMC/CMC etc.	Yes / No / Explain	
17	The bidder shall provide compliance to Order No. F.No.6/18/2019 PPD dated 23.07.2020 and amendments thereof by Ministry of Finance, Department of Expenditure, Public Procurement Division regarding restrictions on procurement from a bidder of a country which shares a land border with India and comply to all the provisions of the Order. In this regard, you shall certify that the bidder entity is not from such a country or, is from such a country, has been registered with the Competent Authority.	Yes / No / Explain	
18	Do you have Unique GeM Seller ID? If YES, provide details. If NO, As per Office Memorandum No 6/9/2020-PPD dated 24/08/2020 of Department of Expenditure, it is mandatory for sellers providing Goods and Services to Central Government Organizations to be registered on GeM and obtain a Unique GeM Seller ID, at the time of Placement of Order/acceptance of contract. Tenderers shall ensure the same.	Yes / No / Explain	

19	Compliance to Clause No.4.2 and 4.3 of tender i.e., submission of unpriced (masked) price breakup format in the technical bid as per Point No.7 of tender document and uploading of filled price breakup format as per Point No.7 of tender document in the price bid. In case of Prices of any kind revealed in the technical bid, offers will be summarily rejected.	Yes / No / Explain	
20	Remarks, if any	Yes / No / Explain	

C.3 Price Bid

Sl. No.	Item	Quantity	Unit Price	Currency	Total Price	Remark
1	Water circulation system for Mixer Facilities- Supply of items as per the tender document	1.00 Lot		-		
2	Water circulation system for Mixer Facilities - Erection, Testing and commissioning as per the tender document	1.00 Lot		-		

Common charges (Applicable for all items)

Additional Charges, if any (P&F, Freight etc.)	

TENDER DOCUMENT

For

SUPPLY, ERECTION, TESTING AND COMMISSIONING

OF

WATER CIRCULATION SYSTEMS FOR MIXING FACILITIES, SPAG

September 2022

Satish Dhawan Space Centre SHAR
Indian Space Research Organization
Sriharikota -524 124, A.P

INDEX

SECTION-A

GENERAL TERMS AND CONDITIONS

1.0 SCOPE OF THE TENDER:

1.1 Introduction:

1.1.1 SDSC SHAR is planning to realize water circulation systems for Process Facilities -1 & 2 (Bldg. Nos. 683 & 684), Process Facility-3 (Bldg. No. 686) and Process Facility-4 (Bldg. No. 687) under SPAG Project.

1.1.2 The scope of the work under this tender covers procurement of raw materials / components viz. Water tanks, Centrifugal pumps, manual valves, Electro Pneumatic (EP) ON / OFF & control valves, necessary SS pipes & fittings, plate heat exchanger, hot water generator with i-HCC panel, etc. safe delivery to SDSC SHAR and erection, welding of the pipelines using TIG & DP testing of the weld joints, hydro testing of the pipelines, fixing of all the field devices and commissioning of the total system at Process Facilities -1 & 2 (Bldg. Nos. 683 & 684), Process Facility-3 (Bldg. No. 686) and Process Facility-4 (Bldg. No. 687), SPAG, SMPC as per the details given in this document and drawings enclosed.

2.0 OBJECTIVE:

2.1 The objective is to set up and complete erection, testing & commissioning of Water Circulation Systems at Process Facilities -1 & 2 (Bldg. Nos. 683 & 684), Process Facility-3 (Bldg. No. 686) and Process Facility-4 (Bldg. No. 687) and it shall be capable to circulate the water up to 5 kg/cm^2 through the bowl jacket.

3.0 GENERAL TERMS AND CONDITIONS:

3.1 Instruction to bidders:

3.1.1 One set of proposal document along with the drawings is issued. Bidder shall sign and stamp each page of proposal as token of his acceptance & submit along with his offer.

3.1.2 Transfer of Proposal document issued to one Bidder to another is not permissible.

3.1.3 Proposal documents shall remain the property of Department (SDSC SHAR) and if obtained by one intending Bidder shall not be utilized by another without the consent of the Department.

3.1.4 The proposal shall be completely filled in all respects and shall be submitted together with requisite information. Any offer incomplete in any particulars is liable for rejection.

3.1.5 Bidders shall set their quotations in firm figures and without qualifications or variations or additions in the terms of the proposal documents. Proposal containing qualifying expressions such as "subject to minimum acceptance" or "subject to prior sale" or any other qualifying expressions or incorporating terms and conditions at variance with the terms and conditions incorporated in the proposal documents are liable to be rejected.

3.1.6 Cost quoted shall be firm and fixed.

3.1.7 Price shall be quoted in Indian Rupee.

3.1.8 Bidder should award any part of the work under the scope of this tender to any sub vendor only after obtaining necessary approval from the department. Bidder shall submit relevant information as required by the department. Department has every right to accept or reject the proposal submitted. Approval of the department is no way relieves the bidder from his responsibility and the bidder is wholly responsible for execution of work as per the specifications, terms, and conditions mentioned in this document.

3.1.9 Bidder shall indicate clearly such of those works planned to offload to his sub-vendor.

3.1.10 Satish Dhawan Space Centre – SHAR (SDSC-SHAR) Sriharikota is declared as prohibited place under official secrets act 1923. Hence during execution of site works, necessary security requirements enforced by the department from time to time shall be followed strictly.

3.1.11 SDSC SHAR shall have the right of inspection and supervision of the manufacturing process adopted by the Supplier for the manufacture of equipment at various stages through their authorized representatives. In case the manufacturing process adopted is not found suitable and commensurate with

the desired quality of the equipment, the Supplier will be advised to adopt the correct manufacturing process which will be binding on the Supplier. SDSC SHAR's decision regarding the quality of work and its acceptability shall be final and binding on the Supplier.

3.1.12 Defects in the material like fractures, cracks, blow holes, laminations, pitting, etc., are not allowed.

3.1.13 During the erection of the system at site in SMPC Unit-2, SPAG, Sriharikota, the supplier has to make his own arrangements for boarding, lodging and transportation of his men and materials. However, subject to availability, hostel accommodation may be provided by the Purchaser (SDSC SHAR) on chargeable basis.

3.1.14 Free electricity and water will be provided by the Purchaser (SDSC SHAR) for the erection and commissioning works at the site. Bidder shall take this into account while quoting the price.

3.1.15 Tools and erection equipment required shall be arranged by the party.

3.1.16 Before starting the site work (at SDSC SHAR), the party shall provide insurance as per workman compensation act to all his personnel working at site in Sriharikota against accidents. Insurance for the same shall be borne by the party.

3.1.17 The transfer of title of Water Circulation for Mixing facilities, SPAG to the Purchaser (SDSC SHAR) will take place only after satisfactory erection, testing and commissioning at SDSC SHAR by the supplier and full acceptance by the Purchaser.

3.1.18 Quote shall be based on F.O.R. Sriharikota. Prices shall be quoted as per the Price Format provided in this tender document.

3.1.19 All the Taxes and duties applicable shall be indicated clearly in quotation separately.

3.1.20 **GST Clause:** GST as applicable by HSN code.

3.1.21 INCOME TAX

Income tax at the prevailing rate as applicable and if applicable from time to time shall be deducted from the supplier's bills as per Income Tax Act and a certificate issued (TDS Certificate).

3.1.22 Customs Duty – As per notification No.05/2018 Customs dated 25th January, 2018, ISRO is eligible only for partial exemption of Customs Duty. The reduced rate of CD is 10.775% (CD@5%+Surcharge@10%+IGST@5%). Suppliers are requested to submit their bid by loading these elements wherever, it is applicable. In case of an order, we will issue CD exemption certificate to avail the partial exemption. The actual amount will be reimbursed against submission of documentary evidence.

In case tenderers offering items considering reduced rate of customs duty exemption, they should also indicate the bill of materials and price, separately, with Customs Duty component and terms and conditions thereto in the price bid only.

3.1.23 Transportation & Transit Insurance are fully in the scope of supplier and the same shall be borne by the party.

3.2 Publicity relating to tenders

3.2.1 Advertisements, press release or other specialized publicity documents, which are related to or reveal the existence of a tender and are intended by the Bidder for public distribution and/or the press, broadcasting, or television, shall be cleared/approved by the Department.

3.2.2 The Department may direct the Bidder to withhold such publicity or to require modifications to the publicity material. The Bidder shall comply with such direction.

3.3 Site Visit

3.3.1 Bidders may plan to visit and examine the site and it’s surrounding to familiarize themselves of the existing facilities and environment and may collect all other information which he may require for preparing and submitting the Bid and entering into the tender if required. Bidders shall visit within 15 days from the date of tender enquiry.

3.3.2 Claims and objections due to ignorance of existing conditions or inadequacy of information will not be considered after submission of the Bid and during implementation.

3.4 Validity of the offer

3.4.1 Bid shall remain valid for acceptance for a period of **three months** from the due date of submission of the Bid.

3.4.2 The Bidder shall not be entitled during the said period to revoke or cancel his Bid or to vary the Bid except and to the extent required by Department in writing.

3.4.3 Bid shall be revalidated for extended period as required by Department in writing.

3.4.4 In such cases, unless otherwise specified, it is understood that validity is sought and provided without varying either the quoted price or any other terms and conditions of Bid finalized till that time.

3.5 Cost of bidding

3.5.1 All direct and indirect costs associated with the preparation and submission of Bid (including clarification meetings and site visit, if any), shall be to Bidder's account and the Department will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the Bid process.

3.6 Performance bank guarantee (PBG)

3.6.1 PBG at 3% of the value of the Purchase Order shall be submitted through bank guarantee from any of the Scheduled Banks executed on non-judicial stamp paper of appropriate value, and shall be valid for a period of sixty days beyond the date for completion of warranty period.

3.7 Liquidated damage

3.7.1 Time is the essence of this order. If the supplier's defined scope of work is not completed by the end of delivery period, liquidated damage will be levied @ 0.5 % on the undelivered stores (Supply & Erection) per week or part thereof subject to a maximum of 10% of P.O. value.

The Water Circulation System (WCS) will be deemed to have delivered only when all its component parts are delivered. If certain components are not

delivered in time, the WCS will be considered as delayed until such time as these parts are delivered. Delays by the department for clearances more than 2 months will not account in the BIDDER'S delay.

3.8 Security deposit

3.8.1 Party shall submit security deposit within 15 days of Order Acknowledgement for 3% of the total order value. Security Deposit shall be obtained through Bank Guarantee or fixed deposit receipt from any of the Scheduled Banks executed on non-judicial stamp paper of appropriate value, and shall be valid for a period of sixty days beyond the date for completion of the Purchase Order.

3.8.2 In case the vendor fails to furnish the security deposit within the specified date or extended due date, the Purchase Order/Contract shall be cancelled, and the EMD, if any, made earlier shall be forfeited, and, in addition, appropriate penal action will be considered.

3.8.3 Central PSUs/PSEs/Autonomous Bodies shall be exempted from the payment of Security Deposit, and instead, an Indemnity Bond shall be submitted by them in lieu of the Security Deposit.

3.9 Payment terms

A. Our Normal payment term:

Our standard payment term is 100% payment will be made within 30 days from the date of receipt, erection, commissioning, demonstration and final acceptance of the system at our site.

B. If advance payment is requested by the bidder/supplier, and then the following payment terms will be considered:

- 20% of supply cost as advance against submission of Advance Bank Guarantee for an equivalent amount.
- 70% of supply cost after receiving the items at site on pro-rata basis.
- 10 % of supply cost, 100% of erection & commissioning amount and 100% of taxes & duties within 30 days from the date of receipt, erection, testing, commissioning, demonstration and final acceptance of the system at our site.

3.9.1 Advance Payment

Wherever advance payment is requested, Bank Guarantee from any Nationalized Bank/Scheduled Bank should be furnished. In case of advance payments, if the vendor/supplier is not supplying the material within the delivery schedule, the advance amount will be recovered and interest will be levied as per the Marginal Cost of Lending Rate (MCLR) of RBI plus 2% penal interest.

Further wherever advance payments are requested, Interest will be loaded for advance payments/stage payments as per the MCLR of SBI and will be added to the landed cost for comparison purpose while arriving at L1. In case of different milestone payments submitted by the parties, a standard and transparent methodology like NPV will be adopted for evaluating the offers.

3.9.2 MODE OF PAYMENT

Bidders can submit the banker details and payments can be made through NEFT/RTGS/ECS through PFMS.

3.10 Delivery

3.10.1 Delivery date is essence of this contract. Party shall adhere to the delivery date mentioned in this tender and same shall be confirmed along with the offer. In case Party is unable to meet the delivery schedule, the offer is liable for rejection.

3.10.2 Delivery schedule shall be given as below:

S. No.	Item Description	Delivery date from the date of award of Purchase order
1.0	Placement of P.O.	T
1.1	Submission of P & ID and GA drawings	T+1 month
1.2	Approval of P & ID and GA drawings by department	T + 2 months
1.3	Supply of Water tanks, Centrifugal pumps,	T+6 months

	manual valves, Electro Pneumatic (EP) ON / OFF & control valves, necessary SS pipes & fittings, plate heat exchanger, hot water generator, etc items for Process Facilities -1 & 2 (Bldg. Nos. 683 & 684) and Water circulation pumps, syntax water tanks, SS pipes, fittings and Manual valves etc., for), Process Facility-3 (Bldg. No. 686) and Process Facility-4 (Bldg. No. 687.	
1.4	Completion of erection, testing & commissioning of water circulation systems for Process Facilities -1 & 2 (Bldg. Nos. 683 & 684), Process Facility-3 (Bldg. No. 686) and Process Facility-4 (Bldg. No. 687).	T+9 months

3.10.3 Intermediate milestones identified shall be met with mutually after placement of order.

3.11 Packing & Forwarding:

3.11.1 The supplier will be held responsible for the stores being sufficiently and properly packed for transport by rail, road, sea or air, to withstand transit hazards and ensure safe arrival at the destination. The packing and Marking of packages shall be done by and at the expenses of the Supplier.

3.12 Exclusion of tenders:

3.12.1 The following tenders shall be summarily rejected from the procurement process.

3.12.2 Tenders of vendors who have been removed from the vendor list or banned/debarred from having business dealings.

3.12.3 The tenders which materially depart from the requirements specified in the tender document or which contain false information.

3.13 Drawings:

3.13.1 A schematic drawing (P&ID) is attached for reference in Annexure. However, party shall prepare the detailed P&I diagram and isometric 3D view drawings for the Water Circulation System and shall submit to Department for approval within 30 days from the date of Purchase Order release.

3.13.2 The drawings shall indicate all dimensions and details of equipment, materials of construction etc.

3.13.3 For all revisions of the drawing, Bidder shall ensure that all revisions are clearly encircled with revision numbers marked on the drawing.

3.13.4 Bidder shall also ensure that general details of revisions are indicated for each revision in the revision block of the drawing along with the date and signed by the approving authority.

3.13.5 The following drawings are attached in Annexure

1. P&ID for Process Facilities -1 & 2 (Bldg. Nos. 683 & 684).
2. P&ID for Process Facility-3 (Bldg. No. 686)
3. P & ID for Process Facility-4 (Bldg. No. 687)

3.14 Make in India Clause

General Terms & conditions for Bidders: For this procurement, bids from Class-I & class-II Local Suppliers are admissible. hence provisions contained in Public Procurement (Preference to Make in India), Order 2017 issued by Department for Promotion of Industry and Internal Trade (DIPP), Ministry of Commerce & Industries vide letter No. P-45021/2/2017-PP(BE-II) dated 04.06.2020 and subsequent amendment & directives shall be followed. Accordingly, offer will be evaluated & processed in conformation with above referred GOI order (Specially mentioned below). The bidder shall provide compliance and undertaking as per order and hereafter amendments:

(a) Order no: F.No.6/18/2019 PPD dated 23.07.2020 of Department of Expenditure), Ministry of Finance Under Public procurement division for the General Financial rule (GFRs).

(b) Class-I local supplier means a supplier or service provider, whose goods, service or works offered for procurement, has local content equal to or more than 50%, as defined under order.

(c) Class-II local supplier means a supplier or service provider, whose goods, services or works offered for procurement, has local content more than 20% but less than 50%, as defined under this Order

(d) Verification of local content:

(i) The Class I local supplier/ Class- II local supplier at the time to tender, bidding or solicitation shall be required to indicate percentage of local content and provide self-certification that the item offered meets the local content requirement for Class-I local supplier / Class II local supplier as the case may be. They shall also give details of the location(s) at which the local value addition is made.

(ii) In case bid value is in excess of Rs. 10 Cr., Class-I local supplier / Class-II local supplier shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.

(iii) False declarations will be in breach of the code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules (GFR) for which a bidder or its successors can be debarred for up to two years as per Rule 151(iii) of the general Financial Rules along with such other actions as may be permissible under Law.

(iv)A supplier who has been debarred by any procuring entry for violation of this order shall not be eligible for preference under this order for procurement by any other procuring entity for the duration of the debarment.

(e) The percentage of local content should be specifically mentioned in the offer, without which it will be summarily rejected.

(f) Preference will be given to Class-I Local supplier and in their absence, Class-II Local supplier will be considered.

4.0 PRICE AND TECHNICAL BIDS

4.1 Documents comprising the bid:

4.1.1 This is e-procurement tender. All the documents need to be scanned and attached to the bid under “documents solicited from Vendor” form. In case it is not possible to upload due to higher file size, hard copy of the balance documents (without any price figures) shall be submitted physically before due date.

4.1.2 Offers shall be sent online only using standard digital signature certificate of class III with encryption / decryption. The tenders authorized online on or before the open authorization date and time only will be considered as valid tenders even though the bids are submitted online.

On-line bids shall consist of the following:

4.2 Part –1 Technical and un–priced commercial part:

4.2.1 Technical and un-priced commercial part shall comprise the following documents/information. All the documents shall be scanned and uploaded in the ISRO e-procurement portal.

4.2.2 Submission of bid letter along with one set of proposal document duly signed and stamped as token of acceptance. Scanned copy shall be uploaded in the ISRO e-procurement portal.

4.2.3 Power of attorney in favour of authorized signatory of the bid/ proposal documents.

4.2.4 **Unfilled price formats** as per point No. 7 of tender document (i.e. masking the prices) shall be submitted. If the prices are indicated in the formats, the quotation/bid will be rejected.

4.2.5 Relevant documents for the price bid qualification criteria as per Sl. No. 6.0 shall be submitted.

4.2.6 Any other relevant document, bidder desires to submit.

4.2.7 Note: All the above documents shall be uploaded in the ISRO e-procurement portal.

4.3 Part -2 Price Bid:

4.3.1 Price bid shall contain schedule of prices and shall be filled in ISRO e-procurement portal. No deviations, terms and conditions, assumptions, discounts etc. shall be stipulated in price bid. Department will not take cognisance of any such statement and may at their discretion reject such bids.

4.3.2 Price bid format enclosed in the tender document shall also be filled and uploaded in the ISRO e-procurement portal.

4.4 Bid submission:

4.4.1 Bid shall be submitted in two parts

a. Part-1: Techno-Commercial Part of the Bid.

b. Part-2: Price Part of the Bid.

4.4.2 Offers should be submitted On-line using standard digital signature of class -3 with encryption/decryption options.

4.4.3 Prices shall be mentioned in the space/column provided in the ISRO e-procurement portal only for such purpose.

4.4.4 Physical copy of the bid will be accepted only in case if the file size is bigger and not possible to upload the same. In such case, the hard copy shall be submitted within due date. Documents received after due date will not be considered.

4.4.5 Prices quoted should be on the basis of F.O.R. Sriharikota.

4.4.6 The purchaser will not pay separately for transit insurance and same shall be included in the cost quoted by the Bidder.

4.4.7 All risks in transit shall be exclusively borne the contractor and the purchaser shall pay only for such items as are actually received in good condition in accordance with the purchase order.

4.4.8 Bids duly filled in by the Bidder should invariably be submitted as stipulated in the e-procurement portal.

4.4.9 Department may open Part-1 of the bid on the due date of opening at convenience. Price bid (Part-2) of the bid of the technically and commercially acceptable bids shall be opened at a later date.

4.4.10 Department reserves the right to reject any or all the Bids without assigning any reasons thereof.

4.5 Bid evaluation:

4.5.1 The bidder shall provide all the relevant data/information/details required for evaluating the bid technically and commercially. Apart from this, Bidder is free to add any other relevant information.

4.5.2 During evaluation, Department may request Bidder for any clarification on the bid/ additional documents/ information required. Bidder shall submit all clarifications/ additional documents/ information requested in original. If not submitted within the stipulated time Department has right to reject such bids.

4.5.3 Techno-commercial discussion shall be arranged with Bidder, if needed. Bidder shall depute his authorized representatives for attending discussions.

4.5.4 The complete scope of work is defined in the tender document. Only those Bidders who undertake total responsibility for the complete scope of work as defined in the tender document will be considered.

4.5.5 In case Bid does not fully comply with the requirement of Proposal document and the bidder stipulates deviations to the clauses of the proposal, which are unacceptable to the Department, the Bid will be rejected.

4.5.6 Performance of Bidder on similar nature of works executed/ under execution will be taken into consideration.

4.5.7 The time schedule for completion is given in the Proposal document. Bidder is required to confirm the completion period unconditionally.

4.5.8 Department shall not be obliged to furnish any information / clarification to unsuccessful bidder as regard non acceptance of their Bids.

4.5.9 All the components mentioned in the price format to be quoted. ***Overall lowest offer*** will be considered for placement of order.

5.0 SPECIAL CONDITIONS:

5.1 Effective date:

5.1.1 The successful BIDDER will be awarded with PO (Purchase Order) and the PO shall come into force from the date of release.

5.2 Quotation/Bid:

5.2.1 The quoted price shall be fixed and firm.

5.3 Schedule of delivery:

5.3.1 Bidder shall submit a detailed time chart for Supply, Erection, testing and commissioning after placement of PO.

5.4 Payment schedule:

All payments shall be made within 30 (thirty) days after submission of the following documents:

5.4.1 The original and three Xerox copies of Proforma invoice.

5.4.2 Clearance by DEPARTMENT for stage payments as appropriate.

5.5 Claims:

5.5.1 Claims on account of additional works, not covered under the above scope, if any, may be considered by the DEPARTMENT and shall be settled based on mutual discussion.

5.5.2 Claims on account of any additional Taxes & duties payable, which are statutory levies, shall be paid by the DEPARTMENT, at rates prevailing at the time of delivery.

5.5.3 In the event of the failure on the part of either party to meet its responsibilities of the PO, the parties of this PO shall negotiate and come to a mutual understanding regarding the payments already made and the schedule of subsequent delivery/payments, in accordance with the PO.

5.6 Modifications /changes to specifications:

5.6.1 The job is Supply of Water Circulation systems to Mixing Facilities, SPAG as such it may involve minor changes in qualitative requirements and specifications. The party has to accept and execute the same without any additional cost.

5.7 Conditions for Completion of Purchase Order (PO):

5.7.1 This PO will be considered to have been completed in all respects, only after delivery of items, erection, testing and commissioning of Water Circulation Systems for Mixing facilities, SPAG at SDSC SHAR, Sriharikota in satisfactory working condition.

5.8 Execution methodology:

5.8.1 BIDDER and SDSC SHAR shall designate in writing competent representative(s) to co-ordinate and carry out various tasks such as interfacing, progress monitoring, scheduling of inspection and acceptance tests etc., for effective channel of communication with other party for timely realization of the system.

5.8.2 SDSC SHAR / its representatives shall be entitled to inspect the BIDDER'S premises and other sub-vendor's premises during the manufacture, examine and test at workmanship of all systems, components to be supplied under this PO.

5.8.3 When systems / components have passed the specified test, the SDSC SHAR representative will furnish declaration to this effect in writing to BIDDER. BIDDER shall provide copies of test certificates to the SDSC SHAR as may be required.

5.8.4 A separate Project Team shall be identified by the BIDDER immediately after signing the Contract to organize and progress with identified activities and task. The project engineer shall co-ordinate various activities of the PO. BIDDER shall ensure active functioning of the project team from start to end of the project.

5.9 Review methodology / technical review / status review:

5.9.1 Party shall intimate the status to SDSC SHAR for every 15 days.

5.10 Replacement:

5.10.1 If any material/system/component or any portion thereof is damaged or lost during transit and commissioning, SDSC SHAR shall give notice to BIDDER

setting forth particulars of such materials/ systems/components damaged or lost. The replacement of such material/systems /components shall be effected at no extra cost to the SDSC SHAR by BIDDER within a reasonable time to avoid unnecessary delay in the intended usage of the systems/components.

5.11 Warranty:

5.11.1 BIDDER shall provide warranty for a period of 12 months from the date of installation, commissioning and acceptance of the system by the SDSC SHAR. The warranty shall cover the quality and workmanship of the system.

5.11.2 If during the aforesaid period of 12 months the said any component of the water circulation system is found to be not conforming to the description and quality aforesaid or have deteriorated then SDSC SHAR will be entitled to reject such component thereof as may be noticed not to conform to the said description and quality.

5.11.3 On such rejection, BIDDER (if called upon to do so) shall replace the rejected components within reasonable time at no extra cost to the SDSC SHAR.

5.12 Documentation:

5.12.1 BIDDER shall present detailed document on the water circulation systems for 10 t Mixing facilities, SPAG and submit the same to the SDSC SHAR (4 sets). The document should include sub-system specifications, acceptance plan & acceptance test specifications at system level & sub-system level, interface specifications, manufacturing drawing, P& I drawing and also other documents mentioned elsewhere in the PO.

5.13 Inspection & Acceptance criteria:

5.13.1 All the materials shall be supplied as per the specifications mentioned in this tender document.

5.14 APPLICABLE LAW AND JURISDICTION

The laws of India shall govern this contract for the time being in force. The Courts of Andhra Pradesh, India only shall have jurisdiction to be with and decide any legal matters or disputes what so ever arising out of the contract.

5.15 Force Majeure:

5.15.1 For the purpose of this Tender/PO the term “force majeure” shall mean strikes, lock-outs and other conflicts, acts of an enemy, war hostile blockade, disturbance of the public order, stroke of lightning, fire, thunder storm, flood explosion and acts of God and Government Acts beyond the reasonable control of the party claiming force majeure.

5.15.2 If due to circumstances of force majeure, either of the parties to this Contract partially or completely unable to fulfil its obligations in accordance with this PO, then the said party shall be obliged to immediately inform the other party of the occurrence of the circumstances of force majeure in writing.

5.15.3 The party claiming force majeure shall also be obliged to keep the other party informed of the events in the process related to the occurrence of the said force majeure circumstances and of the possible degree of non-fulfillment or delay in fulfilment of the obligations in accordance with this Contract.

5.15.4 All the obligations of the party that invokes the plea of force majeure shall be suspended as long as the said force majeure circumstances continues to exist and not longer, and the said party shall not be regarded as having committed breach or failure, nor shall be held responsible to make compensation for losses suffered by either party.

5.15.5 The terms of fulfillment of the obligation shall be duly extended for the period during which the circumstances of force majeure lasts. The fulfillment of the obligations shall be resumed immediately after the cessation of the said circumstances of force majeure.

5.15.6 If the said force majeure circumstances last for more than sixty days, parties to this Contract shall discuss and agree upon further action.

5.15.7 If the state of non-fulfillment of obligation under the Contract be more than six (6) months and nothing could be done to make a statement about ceasing of obligations of Contract, within not more than six (6) months, either party has the right to cancel the Contract without any preventive term with the agreement cancellation coming into force immediately.

5.16 Arbitration:

5.16.1 In the event of any dispute/s, difference/s or claim/s arising out of or relating to the interpretation and application of the Contract, such dispute/s or difference/s or claim/s shall be settled amicably by mutual consultations of the good Offices of the respective Parties and recognizing their mutual interests attempt to reach a solution satisfactory to both the parties. If such a resolution is not possible, within 30 days from the date of receipt of written notice of the existence of such dispute/s, then the unresolved dispute/s or difference/s or claim/s shall be referred to the Sole Arbitrator appointed by the Parties by mutual consent in accordance with the rules and procedures of Arbitration and Conciliation Act 1996 as amended from time to time. The arbitration shall be conducted at SDSC SHAR, Sriharikota. The expenses for the Arbitration shall be shared equally or as may be determined by the Arbitrator. The considered and written decision of the Arbitrator shall be final and binding between the Parties. The applicable language for Arbitration shall be “English” only.

Work under the Contract shall be continued by the CONTRACTOR during the pendency of arbitration proceedings, without prejudice to a final adjustment in accordance with the decision of the Arbitrator unless otherwise directed in writing by the DEPARTMENT or unless the matter is such that the works cannot be possibly continued until the decision (whether final or interim) of the Arbitrator is obtained.

In case order is concluded on the Public Sector Undertakings, the following Arbitration Clause will be applicable:

In the event of any dispute(s) or difference(s) relating to the interpretation and application of the provisions of the commercial contracts between ISRO/SDSC SHAR & Central Public Sector Enterprises (CPSEs)/Port Trusts inter se and also between ISRO/SDSC SHAR & CPSEs and Government Departments/Organizations (excluding disputes concerning Railways, Income Tax, Customs & Excise Departments), such dispute(s) or difference(s) shall be taken by either party for resolution through the “Administrative Mechanism for Resolution of CPSEs Disputes (AMRCD)”, as mentioned in the Office

Memorandum F No. 4(1)/2013-DPE(GM)/FTS-1835 dated 22nd May, 2018 issued by the Director of the Department of Public Enterprises (DPE) under the Ministry of Heavy Industries and Public Enterprises, Government of India.

5.17 Language and Measures:

5.17.1 All documents pertaining to the Contract including specification, schedule, notices, correspondence, operating and maintenance instructions, drawings or any other writings shall be in English language. The metric system of measurement shall be used.

5.18 Indemnify:

5.18.1 The party shall, at all times, indemnify the SDSC SHAR against all claims including claims by any third party relating to stores for infringement of any rights protected by patent registration of design or trademarks. The party shall also take the entire responsibility for adequacy of supplies/services for fulfillment of the Purchase Order.

5.19 Amendment to the Contract:

5.19.1 No amendments or modifications of the PO shall be valid unless both parties and their authorized representatives make the same in writing and specifically stating the same to be an amendment to the PO. The modifications/changes shall be effective from the date on which they are made/ executed unless otherwise agreed to.

5.20 Termination of the Purchase Order:

5.20.1 Both the DEPARTMENT and BIDDER shall have the right to terminate the PO by giving a notice of 30 days in writing to the other for non-compliance with any of the clause of the PO. The termination for any other reason will be by mutual consent.

5.20.2 If the PO is terminated for any reasons, the expenses incurred for conduct of the above work are to be reckoned to the extent of the work that is carried out which will be settled by either of the parties to the PO on mutual agreement within 30 days or such extended period from the date of intimation of termination of the PO.

5.20.3 The ownership of all materials, parts and unfinished work paid for by the DEPARTMENT under the provisions of the PO shall vest with the DEPARTMENT or transferred to the DEPARTMENT by BIDDER as soon as they have been paid for.

5.21 Secrecy:

5.21.1 The technical information, drawings, specifications and other related documents forming part of the PO, supplied by the DEPARTMENT/ BIDDER to each other shall not be used for any other purpose, except for execution of the PO.

5.21.2 The technical information, drawings, specifications, records and other documents shall not be copied, transcribed, traced or reproduced in any other form or otherwise in whole and/or duplicated, modified, divulged and/or disclosed to a third party nor misused in any other form whatsoever without the consent in writing by either party, except to the extent required for the execution of this Contract. The technical information, drawings, specifications and other related documents, supplied by the DEPARTMENT shall be returned back with all approved copies and duplicates, if any, immediately after they have been used for the agreed purpose.

5.21.3 The technical information, drawing, specifications, records and other documents, which are supplied by BIDDER to the DEPARTMENT, shall be used only for exclusive purposes of the DEPARTMENT.

5.22 Security:

5.22.1 The party shall strictly comply with the security rules & regulations of the SDSC SHAR. The party shall complete the required formalities including verification of character & antecedents, of the persons engaged or deployed by him, through police or any other authority.

6.0 BID QUALIFICATION CRITERIA

6.1 Bidders shall have experience of at least 5 years in the field of carrying out fabrication, supply, erection, testing & commissioning of water circulation

system with Electro Pneumatic and manual valves and executed such jobs within past 5 years shall be

- A contract value of Rs. 200 lakhs and above. Documentary proof of relevant Purchase order (1 no.) shall be submitted.

Sl.No.	Name of the work & Value	Documentary proof

Or

- 2 nos. of contracts, each of value Rs 120 lakhs and above. Documentary proof of relevant Purchase orders (2 nos.) shall be submitted.

Sl.No.	Name of the work & Value	Documentary proof
1		
2		

6.2 Bidder shall have average annual turnover of Rs. 300 lakhs for the last three financial years (2019 – 20, 2020 – 21, 2021-22). Relevant documents shall be submitted. Details as per Table-A shall be filled by the party.

Table-A		
Year	Avg. Annual turnover (Rs.)	Documentary Proof
2019-20		
2020-21		
2021-22		

7.0 PRICE FORMAT:

Sl.No.	Items / Information	Qty.	Unit cost in Rs.	GST	Total cost in Rs.
7.1	Supply of water circulation system (i.e. Water tanks, Centrifugal pumps, manual valves, Electro Pneumatic (EP) ON / OFF & control valves, necessary SS pipes & fittings, plate heat exchanger, hot water generator, etc) and other associated items as per technical specifications for Process Facilities -1 & 2 (Bldg. Nos. 683 & 684), Process Facility-3 (Bldg. No. 686) and Process Facility-4 (Bldg. No. 687). (Sub Total Cost-A as per table:1)	LOT			
7.2	Erection, testing & Commissioning of water circulation system in Process Facilities -1 & 2 (Bldg. Nos. 683 & 684), Process Facility-3 (Bldg. No. 686) and Process Facility-4 (Bldg. No. 687) (Sub Total Cost-B as per table:1)	LOT			
GRAND TOTAL					

Table-1

Bill of Material of Water Circulation System for Process Facilities -1 & 2 (Bldg. Nos. 683 & 684), Process Facility-3 (Bldg. No. 686) and Process Facility-4 (Bldg. No. 687), SPAG

S.No.	Item Name	Specification	Description	MOC	Quantity Nos. / mts	Make	Unit cost (Rs.)	Tax %	Total Rs
1	Water tank	3000 ltr	1.5 x 1.4 x 1.5 m	SS	2				
2	Water tank	3000 ltr	Dia. 1.5 m X Length 2.0 m	HDPE tank	2				
3	Water pump	67 mlc & 72 m3/hr	Centrifugal pump coupled with electric motor	SS	4				
4	Water pump	67 mlc & 7.2 m3/hr	Centrifugal pump coupled with electric motor	SS	4				
5	Hot water generator	210 kw	Electric type hot water generator (3 heater banks each 70 kw with 1 as thyrister) with Heater control panel	SS	2				
6	Heat Exchanger	83 kw	Plate type heat exchanger	SS	2				
7	Pipe	125 NB	Sch. 10	SS	20				
8	Pipe	100 NB		SS	330				
9	Pipe	50 NB	Sch. 40	SS	115				
10	Pipe	25 NB		SS	330				
11	SS tube	1/2" (12 mm)	12.7 mm OD X 2.1 mm Thick	SS	80				
12	SS tube	1/4 " (6 mm)	6.32 mm OD X 1.21 mm Thick	SS	100				
13	Flange	125 NB	SORF,# 150	SS	30				
14	Flange	100 NB	SORF,# 150	SS	130				
15	Flange	65 NB	SORF,# 150	SS	30				
16	Flange	50 NB	SORF,# 150	SS	45				

S.No.	Item Name	Specification	Description	MOC	Quantity Nos. / mts	Make	Unit cost (Rs.)	Tax %	Total Rs
17	Flange	32 NB	SORF,# 150	SS	5				
18	Flange	25 NB	SORF,# 150	SS	95				
19	Dummy flanges	25 NB	SORF,# 150	SS	10				
20	Studs	125 NB	M20 x 2, 150 mm length	SS	65				
21			M20 x2, 100 mm length	SS	50				
22		100 NB	M16x2, 150 mm length	SS	200				
23			M16 x2, 100 mm length	SS	500				
24		65 NB	M16 x2, 100 mm length	SS	75				
25		50 NB	M16 x2, 100 mm length	SS	160				
26		32 NB	M14 x 1.75, 75 mm length	SS	20				
27		25 NB	M12 x 1.75, 75 mm length	SS	250				
28	Elbow	125 NB	90 deg. LR (Butt Weld), sch. 10	SS	5				
29	Elbow	100 NB	90 deg. LR (Butt Weld), sch. 10	SS	80				
30	Elbow	50 NB	90 deg. LR (Butt Weld), sch. 40	SS	20				
31	Elbow	25 NB	90 deg. LR (Butt Weld), sch. 40	SS	35				
32	EqualTee	125 NB	Butt Weld type, sch. 10	SS	3				
33	EqualTee	100 NB	Butt Weld type, sch. 10	SS	18				
34	EqualTee	80 NB	Butt Weld type, sch. 10	SS	6				
35	EqualTee	50 NB	Butt Weld type, sch. 40	SS	6				
36	EqualTee	25 NB	Butt Weld type, sch. 40	SS	20				
37	Reducer	125 NB X 100 NB	Eccentric, Butt Weld type, Sch. 10	SS	6				
38		100 NB X 65 NB	Concentric, Butt Weld type, sch. 10	SS	15				
39		100 NB X 80 NB	Concentric, Butt Weld type, sch. 10	SS	6				
40		32 NB x 25 NB	Concentric, Butt Weld type, sch. 40	SS	5				

S.No.	Item Name	Specification	Description	MOC	Quantity Nos. / mts	Make	Unit cost (Rs.)	Tax %	Total Rs
41	Coupling male	65 NB	QCQR	SS	16				
42	Coupling female	65 NB	QCQR	SS	30				
43	Coupling	25 NB	Female socket coupling, sch. 40	SS	10				
44	Hexagonal reducer nipple	25 NB x 50 NB	Both side threaded, sch. 40	SS	10				
45	Hexagonal reducer nipple	50 NB x 80 NB	Both side threaded, sch. 10	SS	10				
46	Strainer	125 NB	Y type strianer	SS	5				
47	Strainer	50 NB	Y type strianer	SS	5				
48	NRV	100 NB	Swing type check valve	SS	5				
49	NRV	25 NB	Swing type / Flap type check valve	SS	5				
50	Manual valve	125 NB	Butterfly valve	SS	8				
51	Manual valve	100 NB	Butterfly valve	SS	30				
52	Control valve along with air filter regulator & dual coil solenoid valve	100 NB	2 -wayON-OFF (ball vlave)	SS	12				
53	Control valve along with air filter regulator & smart positioner	100 NB	2-way modulating (globe valve)	SS	3				
54	Control valve along with air filter regulator & smart positioner	100 NB	3-way modulating (globe valve)	SS	3				

S.No.	Item Name	Specification	Description	MOC	Quantity Nos. / mts	Make	Unit cost (Rs.)	Tax %	Total Rs
55	Manual valve	50 NB	Ball valve, Full bore ,two piece	SS	8				
56	Manual valve	25 NB	Ball valve, Full bore, two piece	SS	15				
57	Manual valve	50 NB	Ball valve, Reduced bore, two piece	SS	5				
58	Manual valve	25 NB	Ball valve, Full bore, two piece	SS	15				
59	Manual valve	25 NB	Ball valve, Reduced bore, two piece	SS	8				
60	Manual valve	15 NB	Ball valve, Reduced bore, two piece	SS	35				
61	Nipple male	65 NB	100 mm length (Both side weldable) sch. 10	SS	12				
62	Nipple male	65 NB	100 mm length (one side thread and other side weldable) sch. 10	SS	12				
63	Nipple male	25 NB	100 mm length (one side thread and other side weldable), sch. 40	SS	12				
64	Nipple male	25 NB	150 mm length (Both side weldable) sch. 40	SS	45				
65	Nipple male	15 NB	100 mm length (one side thread and other side weldable), sch. 40	SS	40				
66	Nipple male	15 NB	100 mm length (both sides threaded) sch. 40	SS	15				
67	Thermal insulation for piping	125 NB	Phenotherm		20				

S.No.	Item Name	Specification	Description	MOC	Quantity Nos. / mts	Make	Unit cost (Rs.)	Tax %	Total Rs
68	Thermal insulation for piping	100 NB	Phenotherm		330				
69	Pr. Guages	0-10 bar	Bourdan type pr. Guages		20				
70	Water hose	65 NB	Nylon braided PVC hose with both ends crimped with SS hexagonal threaded nipple (male).	PVC	16				
71	Water hose	50 NB	Nylon braided PVC hose with both ends crimped with SS ferrule nipple (female).	PVC	16				
72	Manifold (female)-NPT thread	15 NB		SS	16				
73	Adapter	½ inch NPT (M)x 12.7 mm (M) ferrule		SS	60				
74	U-clamps set			SS	150				
75	Anchor fasteners (Carbon steel)			CS	450				
76	Structural steel			MS	7.5 tonnes				
Sub Total Cost-A									
77	Tig welding, Inch -dia.				2700				
78	Erection, testing, commissioning & Painting, Inch -m				1850				
Sub Total Cost-B									
Grand Total									

SECTION-B

SCOPE OF THE WORK

1.0 SCOPE OF THE SUPPLIER

- Scope of work involves supply of equipment, required materials, erection, testing and commissioning of the Water Circulation system for Process Facilities -1 & 2 (Bldg. Nos. 683 & 684), Process Facility-3 (Bldg. No. 686) and Process Facility-4 (Bldg. No. 687), SPAG.

1.1 Supply of equipment and material:

- Bidder has to supply the Water tanks, Centrifugal pumps coupled with electric motors, Hot water generator with i-HCC panel, plate heat exchanger etc as mentioned in the tender document. All the SS pipes, SS fittings, SS flanges, manual valves and solenoid operated ON/OFF Electro Pneumatic (EP) valves with manual override etc. shall be supplied by the party.
- SS studs and nuts along with two washers, SS U Clamps, MS angles, channels for the pipeline support, Anchor fasteners shall be supplied.
- Bidder has to supply the material as per technical specifications mentioned in the tender document.
- Bidder shall supply all the necessary items which are required for the successful commissioning of the Water Circulation System but are not mentioned in the list of items.
- Supply of paints is in the bidder scope. All the required consumables for painting like painting brush, thinner, wire brush, emery, cleaning cloth, ladders, any other approach platforms etc. shall be in the bidder scope.

1.2 Erection of equipment:

- Scope includes erection of the equipments like Water tank, water circulation pumps, Hot water generator, Plate heat exchanger etc. which are supplied as part of tender document.

- Receipt, transportation, position, grouting and painting of all equipments required for completing the piping related works. Details for the equipment are given in BOM. Erection procedures for the above equipments shall be submitted to the department for approval prior to taking up the erection work. Specific care shall be taken while handling and erecting equipments.
- Slopes and elevations of equipments are as per piping layouts provided by the purchaser.
- Tools and tackles, wire ropes, D-shackles and any other handling accessories are under the scope of the party and has to arrange for transporting the equipment.
- Proper alignment of equipments is under bidder scope.
- Minor civil works, if any required shall be under bidder scope.

1.3 Erection and fabrication of Piping works:

- Bidder has to prepare fabrication drawing of piping system based on P & ID and subsequent site visit after awarding the contract with inclusion of all the elements and shall be submitted for approval. After due clearance by the DEPARTMENT, bidder has to start the work.

- Erection of Water Circulation System shall be carried out by the bidder as per the approved P&I diagram and isometric drawings.

- The water pipeline shall generally be clamped on brackets carried on the wall/support structures without infringing any equipment/structure.

- SS tube of size 6mm shall be provided for each EP valve for supply of compressed air to the valves. SS tubes from the EP valves should be connected to the nearest compressed air manifold.

- Necessary tube fittings like ferrules etc. required for connecting the 6mm SS tubes for EP valves to the nearest compressed air manifold shall be provided by the bidder.

- Bidder shall cut the pipes to required lengths and carry out the welding of fittings and flanges etc.

- The party shall use GTAW (TIG welding) process for welding of SS pipes and fittings.
- Argon purging shall be carried out during TIG welding.
- Qualified welders who possesses necessary TIG welding certificates shall be deployed for welding the pipelines/fittings.
- All welds shall be ground smooth and all the sharp edges should be rounded off for ease of cleaning.
- Dye Penetration (DP) Test for all weld joints (root & final) shall be carried out. Test report shall also be submitted.
- 10 % Radiography for butt weld joints.
- Necessary consumables required for carrying out the DP like cleaner, developer, cotton waste, gloves, mask etc. shall be provided by the party.
- Pipes shall be cleaned free from DP and dried completely before erection.
- Phenotherm insulation shall be fitted to the pipes, fittings and equipments as per P & ID.
- Fabrication and erection of required quantity of MS brackets for mounting the pipelines shall be carried out by the party.
- Assembly of flow components, instruments as per P & ID.
- Pipe support shall have the mounting plate for fixing of the support to the wall with HILTI make anchor fasteners (Wherever required).
- SS U clamps shall be used for pipe line clamping. Pipe support shall have suitable holes.
- Party shall bring the consumables such as electrodes, filler rods, grinding wheels, industrial gases (oxygen/acetylene), Argon for TIG, DP test kit, face shields, gloves, wire brush, paints, U-clamps, emery paper, cotton waste and any other hand / power tools required for completion of the work.
- Party shall bring all consumables, machinery and manpower required to carry out fabrication works including cutting, welding, grinding and drilling of holes up to dia. of 16mm.

- The party has to fix the field devices (instruments) like sensors, transmitters, valves etc. (will be provided by department as free issue) in the pipeline with suitable adaptors/ hoses.

- Party has to deploy the required teams to complete the work within the delivery schedule.

1.4 Painting:

Painting for Water tank:

- Surface preparation: Cleaning by wire brush or power tools to remove any dirt or mill scales from the surface.
- Primer: One coat of zinc rich epoxy primer of 120±10 micron Dry Film Thickness (DFT)
- Final coat: one coat of aliphatic / acrylic/ polyurethane of total 40 micron DFT.
- Finally the total DFT shall be 160±10 microns.
- Cleaning required between successive coats of paint shall also be carried out as per paint manufacturer's standard.

Painting for pipe lines:

- Subsequent to hydrotest, application of primer and finish coat paint shall be carried out. A high build epoxy primer suitable for pipe surface of 120±10 micron Dry Film Thickness (DFT) followed by a finish coat of aliphatic / acrylic, polyurethane finish paint of 40 microns DFT shall be applied so that the total DFT achieved will be 160±10 microns.
- The tag numbering & flow direction arrows of pipelines and flow components shall be written as per P & I diagram. Department will provide the colour scheme for finish paint for various pipeline systems.

Note:

- Insulation shall be applied only after painting of pipe lines.

- Paints shall be one among the reputed makes like Berger / CDC Carboline / Asian Paints / Nerolac.

1.5 Testing and Commissioning:

- After satisfactory completion of fabrication and erection, Hydrostatic test shall be carried out with potable water at 10 bar.
- Sequence of Testing (for SS piping):
    - Flushing of piping segments with potable water.
    - Hydro test.
    - Replacement of test gaskets with actual gaskets.
    - Leak check of the total system with DM water as an integrated system ready for process functional checks at operating conditions.
    - Performance of equipments
        1. Water pumps
        2. Hot water generator
        3. Plate heat E
        4. EP valves and modulating valves

Performance of overall system.

Note:

1. Hydro test set up: Valves, flanges, spool pieces etc., including Pump, calibrated gauges, Hose, measuring instruments etc., required for conducting Hydro Tests shall be mobilized by contractor.

The following certificates shall be provided by supplier before hydro test:

1. Welder qualification certificate
2. DP test report
3. Radiography
4. Weld joint fitup and history.
5. Submission of material test certificates.

2.0 SCOPE OF THE DEPARTMENT

- Providing necessary electricity within 50 m from work spot and water required for erection works.
- Material handling equipment like trailer, fork lift / hydra based on the availability.
- Dept. will provide sensors, transmitters as free issue. The party has to fix these instruments in the pipeline with suitable adaptors.

3.0 QUANTITY VARIATION

- Quantity variation of +10% is allowed.
- Payment will be made as per actuals.

SECTION – C

TECHNICAL SPECIFICATIONS

1.0 TECHNICAL SPECIFICATIONS OF WATER CIRCULATION SYSTEM FOR MIXING FACILITIES, SPAG

1.1 General description of the system:

The following Mixing facilities which requires Water circulation system are

1. Process Facilities -1 & 2 (Bldg. Nos. 683 & 684)
2. Process Facility-3 (Bldg. No. 686)
3. Process Facility-4 (Bldg. No. 687)

In Process Facilities -1 & 2 (Bldg. Nos. 683 & 684), to maintain the propellant slurry temperature (PST) within the specified values, the mixer bowl is provided with jacket for circulation of hot or cold water as per the requirement. The water circulation system will provide the necessary heating or cooling requirements during process. The water will be pumped from the water tanks and circulated through Hot water generator and Plate heat exchanger depending on the heating or cooling requirement to the bowl jacket. The return water from the bowl jacket to the water tank. The required pneumatically operated ball/globe valves shall be remotely controlled.

The Propellant Slurry Temperature Control System (PSTCS) shall have Water tanks, Centrifugal pumps, manual valves and EP ON/OFF & control valves, necessary SS pipes & fittings, plate heat exchanger, hot water generator, etc. as mentioned in the tender document. P & I diagram for water circulation system is given in the annexure.

Process Facility -3 & 4 requires water circulation system for carrying out bowl readiness activities. It consists of Water circulation pumps, water tank, SS pipes, fittings and Manual valves etc.,

1.2 The system in Process Facilities-1 &2 shall have the following equipments / components:

1	Stainless Steel Water tanks
2	Centrifugal Pumps coupled to electric motors
3	Y-type strainer
4	Hot water generator with heater control panel

5	Plate Type Heat Exchanger
6	Valves
7	Dual Coil Solenoid Valves for the EP valves and Air filter regulators
8	Stainless Steel pipes
9	Stainless Steel Fittings & Flanges
10	SS studs, Nuts & washers
11	SS Tubes (6mm dia. & 12 mm dia.)
12	Pressure gauges
13	PVC Braided hose
14	QCQR couplings
15	Thermal Insulation
16	Asbestos gaskets
17	SS U- clamps set
18	Anchor fasteners
19	Structural steel for pipe supports

1.3 The system in Process Facilities – 3 & 4 shall have the following equipments / components:

1	Syntax Water tanks
2	Centrifugal Pumps coupled to electric motors
3	Y-type strainer
4	Valves
5	Stainless Steel pipes, Fittings & Flanges
6	SS studs, Nuts & washers
7	Pressure gauges
8	PVC Braided hose
9	QCDC couplings
10	Asbestos gaskets
11	Anchor fasteners

2. Water Tanks

A. SS Water Tank

2.1 Scope includes preparation of fabrication drawing, fabrication, supply, erection and commissioning of water tanks at SDSC SHAR.

2.2 Tank should be made out of SS 304L / 316 L and the gap between inside and outside SS plates shall be stuffed with 50 mm thick **Phenotherm** insulation material as per the drawing attached.

2.3 Lugs shall be welded on the inner surface to retain insulation material in position. After fixing insulation material, outer SS sheets shall be welded to tank.

2.4 Internal dimensions: 1500 (L) x 1400 (W) x 1500 (H) mm (approx.)

2.5 Tank volume - 3000 lit (approx.) and quantity required-2 Nos.

2.6 Operating temperature:10 to 80 ^{o}C (max.) and operating pressure – atmospheric pressure. Design pressure as per standard applicable.

2.7 All the inner wall plates including bottom plate shall be of 5 mm thick.

2.8 Outer wall shall be of 3 mm thick and outer bottom plate shall be of 5 mm

2.9 Single plates shall be used for fabricating tank. Welded plates are not accepted.

2.10 Dimensions (Overall) and internal details shall be as per the enclosed drawing and the Supplier shall prepare detailed fabrication drawings and shall be sent to the Purchaser for approval. Fabrication shall be taken up only after the final approval by the purchaser. The fabrication shall be carried out using tested and qualified materials only.

2.11 Detailed quality assurance plan to be followed during fabrication and testing, shall be submitted to the Purchaser for approval prior to the commencement of fabrication.

2.12 All the nozzles shall be of seamless type (MOC- SA 312 TP 304 L / 316L). The nozzles shall be provided on the tank as shown in drawing. All the nozzle flanges shall be of SS forged quality (SA 182 gr. F304 L/ 316 L, SORF,150 CLASS) & shall conform to ANSI B 16.5. All ports shall be suitably terminated with standard flanges.

2.13 **GTAW process**, shall be followed with high purity Argon gas purging and shielding, right from root to final passes for all weld joints. Welding consumables (filler wire) shall be used as per AWS classification or ER 316L.

2.14 Certified welder shall be employed for carrying out the fabrication work and Welder qualification certificates shall be submitted for review.

2.15 Weld area at inner and outer side of tank shall be buffed.

2.16 Water tank shall be provided with stiffeners on bottom plate. SS 304 /316 channels / angles shall be used as stiffeners.

2.17 Material test certificates to be provided confirming to SS 304L /316L.

2.18 100% DP test to be done for root pass as well as final pass for all weld joints.

2.19 All welds shall follow the standards for welding method of steel plates with supports, Door hinges etc

2.20 Tank shall be covered with Phenotherm insulation and specifications are as per details mentioned in tender document. Manufacturer test certificate for insulation material shall be obtained.

2.21 Phenotherm which is used as insulation material shall be made available during inspection of water tank and relevant test certificates shall be made available for review by purchaser.

2.22 Tank shall have inspection covers as per standard industrial practice.

2.23 Suitable provisions shall be made to mount RTDs, level indicators etc., as shown in the drawing.

2.24 Swing type door (MOC- Aluminium) shall be provided on the top side with door stopper as shown in the drawing. Neoprene gasket shall be bonded on the tank at door closing area.

2.25 Provisions shall be made for draining and fresh water addition as shown in the drawing.

2.26 Tank should have a name plate permanently fixed on leg support.

2.27 Outer wall of water tank shall be painted with red colour. Painting of water tank shall be as per the procedure mentioned under painting section in the tender document.

2.28 Tank should be mounted on a structural steel base frame. Painting of base frame shall be carried out with blue colour.

2.29 Foundation bolts & nuts shall be of SS.

2.30 QAP to be followed for fabrication of water tank shall be as per approved QAP by purchaser only.

2.31 After fabrication of hot water tank, it shall be cleaned, packed properly and dispatched to the purchaser site. After receipt, if it is found damaged, supplier shall rectify the same at free of cost.

TESTING:

Testing of materials:

2.32 All the Plates used for fabrication shall be tested for physical and chemical properties as per ASTM E 1086 or Equivalent mentioned in QAP.

Water fill Test:

2.33 Tank shall be leak tested in the presence of purchaser by filling it with clean potable water with chloride content of less than 25 PPM before insulating the tank. The same test shall be repeated after completion of all works at party's site and receipt of tank at purchaser's site. Both will be witnessed by purchaser.

Nozzle & flange details:

Nozzle						Flange		
Number	Qty	Description	Size, NB	Schedule No.	projection	Std.	Rating	Type
N1	1	Recirculation inlet	100	10	150 mm	ANSI B 16.5	#150	SORF
N2	1	Pump inlet	125	10				
N3	2	Water fill connection	25	40				

N4	1	Vent	25	40				
N5	1	Drain	40	40				
N6	1	Over flow	40	40				
N7	2	Level transmitter	15	40				
N8	2	Temp. transmitter	25	40				
N9	1	Spare nozzle	100	10				

Quality assurance plan for water tank:

S. No.	Description	Method of check	Sample	Ref. Std./ acceptance norms	Format of record	Inspection		Remarks
						Party	M/s SHAR	
1	Visual inspection	Visual	100 %	No scratch, cracks, pitting/corrosion	Inspection report	P	R	
2	Dimensional check including orientation of nozzles	Dimensional	100%	As per approved drawing	Inspection report	P	R	
3	Physical and chemical properties of SS sheets, seamless pipes, Forged fittings.	Lab analysis	01 per heat/ lot	ASTM E 1086 or equivalent	Material test certificates	R	R	
4	Material test certificates for Insulation	Lab analysis	01 per lot	As per standard	Material test certificates	R	R	
5	Soundness of Root & Final pass	DP test	100%	As per ASTM/eq. standards	Weld Inspection report	P	R	
6	Leak test	Water fill test	100%	No leakage/no permanent deformation	Inspection report	P	W /R	For 3 hrs. duration
7	Painting	Visual	100%	As per the tender document	Inspection report	P	R	

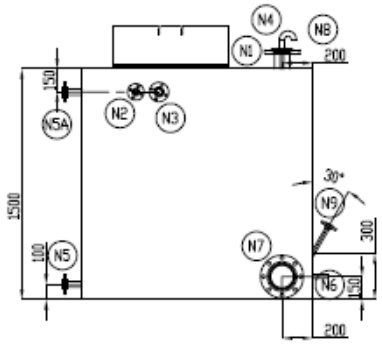
Legend:
P: Perform **R: Review** **W: Witness**

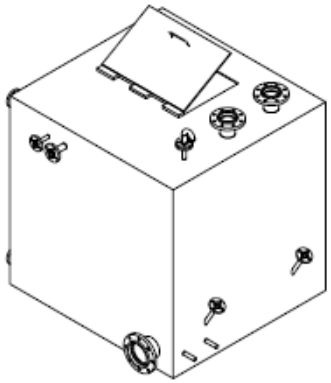
WATER TANK

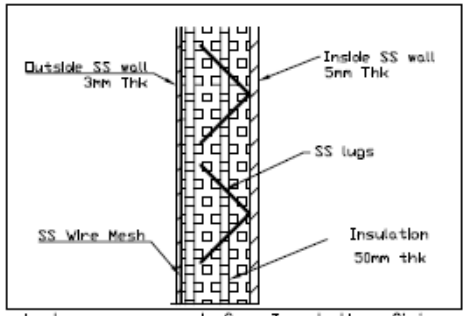
l x b x h : 1500 x 1400 x 1500

All dimensions are in mm

Side View

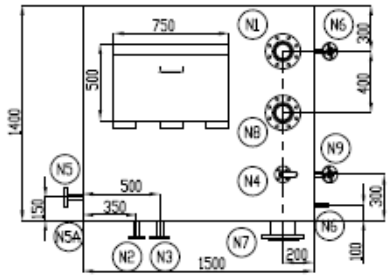






Typical arrangement for Insulation fixing

Top View



NOZZLE SCHEDULE

NOZZLE			FLANGE			NOZZLE PROJECTED 150 MM		REMARKS
No.	SIZE	Sch.	RATING	TYP.	FACE		Qty.	
N1	100	Sch 10	#150	SO	R.F.		1	RECIRCULATION INLET
N2	25	Sch 40	#150	SO	R.F.		1	INLET CONNECTION
N3	25	Sch 40	#150	SO	R.F.		1	QUICK FILL CONNECTION
N4	25	Sch 40	#150	SO	R.F.		1	VENT
N5	40	Sch 40	#150	SO	R.F.		1	DRAIN
N5A	40	Sch 40	#150	SO	R.F.		1	OVERFLOW
N6	15	Sch 40	#150	SO	R.F.		2	LEVEL TRANSMITTER
N7	125	Sch 10	#150	SO	R.F.		1	PUMP INLET
N8	100	Sch 10	#150	SO	R.F.		1	SPARE NOZZLE
N9	25	Sch 40	#150	SO	R.F.		2	TEMP ELEMENT

Details/ Documents to be submitted along with offer:

1. Technical data sheet confirming specifications mentioned in the tender document

Details/ Documents to be submitted after awarding contract:

2. Detailed quality assurance plan, in compliance with QAP mentioned in tender document, to be prepared and submitted to the purchaser for approval.
3. Party has to prepare the fabrication drawings and shall submit the drawings to purchaser for approval before start of fabrication.

Final Documents to be submitted along with supply:

4. Approved fabrication drawings
5. As-built drawings
6. Relevant material test certificates
7. Welding layouts.
8. Inspection/test reports.
9. DP testing reports of all weld joints
10. Dimensional report
11. Leak test report

B. Sintex Water Tanks:

Type	Sintex double layer water tank	
Make	Sintex / Any equivalent	
Capacity	3000	litres
Size	Dia. 1500 X Length 2000	mm
Qty	2	Nos.
MOC	Virgin Plastic	
Nozzles	Drain – 40 NB	Ball Valve to be provided
	Suction – 50 NB	End connection with flange
	Return – 25 NB (Suitable provision shall be provided)	
Size of Manhole	520	mm
Other features	• 100% UV stabilized • FDA Approved • Protection against algae formation • Light weight and durable • Hygienic • Quality tested and approved	

	by leading laboratories • Maintenance free • Rust proof	

Quality assurance plan for sintex water tank:

S. No.	Description	Method of check	Sample	Ref. Std./ acceptance norms	Format of record	Inspection		Remarks
						Party	M/s SHAR	
1	Visual inspection	Visual	100 %	No scratch, cracks, pitting/corrosion	Inspection report	P	R	
2	Material test certificates for tank	Lab analysis	01 per lot	As per standard	Material test certificates	R	R	
6	Leak test	Water fill test	100%	No leakage/no permanent deformation	Inspection report	P	W /R	For 3 hrs. duration

Legend:
P: Perform **R: Review** **W: Witness**

Details/ Documents to be submitted along with offer:

1. Technical data sheet confirming specifications mentioned in the tender document

Details/ Documents to be submitted after awarding contract:

2. Detailed quality assurance plan, in compliance with QAP mentioned in tender document, to be prepared and submitted to the purchaser for approval.

Final Documents to be submitted along with supply:

3. Relevant material test certificates
4. Inspection/test reports.
5. Visual inspection report
6. Leak test report

3.Water Pumps

General	Type	Horizontal, Centrifugal pump, back pull out type	
	Make	Kirloskar / Greaves/Mather & plat / Beconweir / Microfinish / KSB	

	Operation duty	Continuous (S1)	
	Qty	72 m^3/hr capacity (Category-1)	4 Nos.
		7.2 m^3/hr capacity (Category-2)	4 Nos.
Design data	Liquid pumped	DM Water	
	Spg. Gravity	1.0	
	Viscosity	0.000653	Kg/ms
	Pump capacity	72 & 7.2	M3/hr
	Total Head	72 m3/hr – 67 7.2 m3/hr - 67	mlc
	Shut off head	110 % of total head	
	Operating temp.	10 to 80	^oC
	NPSHA	9	mlc
	No. of stages	1	
	Pump efficiency	Bidder to specify	
	Design code	API 610/ any eq. code	
	Method of lubrication	oil	
Construction features	Impeller	Closed	
	Volute	Single	
	Shaft	Coupled	
	Coupling pump & motor	Love joy with flexible bushes	
	Drive transmission	Direct	
	Seal	Mechanical seal (MOC-Tungsten Carbide)	(Eagle Bergman or reputed make)
	Bearing make	SKF / FAG	
	Nozzle orientation	End suction-top discharge	
	Flanges	ANSI B 16.5, class 150	
MOC	Casing	ASTM A 351 Gr. 304/316	
	Impeller	Bronze IS 318 LTB Gr. 2	
	shaft	SS304/316/410	
	shaft sleeve	SS 410/314/316	
	Wear plate	CF8M	
	Coupling	Cast Iron	
	Bearing housing	SS 304	
	Studs	ASTM A 193 Gr.B8M	
	Nuts	ASTM A 194 GR B	
	Base plate	MS Fabricated & Epoxy Painted	
	Coupling guard	Aluminum Fabricated	
	Drip tray	Aluminum Fabricated	
	Companion flanges	SA 182 gr. F304 L, forged	

Electric motor	Make	Kirloskar/BBL/Siemens/ABB, class IE3 or better	
	Motor rating kW/ RPM	Bidder to specify	
	Model No. & frame size	Bidder to Specify	
	Duty	**S1 and Suitable for Inverter Driven Duty**	
	Insulation class	Class F limited to class B	
	Enclosure	TEFC	
	DEG. of Protection	IP 55	
	Supply Volts	415 +/- 10%	
	Connection	Delta	
Spares to be provided		Mechanical seals	2 nos. per each category
		Bearings	
		Couplings	
		Shaft sleeves	
		Flexible star bushes	4 Nos. per each category

Note:

1) Supplier shall furnish foundation details for pump along with motor.
2) The direction of rotation shall be clearly marked either by incorporating it on the casing or by an arrow on a separate SS metal plate securely fitted to the casing.
3) The required NPSH at duty point shall be specified in the offer.
4) A stainless-steel name plate of 2 mm thickness shall be provided and securely attached by stainless steel pins at an easily accessible point on the pump. The same shall be stamped with the minimum information.
5) Pump performance test report and material certificate of components to be provided along with the pump as per standards mentioned in QAP.
6) Party shall assemble the mechanical seal to the pump at their premises. Defects/leakages if any observed during trials after installation at our site, the party shall rectify the same at free of cost.
7) Lubrication oil cup with minimum & maximum oil level is to be provided.
8) Party shall provide operating/instruction manual, spare parts catalogue and standard warranty/guarantee certificate along with the pump.

Quality assurance plan for water pump & Electric Motor:

S. No.	Description	Method of check	Sample	Ref. Std./ acceptance norms	Format of record	Inspection		Remarks
						Party	M/s SHAR	
1	Visual inspection	Visual	100 %	No scratch, cracks, pitting/corrosion	Inspection report	P	R	
2	Dimensional check	Dimensional	100%	As per approved drawing	Inspection report	P	R	
3	Physical and chemical properties of Pump casing, impeller, shaft, shaft sleeves and bearings	Lab analysis	01 per heat/ lot	As per ASTM/eq. standards	Material test certificates	R	R	
4	Alignment	Measurement	100%	As per ASTM/eq. standards	Inspection report	P	R	
5	Vibration, noise & temperature rise	Measurement	100%	As per ASTM/eq. standards	Test report	P	R	
6	Static/dynamic balancing	Measurement	100%	As per ASTM/eq. standards	Test report	P	R	
7	Pump performance (Capacity, Head, Input Power, Efficiency)	Pump performance test	100%	API 610 or equivalent	Performance test report	P	R	
8	Leak test	Hydro test	100%	No leakage/no permanent deformation	Test report	P	W /R	
9	Painting	Visual	100 %	As per ASTM/eq. standards	Inspection report	P	R	

Legend: P- Perform R- Review W- Witness

Details/ Documents to be submitted along with offer:

1. Technical data sheet confirming specifications mentioned in the tender document.
2. General Assembly drawing giving overall dimensions.
3. Performance curves duly marked with the duty point for the rated capacity (Flow rate Vs head, power, efficiency, NPSHR).
4. Product catalogue.

Details/ Documents to be submitted after awarding contract:

5. Detailed quality assurance plan, in compliance with QAP mentioned in tender document, to be prepared and submitted to the purchaser for approval.
6. Cross sectional drawing of pump with part list, MOC and relevant standards.
7. Foundation drawing & grouting details.

Final Documents to be submitted along with supply:

8. Relevant material test certificates
9. Inspection/test reports as per approved QAP.
10. Performance test reports.
11. Installation, operation and maintenance manual.
12. List of spares with part numbers, description and specification required for operation & maintenance of Pump.
13. Standard warranty/guarantee certificate.
14. Spares as mentioned in the technical specification table.

4. Y-type Strainer

General	Type	Y-type strainer	
	Make	MARCK/ Reputed make	
	Size & Qty. required	125 size – 4 nos. 50 size – 4 nos.	
Design data	Operating medium	DM Water	
	Flow rate	125 size - 72	m^3/hr

		50 size - 7.2	m^3/hr
	Operating pressure	0.5	ksc
	Operating Temperature	10 to 80	^oC
	Design pressure	7	ksc
	Design Temperature	80	^oC
	Viscosity	0.000653	kg/ms
	Specific gravity	1	
	Dia. Of perforations of filter	20	MESH
	Filtration area	6 to 8 times of pipe cross sectional area	
	Ends	Flanged, SORF, #150	ANSI B 16.5
	Cover	Bolted	
MOC	Main body	SS 304 /316	
	Flanges	SA 182 gr. F304 L/ 316 L	
	Screen basket	SS 304 /316	
	Studs	ASTM A 193 Gr.B8M	
	Nuts	ASTM A 194 GR B	

Quality assured plan for strainer:

S. No.	Description	Method of check	Sample	Ref. Std./ acceptance norms	Format of record	Inspection		Remarks
						Party	M/s SHAR	
1	Visual inspection	Visual	100 %	No scratch, cracks, pitting/corrosion	Inspection report	P	R	
2	Dimensional check	Dimensional	100%	As per approved drawing	Inspection report	P	R	
3	Physical and chemical properties of Main body, filter and Flanges.	Lab analysis	01 per heat / lot	As per ASTM/eq. standards	Material test certificates	R	R	
4	Leak test	Hydro test	100%	No leakage / no permanent deformation	Test report	P	R	

Legend:
P: Perform **R: Review** **W: Witness**

Details/ Documents to be submitted along with offer:

1. Technical data sheet confirming specifications mentioned in the tender document
2. General Assembly drawing giving overall dimensions.
3. Product catalogue.

Details/ Documents to be submitted after awarding contract:

4. Detailed quality assurance plan, in compliance with QAP mentioned in tender document, to be prepared and submitted to the purchaser for approval.
5. Fabrication drawings of strainer with outline dimensions, part list, MOC, design data applicable codes etc.

Final Documents to be submitted along with supply:

6. Relevant material test certificates
7. Inspection/test reports.
8. Operation and maintenance manual.

5. Hot water generator

General	Type	Electric type hot water generator		
	Make	Thermodyne / Any reputed make		
	Qty. required	2 nos.		
Design data	Shell details	Medium to be heated	DM Water	
		Water flow rate	72	m^3/hr
		Operating pressure for shell	7	Ksc
		Design pressure for shell	10	Ksc
		Mounting arrangements	Saddle	
		Size of inlet / outlet nozzles	100	NB
		Shell MOC	SA 240 Gr. 304 L/316 L	
		Seamless pipe for nozzle	SA 312 TP 304 L/ 316L	
		Shell flange, nozzle flanges	SA 182 gr. F304 L/316 L	SORF, #150, ANSI B 16.5
		Studs	ASTM A 193 Gr.B8M	
		Nuts	ASTM A 194 GR B	
		Wear pad MOC	Same as shell	
		Saddle MOC	IS 2062	
		Design/fabrication code for shell	ASME section VIII Div. 1	
	Heating elements	Heating element	Nichrome wire	
		Maximum output	90	^oC

		Temperature		
		Rating capacity	210	kw
		No. of banks	3	One thyristor & 2 ON-OFF banks
		Individual bank capacity	70	Kw
		Heating elements	Replaceable type	
		Sheath MOC	SA 240 Gr. 304 L/316 L	

Accessories to be provided by party:

1. Counter flanges for all connections with nuts, bolts, gaskets, washers.
2. Painting for non-insulated parts other than SS.
3. Drain & vent provision for shell.
4. Safety Relief Valve with necessary piping to vent out the hot water/ steam to outside the operating room. SRV set pressure shall be 8 ksc.

Notes:

- 1 heater bank with 70 kw capacity shall be supplied as spare.
- Painting of hot water generator (red colour) shall be as per the procedure mentioned under painting section in the tender document.
- Necessary electrical interfaces and heater control panel is in the scope of supplier.

Quality assurance plan for hot water generator:

S. No.	Description	Method of check	Sample	Ref. Std./ acceptance norms	Format of record	Inspection		Remarks
						Party	M/s SHAR	
1	Visual inspection	Visual	100 %	No scratch, cracks, pitting/corrosion	Inspection report	P	R	
2	Dimensional check	Dimensional	100%	As per approved drawing	Inspection report	P	R	
3	Physical and chemical properties of Shell, nozzles and nozzle flanges	Lab analysis	01 per heat/ lot	As per ASTM/eq. standards	Material test certificates	R	R	

4	Soundness of Root & Final pass	DP test	100%	As per ASTM/eq. standards	Weld Inspection report	P	R	100 % RT for butt weld joints
5	Leak test of shell	Hydro test	100%	As per ASTM/eq. standards	Inspection report	P	W / R	
6	Painting	Visual	100 %	As per ASTM/eq. standards	Inspection report	P	R	

Legend: P: Perform R: Review W: Witness

Details/ Documents to be submitted along with offer:

1. Technical data sheet confirming specifications mentioned in the tender document
2. Relevant product brochures, catalogues.
3. General Assembly drawing giving overall dimensions, nozzle details etc.

Details/ Documents to be submitted after awarding contract:

4. Detailed quality assurance plan, in compliance with QAP mentioned in tender document, to be prepared and submitted to the purchaser for approval.
5. Cross sectional drawing giving fabrication details, component details, bill of Materials.
6. Foundation drawing giving loading data & grouting details.
7. Lifting arrangement drawing.
8. Name plate details on Hot water generator as per standards.

Final Documents to be submitted along with supply:

9. Final as built drawings.
10. Relevant material test certificates.
11. Inspection/testing reports.
12. Operation and maintenance manuals.
13. Performance guarantee for heater elements- 1 yr.

5.1 Heater Control Panel

Essential design requirements and proposed panel configuration

The proposed panel shall be suitable to the following conditions.

To be complied as per IS8623 – 1 and Type Tested (with switch gears) assembly as per CPRI guidelines.

a. Construction:

- ✓ Enclosure – Indoor, Floor mounting, single front operated free standing *i*-HCC panel.
- ✓ Make: M/s Rittal
- ✓ Fixed mounted design with front door
- ✓ Thickness of frame, mounting plates, Doors, Covers & Patricians – As per OEM Design.
- ✓ Gland plate – As per OEM Design.
- ✓ Lifting arrangements - Suitable Lifting Arrangement shall be provided for each panel on the Top on all four sides
- ✓ Base frame – As per the OEM design.
- ✓ Grouting bolt – M12 (minimum) or as per the standard practice.
- ✓ Hinges – As per the OEM design.
- ✓ Gasket – Neoprene rubber or better.
- ✓ Degree of protection – IP 42 in accordance with IEC60529.
- ✓ Shrouding – As per standard (to be provided inside the panel, in front of power components and power terminals).

b. Door:

- ✓ Door lock– Lever type and key lockable
- ✓ Door Opening angle – Minimum of 125°C
- ✓ Earth connectivity between cubicle door and main frame of the panel shall be established positively.
- ✓ Door hinges must be easily changed to adapt to the specified escape route.

c. Compartment:

- ✓ All the other feeders are to be planned with sufficient place for maintenance. To the extent possible use non-compartmentalized vertical chamber except the incomer feeder.
- ✓ Marshalling chamber to be planned in the panel as per the user requirement.
- ✓ Grouping of feeders also may be required. The same will be decided during detailed engineering.

d. Dimension of panel

- ✓ Height (excluding base frame): Upto 2200 mm
- ✓ Depth (single-fronted): From 500 mm to 1200 mm
- ✓ However, OEM design tolerances are accepted.

e. **Surface preparation / powder coating** - All the exposed steel surfaces/structural

steel shall be painted as per following: -

- ✓ Surface Preparation: Cleaning by wire brush or power tools to remove any loose dirt or mill scales from the surface. Sand blasting shall be carried to clean the inner and outer surface before painting operation or pre-treatment. This is applicable only wherever CRCA sheets were used for the fabrication. A separate list to be submitted for the same.
- ✓ Panel structure (frames, cubicle, doors, etc) to undergo for Nine tank process for surface treatment – necessary certificate and process flow chart need to be produced along with tender submission.
- ✓ Base frame – Galvanized, Matt black or as per OEM Design.
- ✓ Mounting plate – Silver shade or approved by department.

f. Wiring

- ✓ Control circuit – Minimum size: 1.5 Sq.mm with copper FRLS PVC insulated.
- ✓ All Digital Inputs – Minimum size: 1.0 /0.5 Sq.mm.
- ✓ Power circuit – Minimum size: 4 Sq.mm.
- ✓ Ferrules – double cross ferrules
- ✓ Power supply to / from panel:
- ✓ 3 Ph, 4 Wire, 415 V AC ± 10 %, 50 Hz ± 3 %

g. Busbar

- ✓ Material: Copper as per the latest IS.
- ✓ Busbar Size: To be specified in the submitted G.A drawing.
- ✓ Complete panel shall have a full rated neutral bus bar along with the main bus bar and earth bus bar.
- ✓ The busbar must be identified in accord with the following markings:
  - ➢ Line conductor: L1, L2, L3.
  - ➢ N conductor: N
  - ➢ PE/PEN conductor: Green / Yellow.
- ✓ The above bus bar shall be planned for the following area:
  - ➢ Incoming side – For external cable termination.
  - ➢ Outgoing side – with respect to individual heater bank.
    - i.e., 4 nos. bus bar to be provided.
    - All the heater elements shall be connected to this busbar with respect to its phases.
- ✓ The busbar shall be provided with maintenance free screw connections.
- ✓ Support: Suitable bus bar insulator to be planned for the bus bar support.

Sl. No.	Rating in Amps	Area of cross-section in sq.mm
1.	1000 A	1200

2.	630 A	756
3.	400 A	480
4.	250 A	300
5.	100 A	120

h. Earth busbar

- ✓ Material: Copper as per the latest IS.
- ✓ Shall be fixed on the panel bottom.
- ✓ Rating as per the relevant IS.
- ✓ Shall be extended throughout the length of i-HCC panel.
- ✓ Suitable arrangement shall be provided at each end horizontal earth bus for bolting to supplier's earthing conductor.

i. Instrumentation Earth busbar

- ✓ Material: Copper as per the latest IS.
- ✓ Shall be fixed on the panel bottom with bus bar insulator.
- ✓ Rating as per the relevant IS.
- ✓ Shall be extended throughout the length of i-HCC panel.
- ✓ Suitable arrangement shall be provided at each end horizontal earth bus for bolting to supplier's instrumentation earthing.

j. Wiring

- ✓ Control circuit – Minimum size: 1.5 Sq.mm with copper FRLS PVC insulated.
- ✓ Ferrules – double cross ferrules (if any)

k. Power supply to / from panel:

- ✓ 3 Ph, 4 Wire, 415 V AC ± 10 %, 50 Hz ± 3 %

l. Name plate

- ✓ It shall be acrylic with black background and white colour letter.
- ✓ To be provided for section and sub-sections doors.
- ✓ To be provided for compartment description.
- ✓ To be provided for component identification.
- ✓ To be provided for the entire panel.

m. Terminal blocks:

- ✓ It shall be of 650/1100 V grade of the stud type and shrouded.
- ✓ Insulating barriers shall be provided between adjacent terminals.
- ✓ All the terminals are grouped with respect to the following:
  i. 24V DC power distribution.

ii. 230V AC UPS power distribution.
iii. 230V AC NON-UPS power distribution.
iv. 415V AC power distribution
v. Command (ON, OFF, Analog Input)
vi. Status (ON, OFF, TRIP, Analog Output)
vii. Spare terminals

- ✓ All the future interlocks to be provided with permanent short link.
- ✓ Only shielded cables are to be used for the Analog Input and Output.
- ✓ More than one termination to be avoided in one terminal block (i.e., not more than one in and one out is allowed).
- ✓ Short linked terminals are to be used for terminal multiplication of Phase and neutral / positive and negative.
- ✓ Power terminals blocks suitable for connecting ring type end termination.
- ✓ All the terminals need to be provided with group markers.
- ✓ Make: M/s Connectwell / Wago / Elmex / Pheonix.

Proposed Panel Configuration

a. Refer table below for details related incoming and outgoing switchgear and its rating.

LIST OF INCOMING AND OUTGOING FEEDERS FOR I-HCC PANEL

Sl. No.	Feeder Description	No. of Feeders	Ratings	Preferred Intelligent Module	Preferable Incomer
1.	Main Incomer	1 No.	630 A MCCB or Better	ETU 860	MCCB with Shunt Trip
2.	Heater Bank-1	1 No.	Rating based on the design	SIMOCODE Pro-V and 1 DI/DO and 1 Safety Expansion Modules with Thyristor Bank + SIMOCODE Pro-V and 1 DI/DO and 1 Safety Expansion Modules with ON & OFF control Bank	MCCB with Shunt Trip
3.	Heater Bank-2	1 No.	Rating based on the design	SIMOCODE Pro-V and 1 DI/DO and 1 Safety Expansion Modules with Thyristor Bank +	MCCB with Shunt Trip

				SIMOCODE Pro-V and 1 DI/DO and 1 Safety Expansion Modules with ON & OFF control Bank	
4.	Heater Bank-3	1 No.	Rating based on the design	SIMOCODE Pro-V and 1 DI/DO and 1 Safety Expansion Modules ON & OFF control Bank	MCCB with Shunt Trip

b. Control Voltage inside the Electric Panel:
   - ✓ 1 Ph, 3 Wire, 230 V AC for all contactors, relays & indications lamps (if any)
   - ✓ 1 Ph, 3 Wire, 230 V AC UPS supply for all intelligent modules, control unit of Thyristor and other elements (which will be finalized during detailed engineering), relays & indications lamps (if any)

c. Selection of feeders:
   - ✓ Total no. of Heater bank shall be of 3 Nos. i.e., Heater Bank-1, Bank-2 and Bank-3.
   - ✓ Heater Bank-1 & 2 are planned to control either from ON/OFF mode of control or Thyristor control.
   - ✓ Heater Bank-3 will be controlled by ON/OFF mode of control.
   - ✓ Heater Bank-1 & 2 shall be primarily to planned to control with Thyristor. However, ON/OFF control will be acting as a standby for the Thyristor.
   - ✓ A selector switch to be planned to change over the mode of control from Thyristor to ON/OFF mode of control based on the need and requirement.
   - ✓ The selection status to be made available in the Terminal Block for status acquisition for PLC.

d. ON/OFF Heater feeders:
   - ✓ It shall be taken care of type-2 co-ordination with fuse-less feeder (i.e., with FP MCCB) as the selection criteria with auxiliary for ON, OFF, TRIP and shunt release.
   - ✓ The selected MCCB shall be of Four Pole and one step higher the heater rating mentioned in the Annexure-1.
   - ✓ The MCCB shall have a capability to take care of over load as well as short circuit protection.
   - ✓ intelligent motor management module to be selected based on the detailed technical specification of switchgear and sub-system.
   - ✓ Total no. of ON/OFF Heater feeder – 2 Nos.

e. Thyristor Based feeders:
   - ✓ In addition to the previous requirement which are mentioned in heater feeder, a thyristor as per the specification mentioned in the detailed technical specification

of switchgear and sub-system to be taken care of

- ✓ Total no. of Thyristor based Heater feeder – 2 Nos.

f. *i*-HCC panel cable and bus bar chamber door needs to be provided with panel lamps (LED) along with door limit switches. This requirement is as per the panel design and based on the approval of department.

g. Marshalling chamber to be planned in the panel and the same to be identified for meeting the interface requirement between Instrumentation and Electrical systems.

h. Enamel Danger plates shall be provided on the Panel inscribed in Hindi, Telugu and English languages as directed by department.

i. Phase to phase and phase to earth distance shall be maintained at 25mm and 19mm respectively.

Scope and responsibility of the bidder and department:

Scope of the work:

The scope of work covers supply, testing, commissioning and handing over of ***intelligent Heater Control Centre*** at SPAG, Solid Motor Propellant Complex (SMPC), Unit-2, SDSC SHAR, Sriharikota, Andhra Pradesh.

Scope of supplier / contractor / bidder:

a. Installation/erection of panels is in the scope of supplier.

b. Transportation of panels to M/s SDSC SHAR, Sriharikota is in the scope of supplier.

c. Testing and commissioning at M/s SDSC SHAR, Sriharikota as per this tender document. Handing over the complete commissioning report as per the prevailing standard practice followed in SDSC SHAR, Sriharikota.

d. Submission of operation and maintenance manuals/ technical catalogues for each standard brought-out components /equipment / sub system / items with as built drawings and electrical drawings one (1) copy in soft form in non-editable CDs / pen drives and three (3) copy in hard form except technical catalogue for per panel. One (1) copy in hard form is accepted for technical catalogue for per panel.

e. All bolts, nuts and washers shall be of stainless steel. Anchor fasteners, gaskets, anchoring of panel and bus duct supports etc. required for the satisfactory commissioning are included.

f. Auxiliary steel / structural steel for supporting / erection of panel, bus duct and supporting chequered plate etc.

g. Any other system not indicated herein, but required to make the system complete shall be included and provided by the supplier at no extra cost unless otherwise specifically excluded as indicated.

h. Manpower support for unloading of panels in both the above-mentioned area is in the scope of supplier.

Data to be furnished by supplier after the award of tender

a. Supplier shall submit the *i*-HCC panel general arrangement showing the interface details, power and control scheme and detailed BOM as per the milestone event mentioned in this tender.

b. Sizing calculation of control transformer, power supply unit, etc. for approval along with drawing.

c. Drawings and sizing calculation submitted by the Supplier for approval shall be checked/reviewed by the PURCHASER and comments, if any, on the same will be conveyed to the supplier. Supplier shall incorporate all these comments in his drawings.

d. Erection Plan for review and approval.

e. Inspection and Testing Plan for review and approval.

f. Commissioning Plan for review and approval

g. All the test certificates, panel test reports and other relevant test reports / certificates.

h. Supplier shall send copies of instruction manuals along with the dispatch of equipment. Instruction manual shall contain full details, as-build drawings of all equipment, erection procedure, testing procedure, operation & periodical maintenance procedure of the equipment. If after commissioning and initial operation of the equipment, the instruction manuals require any modifications/additions the same shall be incorporated and the updated instruction manuals shall be submitted by the Supplier to Purchaser.

i. Final as built drawings, 3 sets hard copy and 2 sets of manuals.

Scope of the Department:

The following items / materials / services will be provided by Department to the contractor at free of cost.

a. Required material handling equipment support for unloading of panels at our site will be provided by Department. However, required manpower support shall be arranged by the successful bidder for unloading, unpacking, etc. to ensure the delivered items are in good condition.

b. Concrete trench, pedestals / hardenite cement flooring will be provided by Department. However, channels / angles, clamps for anchoring etc. required for the panel trench and floor support / anchoring for channel have to be provided by the successful bidder if installation is given in the scope of successful bidder.

c. Free electricity and water for completing the installation, testing and commissioning activities at M/s SDSC SHAR, Sriharikota.

d. PLC programming, command execution as per the requirement of the supplier towards successful commissioning the panel.

Detailed technical specification of switchgear and sub-system

Control Transformer

a. Voltage rating: 415 V (input) / 230 V (output).

b. VA rating: Based on sizing calculation during detailed engineering.

c. Both the input and output of the transformer to be provided with suitable rated MCBs.

d. The output of this transformer to be linked to the common non-UPS control supply bus bar.

Power Supply Unit

a. Suitable rated power supply unit shall be supplied based on the need and requirement.

b. Voltage rating: 230 V (input) / 24 V DC (output).

c. It shall be supplied with redundant and its ORing diode.

d. Both the power supplies have to supplied with power supply failure change over contacts (fail safe contacts).

e. Make: M/s SIEMENS

Miniature Circuit Breaker (MCB)

a. No. of poles: Based on the circuit design and as per approval.

b. Operating mechanism: Manual.

c. All the MCBs used for the control circuit shall be provided with ON, OFF and TRIP contacts. These inputs to be wired as digital input to Programming Logic controller and indicate the status in the HMI screens.

d. Make: M/s SIEMENS

Moulded Case Circuit Breaker (MCCB)

a. No. of poles: 4.

b. Type: Plug-in type with necessary base and other accessories.

c. Operating mechanism: Manual.

d. Front operated, door coupled mechanism.

e. Door sealing frame need to be supplied in order to maintain the panel IP rating.

f. Releases: 230 V shunt release with changeover contact for outgoings.

g. No. of change over contacts: Based on the control circuit requirement.

h. No. of alarm contact: Based on the control circuit requirement.

i. All the MCCBs shall be provided with built-in IDMTL type adjustable overload, short circuit, ground fault and instantaneous protection using latest microprocessor-based releases along with LCD display.
j. All the MCCBs to be supplied with phase barriers and splitters both input and output side.
k. The release shall offer minimum 50% to 100% (or wider range) settable overload and Icu = Ics = 50 kA @ 415 V AC.
l. All the MCCBs shall have a communication feature. Same to be used for sharing the status (ON, OFF & TRIP) of MCCB to the centralized automation system via PROFINET communication.
m. All the MCCBs data to be interlinked with common display unit.
n. Display: LCD
o. Make: M/s SIEMENS & Model: 3VA2

MCCB Protection Release:

a. Microprocessor-based Trip Unit shall have
   - ✓ All the MCCBs shall be provided with built-in IDMTL type adjustable overload, short circuit, ground fault and instantaneous protection - LSIG.
   - ✓ All the MCCBs to be supplied with phase barriers and splitters both input and output side.
   - ✓ All the supplied MCCBs shall have a communication module.
   - ✓ The release shall offer minimum 50% to 100% (or wider range) settable overload.
   - ✓ Display: LCD.
   - ✓ Phase and neutral current measurements.
   - ✓ Ground fault current measurement.
   - ✓ Indication of fault type.
   - ✓ High / low threshold limits alarms with respect to current.
   - ✓ Trip, alarm and operating histories.
   - ✓ Counters for Trip, alarm, operation.
   - ✓ Contact wear.
   - ✓ Load profile and thermal image.

b. Functions to be achieved via PROFINET communication
   - ✓ Device identification.
   - ✓ Supply of necessary accessories need to be considered for supply. i.e., external power supply module, etc.
   - ✓ UPS supply need to be extended for the above external power supply. UPS not in the scope of the bidder.

- ✓ Status signalling – ON, OFF and Trip via communication.
- ✓ Event signalling – Tripped signals with data on tripping currents, Alarm signals (e.g. overload), All named event signal with time stamp.
- ✓ Current, voltage, power, energy and power factor monitoring.

c. Connector: PROFINET connector to be supplied.
d. Make: M/s SIEMENS
e. Supplier need to be considered the model with respect to each make while selecting the product as mentioned in Annexure-1 & 2 and the same need to be indicated in the compliance sheet.
f. Supply of one (1) no. of test kit, to test the protection release through secondary injection.

Power contactor

a. Rating of the power contactor is based on the respective feeder in the Annexure-1.
b. Duty: AC-3.
c. Control voltage: 230 V AC.
d. No. of poles: 3/4 poles.
e. Rating: 200% with respect to individual heater bank capacity.
f. Qty: 2 nos. per heater bank per Simocode or thyristor control.
g. Make: M/s SIEMENS
h. All the power contactor status needs to be wired as digital input and to PLC.

***intelligent* Module**

a. All the intelligent motor management module (SIMOCODE Pro V) need to be selected to suit for the application and input mentioned in Annexure – 1.
b. All the modules shall be supplied with PROFINET communication protocol.
c. Safe intelligent module to be selected for all the feeders to avoid contactor latching/fusing
d. Connector: PROFINET connector to be supplied for all the ports.
e. All need to be interlinked to the remotely located PLC and panel located HMI (both PLC and HMI are not in the scope of supplier).
f. The entire feeder shall have a provision to measure current and voltage measurement.
g. All the intelligent Module need to be supplied with door mounting operator panel (big size).
h. All the current measuring modules are to be supplied only with straight through CT only.
i. Health status of the module and the trip log during the power up the period need to be communicated to centralized automation system based on the demand by

sending a request.

j. Necessary support (both hardware and software if any) for building the logic in the centralized automation system is in the scope of supplier during commissioning.
k. To retrieve the data records from the module – if any software or license needed – the same to be considered for the supply along with the panel.
l. Auxiliary supply to the intelligent motor management module need to be extended from UPS supply with independent control MCB other than the control MCB used for the control circuit. However, supply of UPS is not in the scope of bidder
m. Independent Control MCB shall be planned for control circuit, auxiliary supply to intelligent motor management module and shunt trip release.
n. Earthing of the intelligent modules to be connected to the Instrumentation earth. Insulated copper of 2R x 1C x 10 sq.mm at both the ends of the panel.
o. Insulated copper conductor G.I armoured cable of 1C x 10 sq.mm need to be supplied with 250 mts. along with the panel.

Thyristor Module

a. Load type: Resistive load
b. Thyristor module shall be supplied with 50% extra load cushion.
c. Connection voltage: 3 x 500 V AC +10%. -15%
d. Frequency variation: 50 Hz ± 3%
e. Rated current: As per the design of heater capacity @ 45 Deg C
f. Auxiliary voltage: upto 240 V AC.
g. Operating Mode: Phase angle firing / burst firing
h. Trigger: 4 – 20 mA
i. Control Type: Current (I, I2), Voltage (V, V2), Power (P)
j. Set point inputs – configurable analog inputs
k. Digital Inputs – Min. 5 Nos.
l. Digital Outputs – Min. 3 Nos.
m. Analog Inputs – Min. 2 Nos.
n. Analog Outputs – Min. 2 Nos.
o. Potential free changeover points – Min. 2 Nos.@ 5A, 240V AC
p. Communication: PROFINET.
q. It shall have a load circuit monitoring provision.
r. Fault indicators: configurable relay shall be made available.
s. It shall accept control command both via terminal (4-20 mA) as well as communication.
t. It shall be provided with local operating graphical display and the same shall be mounted on the door.

u. Bar chart, line chart, numeral values, data logger may be provided on the display unit.
v. SD card may be provided along with display unit to load / save the data.
w. The operating display shall have password protected provision.
x. It shall have a provision for finding out the minimum heater failure.
y. Qty: 2 Nos. (2 Working).
z. Make: AE; Model: Thyro-PX.

Network switch

a. Network switch to be supplied with ports are manageable.
b. Qty: 1 Nos.
c. Make: M/s SIEMENS
d. It should be positioned inside the panel.
e. Communication cables need to be routed to all the intelligent modules and Thyristor to this network switch as directed by department in-charge.
   - ✓ Connector: PROFINET connector to be supplied for all the ports.
   - ✓ 100 % PROFINET connector as used inside the panel to be supplied as extra as spare.
f. Compartment shall be provided with panel / compartment lamp and it is operated via compartment door operating limit switch. The lamp shall be of LED only.
g. Marshalling chamber to be planned in the panel as per the user requirement. This shall be used for interconnection of status (all DIs, AIs, etc), command (all DO, AO, etc.). The same shall be provided with suitable identified group terminal with group markers.

Earth Leakage Relay

a. Microprocessor based relay shall be provided.
b. Display: LCD.
c. Indication: Set value and measured value shall be indicated.
d. It shall be supplied along with CBCT of suitable size dia. and its calibration certificate.
e. Current Range: 30 mA – 3000 mA
f. No. of steps: 18 Nos.
g. Tripping time: 0.0 S – 5 Sec.
h. CBCT type: Resin cast.
i. Contact rating: 5A, 250V AC
j. No. of change over contact: 2 Nos.
k. Make: Prok DVs

l. Qty: To be provided for the entire panel (both incomer and outgoing).

Surge Protection for Heater *i*-HCC Panel

a. Surge Protection Devices (SPDs) shall be provided & connected in incomer feeder cubicle for all the i-HCC panel.
b. Class: B+C/I+II (according to IEC61643).
c. Line to Neutral: 40 kA (10/350 µSec) – Qty: 3 Nos.
d. Neutral to Earth: 100 kA (10/350 µSec) – Qty: 1 No.
e. HRC Fuse: 100 A (Qty: 3 Nos.).

Selector Switch

a. It shall be provided for all the feeders.
b. This selector switch in addition to the selector switch required for selecting the thyristor or on/off heater control for heater bank-1 & 2.
c. Communication mode, Maintenance mode and Hardwired mode to be selected using this selector switch.
d. It shall be of three position, maintained, key way type.
e. Key shall be removable in all three positions.
f. Position-1: Communication Mode; Position-2: Maintenance Mode; Position-3: Hardwired Mode.
g. Operation to be performed either by communication or by hardwired command. It shall be selectable either based on the status of communication healthiness or position of selector switch, etc as per the process and system requirement towards the safe way of operation as per the guidelines of department.
h. It shall be supplied with 2NO+2NC contacts.

Indication lamps

a. 3-phase (R, Y & B) with 4-pole MCB.
b. ON, OFF and TRIP functions for all the feeders shall be provided in the MCCB handle itself.
c. Thyristor and ON/OFF mode of control selection for heater bank-2 shall be indicated inside the compartment.

Power Cables for heater feeders inside the panel

a. Conductor: Copper
b. Current rating: Minimum 200% with respect to rated current of the system.
c. Type: Teflon insulated heat resistant.
d. Make: M/s NYVIN Cable.

Power Cables for heater elements outside the panel

a. It shall have a provision to terminate the outgoing cables towards the individual heater elements.
b. Conductor: Copper
c. Current rating: Minimum 200% with respect to rated current of the system.
d. Type: XLPE Insulated.
e. Make: M/s LAPP / HAVELLS / GLOSTER.

Programming Tool

a. Suitable software needs to be supplied for the intelligent modules.
b. Supplied software shall have a valid license for its operation.
c. Thyristor configuration software need to be supplied with valid license for programming the device.
d. All the necessary Communication cable suitable for support either USB or RJ45 of the laptop need to be supplied.

LOTO (Lock Out Tag Out)

a. All the switchgears (MCB and MCCB) need to be supplied along with relevant LOTO devices (ie., Lock Out and Tag Out).
b. Supply of both Lock and Key as well as suitable tag for the same.
c. Supply of the following magnetic type display board (each four (4) nos.) in addition to the tags used for the locks. The board shall have a provision to hang.
d. Under Maintenance.
e. Under Breakdown.
f. Under Testing.
g. Under observation.
h. All the LOTO devices (both lock and key) are need to be kept inside the box (LOTO Master box) as approved by the department.
i. Necessary supporting stand need to be supplied for storing the magnetic type display board.

Test to qualify the panel

a. The following are the test proposed during Factory acceptance test.
   - ✓ High voltage test as per the relevant standard.
   - ✓ Insulation resistance measurement for bus-bar and other power and control circuits before and after high voltage test.
   - ✓ Functional checks like ON, OFF and TRIP will be ensured before power the i-HCC panel.
   - ✓ Healthiness of shunt trip coil and its control circuit will be ensured for its correct and recommended functionality.

- ✓ Incomer and outgoing need to be tested in all modes of operation as indicated in this tender.
- ✓ Communicable capability for all the switchgear MCCBs, Thyristor, intelligent modules, MF Meters, ELRs are to be demonstrated for its functionality as per the department requirement.
- ✓ Performance check of all the in-built safety systems like overload tripping, short circuit tripping, earth fault tripping, etc. shall be carried out using the test kit being supplied along with this panel and relevant faults needs to be acknowledged either from the trip unit or from the communicable software or from both.
- ✓ All the relevant test certificates required to accept the supplied panel need to be produced as per the department requirement.
- ✓ Touch protection as a minimum IP20 as defined in IEC60529 in accordance with the requirements of IEC61439-1&2

b. The following are the test proposed during site acceptance test.

- ✓ Insulation resistance measurement for bus-bar.
- ✓ ***Primary as well as secondary injection test for all the switch gears and its protection release in the panel.***
- ✓ Primary injection test to qualify the busbar and current transformer with respect to the rating.
- ✓ Performance check of all the in-build safety systems like overload tripping, short circuit tripping, earth fault tripping, etc. shall be carried out using secondary and primary injection test kit as per the requirement of the department.
- ✓ Healthiness of shunt trip coil and its control circuit will be ensured for its correct and recommended functionality.
- ✓ All the feeders need to be tested as per the tender configuration.
- ✓ Communicable capability for all the switchgear MCCBs, Thyristor, intelligent modules, ELRs are to be demonstrated for its functionality as per the department requirement.
- ✓ Complete data format (handshaking signals, health parameters, status and control, etc) to be made available as per the department requirement.
- ✓ Cyclically communicable bits need to be configured as per the department requirement. The same to be simulated for its proper functioning wherever applicable.
- ✓ Similarly, for Thyristor functionality of communication for both status and command need to be exercised with the centralized control system based on the department requirement
- ✓ Entire electrical parameters of MCCBs need to be accessed from its relevant communicable modules, both from erection site as well as from the centralized monitoring system which is located in remote location and monitoring the health status of all the MCCBs

- ✓ Necessary hardware needs to be arranged for carrying out the demonstration of communication capability of individual system / sub-system / components as per the requirement.
- ✓ In case of communication failure, all the system supposed to run and necessary information about the status (as decided during detailed engineering) may be made available at terminal block of the marshaling chamber.

c. Any relevant qualification test as per the procedure followed during testing of Heater *i*-HCC panels at SDSC SHAR.

d. Test results are to be submitted in the form of report both in soft / hard bound to department within 15 days from the date of completion of the test at site.

6. Plate Heat Exchanger

General	Type	Compact type cold water generator		
	Make	IDMC / ALFA LAVAL / Tranter / L & T		
	Qty. required	2 nos.		
		HOT fluid	**Cold Fluid**	
	Operating fluid	DM water	Raw water	
	Operating temp	33	10	Inlet
		32	14	out let
	Design temperature	80		^{o}C
	Fluid characteristics			
	Viscosity	0.000653	0.000653	kg/ms
	Specific gravity	1	1	
	Specific heat at mean temp.	1	1	kcal/kgC
	Thermal conductivity at mean temp.	0.545	0.545	Kcal/hrmC
	Flow rate	72	12	m3/hr
	Heat load	72000		kcal/hr
	Max. operating pressure	7.0	7.0	ksc
	Design pressure	10.0	10.0	ksc
	Design margin on frame to accommodate additional plates	15		%
	Flange drilling standard	ANSI B 16.5, class 150		
	Inlet / Outlet nozzle sizes for hot & cold	100		NB
MOC	Heat transfer plates	SS 304/ 316		
	Plate gaskets	Nitrile rubber		
	Seamless pipe for Nozzles	Hot fluid side		SA 312 TP 304 L/316 L, sch10
		Cold fluid side		
	Nozzle flanges/counter flanges	Hot fluid side		SA 182 gr. F304 L/316 L, sch10
		Cold fluid side		

	Studs	ASTM A 193 Gr.B8M	
	Nuts	ASTM A 194 GR B	
	Nozzle gaskets	Nitrile rubber	
Accessories to be provided by	Companion flanges with bolts, Nuts and gaskets		
	Lifting lugs		
	Foundation bolts & nuts		
	Name plate with design data		
	Mounting arrangement	Floor mounting	
Spares	Plate gaskets	10	%
	End plate gaskets	4	Nos.
	Nozzle gaskets	4	Nos.

Quality assurance plan for Plate heat exchanger:

S. No.	Description	Method of check	Sample	Ref. Std./ acceptance norms	Format of record	Inspection		Remarks
						Party	M/s SHAR	
1	Visual inspection	Visual	100 %	No scratch, cracks, pitting/corrosion	Inspection report	P	R	
2	Dimensional check	Dimensional	100 %	As per approved drawing	Inspection report	P	R	
3	Physical and chemical properties of heat transfer plates, gaskets, nozzles and nozzle flanges	Lab analysis	01 per heat/ lot	As per ASTM/eq. standards	Material test certificates	R	R	
4	Surface defects & cracks	DP test	100 %	As per ASTM/eq. standards	Test report	P	R	
5	Hardness measurement of gaskets	Measurement	100 %	As per ASTM/eq. standards	Test report	P	R	
6	Hydro test	Pressure test	100 %	As per ASTM/eq. standards	Hydrotest reports	P	R	As per ASTM/eq.

								standards

Legend:
P: Perform **R: Review** **W: Witness**

Details/ Documents to be submitted along with offer:

1. Technical data sheet confirming specifications mentioned in the tender document
2. General Assembly drawing giving overall dimensions, nozzle details etc.
3. Relevant product brochures/catalogues.

Details/ Documents to be submitted after awarding contract:

4. Detailed quality assurance plan, in compliance with QAP mentioned in tender document, to be prepared and submitted to the purchaser for approval.
5. Complete design of PHE.
6. Cross sectional drawing giving fabrication details, component details, bill of materials.
7. Foundation drawing giving loading data & grouting details.
8. PHE lifting arrangement drawing
9. Name plate details on PHE

Final Documents to be submitted along with supply:

10. Final as built drawings.
11. Relevant material test certificates
12. Inspection/test reports.
13. Operation and maintenance manual.

7. Valves:

7.1 Electro Pneumatic On / OFF ball valve

Specification:

The pneumatically actuated ball valves shall comprise valve, actuator and limit/status switches, solenoid valve, AFR and necessary tubing connecting these items.

Data sheet: ELECTRO PNEUMATICALLY OPERATED 100NB 2-WAY ON /OFF ball VALVE			
1.	SERVICE CONDITION	FLUID	DM WATER
2.		TEMPERATURE RANGE	10 - 80^{O}c
3.		ΔP SHUT OFF	7 Ksc
4.	VALVE	VALVE TYPE	2-way, 2-piece, full bore, ball valve

5.		APPLICATION	ON/OFF
6.		FAIL SAFE ACTION	FAIL TO CLOSE / NORMALLY CLOSE
7.		PIPE SIZE	100NB
8.		Make	AVCON/VIRGO/EMERSON/BRAY /SIEMENS /VELAN
9.		Qty	100 NB - 12 Nos.
10.		Design std.	API 607/ BS 5351 / BS EN ISO 17292 / Equivalent std.
11.		Testing std.	BS 6755 part-1 / API 598 / Equivalent std.
12.	VALVE BODY	BODY RATING	150#, ANSI B16.5
13.		BODY MATERIAL	ASTM A351 Gr.CF8/CF8M
14.		END CONNECTIONS	FLANGED TO ANSI B 16.5 CLASS 150 RF
15.		FLOW DIRECTION	Bi-directional
16.	VALVE BONNET	BONNET TYPE	STANDARD
17.		BONNET GASKET	PTFE
18.		BONNET MATERIAL	ASTM A351 Gr.CF8/CF8M
19.	TRIM	PORT	FULL PORT
20.		CHARACTERISTICS	ON/OFF
21.		BODY MATERIAL	ASTM A351 Gr.CF8/CF8M
22.		Ball	SS304/316
23.		SEAT TYPE	PTFE
24.		STEM & STEM NUT MATERIAL	SS304/316
25.		STEM SEALS	PTFE
26.		Body gasket	PTFE

27.		Studs	ASTM A 193 GR B8
28.		Nuts	ASTM A 194 GR 8
29.		GUIDE MATERIAL	SS304/316
30.		LEAKAGE	CLASS VI bubble tight
31.	ACTUATOR	ACTUATOR TYPE	PNEUMATIC ROTARY TYPE RACK & PINION (SPRING RETURN)
32.		AIR SUPPLY REQUIREMENT	4 to 6 BAR
33.		MANUAL HAND OPERATION	YES (TOP MOUNTED)
34.		Accessories	Local Position indicator, Rotary limit switch box, Solenoid valves, AFR etc.
35.		TRAVEL INDICATOR	REQUIRED
36.	ACCESSORIES	AIR FILTER REGULATOR	Make: PLACKA / SHAVO
37.		SOLENOID VALVE	Make: ASCO/ NORGREN/ ELOMATIC
38.		LIMIT SWITCH	4 nos. of limit switches with terminal blocks enclosed to explosion proof to zone 0, Gr.IIA IIB T4 with contact rating 24V DC, 2A
39.		PNEUMATIC TUBING	SS 304/316
40.		PNEUMATIC FITTINGS	SS304 /SS 316 with washers, BSP(M) end connections
41.		NAME PLATE	SS
42.		TAG PLATES	SS
43.	TESTS	• VISUAL & DIMENSIONAL INSPECTION • MATERIAL TEST CERTIFICATES • ACTUATOR FUNCTIONALTEST • SEAT LEAKAGE TEST • HYDRO TEST FOR	

		EXTERNAL LEAKAGE • FUNCTIONAL TEST ALONG WITH ALL ACCESSORIES	

7.2 Electro Pneumatic 2-Way Modulating globe valves

Specification:

The pneumatically actuated globe valves shall comprise valve, actuator and smart positioner and necessary tubing connecting these items.

Data sheet: ELECTRO PNEUMATICALLY OPERATED 100NB 2-WAY MODULATING GLOBE VALVE			
1.	SERVICE CONDITION	FLUID	CHILLED WATER
2.		TEMPERATURE RANGE	0 TO 15 ^{O}C
3.		FLOW RATE	Max; 12 m^3/hr.
4.		ΔP ACROSS VALVE	0.5 Kg/Cm^2 (max)
5.	VALVE	VALVE TYPE	2-WAY GLOBE VALVE
6.		APPLICATION	MODULATING
7.		FAIL SAFE ACTION	FAIL TO CLOSE / NORMALLY CLOSE
8.		SIZE	100 NB
9.		Make	AVCON/VIRGO/EMERSON/BRAY /SIEMENS / VELAN /MIL CONTROLS
10.		Qty	3 Nos.
11.		Design std.	BS 1873 / ASME B16.34/ Equivalent std.
12.		Testing std.	ANSI FCI 70-2/ IS6157 / Equivalent std.
13.		FLOW DIRECTION	Flow to open
14.	VALVE BODY	BODY RATING	150# ANSI
15.		BODY MATERIAL	ASTM A351 Gr.CF8 / CF8M

16.		END CONNECTIONS	FLANGED TO ANSI B 16.5 CLASS 150 RF
17.	VALVE BONNET	BONNET TYPE	STANDARD
18.		BONNET GASKET	PTFE
19.		BONNET MATERIAL	ASTM A351 Gr.CF8
20.	TRIM	PORT	FULL PORT
21.		CHARACTERISTICS	EQUAL PERCENTAGE
22.		SEAT TYPE	METAL TO METAL
23.		STEM MATERIAL	AISI SS 420- BURNISHED & HARD CHROMED
24.		PLUG MATERIAL	AISI SS 420-BURNISHED & HARD CHROMED
25.		GUIDE MATERIAL	AISI SS 420
26.		STUDS	ASTM A 193 GR B8
27.		NUTS	ASTM A 194 GR 8
28.		LEAKAGE	CLASS IV - 0.01% OF K_V
29.	ACTUATOR	ACTUATOR TYPE	MULTI SPRING DIAPHRAM SINGLE ACTING WITH YOKE
30.		MAXIMUM AIR PRESSURE	6.0 BAR (after regulator)
31.		DIAPHRAGM MATERIAL	NYLON INSERTED HIGH NITRILE ROLL FORM
32.		SPRING TO	CLOSE
33.		MANUAL HAND OPERATION	YES (TOP MOUNTED)
34.		TRAVEL INDICATOR	REQUIRED
35.	ACCESSORIES	AIR FILTER REGULATOR	Make: PLACKA
36.		PNEUMATIC TUBING	SS 316
37.	DESIGN DATA	LEAKAGE	CLASS IV
38.	TESTS	• VISUAL & DIMENSIONAL INSPECTION	

		• MATERIAL TEST CERTIFICATES • CV TEST • ACTUATOR FUNCTIONALTEST • SEAT LEAKAGE TEST • HYDRO TEST FOR EXTERNAL LEAKAGE • FUNCTIONAL TEST ALONG WITH ALL ACCESSORIES	

Specifications of SMART positioner:

S. No	Description	Specification
1.	Type of Actuator	Single acting type
2.	Positioner type	Linear
3.	Fail-Safe	Depressurizing the actuator in case of failure of electrical auxiliary power
4.	Housing /Enclosure	SS 304 or above
5.	Angle of rotation range (Part-turn actuator)	360°
6.	Explosion protection according to ATEX/IECEx	Intrinsic safety "ic": II 3 G Ex ic IIC T6/T4 Gc
7.	Degree of protection	IP66 according to IEC/EN 60529/NEMA 4X
8.	Communication type for Command	PROFIBUS PA
9	Communication type for Valve Position feedback	PROFIBUS PA
10.	GSD and DDL files for PLC interface	OEM supplied files to be provided
11.	Connection thread electrical	M20x1.5
12	Pneumatic Connection	G 1/4
13.	Ambient conditions	For indoor use
14.	Relative humidity	0 ... 100 %
15.	**Pneumatic data** Auxiliary power (air supply)	Compressed air
16.	Pressure	1.4 ... 7 bar (20.3 ... 101.5 psi)
17.	Brief instructions Manual	To be Provided

7.3 Electro Pneumatic 3-Way Modulating globe valves:

Specification:

The pneumatically actuated globe valves shall comprise valve, actuator and SMART positioner and necessary tubing connecting these items.

Data sheet: ELECTRO PNEUMATICALLY OPERATED 100 NB 3-WAY MODULATING GLOBE VALVE			
1.	SERVICE CONDITION	FLUID	DM WATER
2.		TEMPERATURE RANGE	10 TO 80 ^{O}c
3.		FLOW RATE	Max; 72 m^3/hr.
4.		ΔP SHUT OFF	7 ksc
5.		ΔP ACROSS VALVE	0.5 Kg/Cm^2 (max)
6.		Inlet (100 NB)- Hot water and cold water	2 ports
7.		Out let (100 NB)- Mixed water	1 port
8.	VALVE	VALVE TYPE	3-WAY GLOBE VALVE
9.		APPLICATION	MODULATING
10.		SIZE	100 NB
11.		Make	AVCON/VIRGO/EMERSON/BRAY /SIEMENS/ VELAN /MIL CONTROLS
12.		Qty	3 Nos.
13.		Design std.	BS 1873 / ASME B16.34/ Equivalent std.
14.		Testing std.	ANSI FCI 70-2/ IS6157 / Equivalent std.
15.	VALVE BODY	BODY RATING	150# ANSI
16.		BODY MATERIAL	ASTM A351 Gr.CF8
17.		END CONNECTIONS	FLANGED TO ANSI B 16.5 CLASS 150 RF

18.	VALVE BONNET	BONNET TYPE	STANDARD
19.		BONNET GASKET	PTFE
20.		BONNET MATERIAL	ASTM A351 Gr.CF8
21.	TRIM	PORT	FULL PORT
22.		CHARACTERISTICS	EQUAL PERCENTAGE
23.		GUIDING	TOP GUIDED
24.		SEAT TYPE	METAL TO METAL
25.		STEM MATERIAL	AISI SS 420- BURNISHED & HARD CHROMED
26.		PLUG MATERIAL	AISI SS 420-BURNISHED & HARD CHROMED
27.		GUIDE MATERIAL	AISI SS 420
28.		STUDS	ASTM A 193 GR B8
29.		NUTS	ASTM A 194 GR 8
30.		LEAKAGE	CLASS IV
31.	FABRICATION	CASTING	REQUIRED, INVESTMENT CASTING
32.	ACTUATOR	ACTUATOR TYPE	MULTI SPRING DIAPHRAM SINGLE ACTING WITH YOKE
33.		MAXIMUM AIR PRESSURE	6 BAR (after regulator)
34.		DIAPHRAGM MATERIAL	NYLON INSERTED HIGH NITRILE ROLL FORM
35.		MANUAL HAND OPERATION	YES (TOP MOUNTED)
36.		TRAVEL INDICATOR	REQUIRED
37.	ACCESSORIES	AIR FILTER REGULATOR	Make: PLACKA/ SHAVO
38.		PNEUMATIC TUBING	SS 316
39.	DESIGN DATA	LEAKAGE	CLASS IV
40.	TESTS	• VISUAL & DIMENSIONAL	

		INSPECTION • MATERIAL TEST CERTIFICATES • CV TEST • ACTUATOR FUNCTIONALTEST • SEAT LEAKAGE TEST • HYDRO TEST FOR EXTERNAL LEAKAGE • FUNCTIONAL TEST ALONG WITH ALL ACCESSORIES	

Specifications of SMART positioner:

S.No.	Description	Specification
1.	Type of Actuator	Single acting type
2.	Positioner type	Linear
3.	Fail-Safe	Depressurizing the actuator in case of failure of electrical auxiliary power
4.	Housing /Enclosure	SS 304 or above
5.	Angle of rotation range (Part-turn actuator)	360°
6.	Explosion protection according to ATEX/IECEx	Intrinsic safety "ic": II 3 G Ex ic IIC T6/T4 Gc
7.	Degree of protection	IP66 according to IEC/EN 60529/NEMA 4X
8.	Communication type for Command	PROFIBUS PA
9	Communication type for Valve Position feedback	PROFIBUS PA
10.	GSD and DDL files for PLC interface	OEM supplied files to be provided
11.	Connection thread electrical	M20x1.5
12	Pneumatic Connection	G 1/4
13.	Ambient conditions	For indoor use
14.	Relative humidity	0 ... 100 %
15.	**Pneumatic data** Auxiliary power (air supply)	Compressed air
16.	Pressure	1.4 ... 7 bar (20.3 ... 101.5 psi)
17.	Brief instructions Manual	To be Provided

Quality assurance plan for EP control valves:

S. No.	Description	Method of check	Sample	Ref. Std./ acceptance norms	Format of record	Inspection		Remarks
						Party	M/s SHAR	
1.	Surface defects of all parts	Visual	100 %	No scratch, cracks, pitting/corrosion	Inspection report	P	R	
2.	Dimensional check	Dimensional	100%	As per Customer Approved drawing.	Inspection report	P	R	
3.	Physical and chemical properties of body, bonnet, ball & stem (ball valves) & body, plug & stem (globe valves)	Lab analysis	01 per heat/ lot	Relevant standard	Material test certificates	R	R	
4.	Weld defects	DP	100 %	As per standard	Test reports	R	R	
5.	Hydro shell / body test	Testing on RIG	100 %	As per standard	Test reports	P	R	
6.	Hydrostatic seat test	Testing on RIG	100 %			P	R	
7.	Pneumatic seat test	Testing on RIG	100 %			P	R	
8.	CV TEST	Testing on RIG	100%	As per standard	Test reports	P	R	
9.	ACTUATOR FUNCTIONAL TEST	Testing on RIG	100%	As per standard	Test reports	P	R	
10.	FUNCTIONAL TEST of valve ALONG WITH ALL ACCESSORIES	Testing on RIG	100%	As per standard	Test reports	P	W	

11.	Valve coating / painting	Visual	100 %	Customer P. O	Inspection report	P	R	
12.	Valve identification Tagging/labeling on valve/ End protection	Visual	100 %	Customer P. O	Inspection report	P	R	

Legend: P: Perform R: Review W: Witness

7.4 Manual Ball valves:

S.no	Description	Specifications
1	Type	Full Bore, Two - piece Ball valve Reduced Bore, Two-piece Ball valve
2	Make	BDK/Leader/Marck/Audco/L&T/Virgo/Microfinish/ Velan/Flowserve
3	End connections	RF Flanged Conforming to ANSI B 16.5, serrated (For 50 NB, 40 NB & 25 NB ball valves) Threaded BSP for 15 NB ball valves
4	Mode of operation	SS Hand Lever
5	Valve body	Stainless Steel SS 304 / 316
6	Valve size & Quantity required	As per BOM
7	Design code	BS 5351/ASME B 16.34/BS-EN- ISO 17292 / Equivalent std.
8	Testing code	BS 6755 Part –I/ API-598 / BS-EN-ISO 12266 part-I/ IS-6157 / Equivalent std.
9	Pressure class rating	150#
10	Leakage Class	Bubble Tight shut off
11	Face to face dimensions	As per ANSI B 16.10
12	Body and Ball Material	SS 304/316
13	Soft seals	PTFE
14	Stem, stem bush, stem nuts spacer materials	SS 304/316
15	Studs	ASTM A 193 Gr.B8M
16	Nuts	ASTM A 194 GR B
17	Lever material	SS 304/ 316
18	Working temperature	10 to 80 ^{o} C

7.5 Manual butterfly valves:

S.no	Description	Specifications
1	Type	Wafer type Butterfly valves
2	Make	BDK/ Leader/Marck/Audco/L&T/Virgo/Microfinish/ Velan/Flowserve or any reputed make
3	End connections	Wafer type
4	Mode of operation	Throttling plate & handle unit
5	Valve body	Stainless Steel SS 304 / 316
6	Valve size & Quantity required	As per BOM
7	Design code	BS 5155/EN 593/API 609 / MS-SP-67 / Equivalent std.
8	Testing code	BS 6755 Part –I /EN 12266-1/API 598 / Equivalent std.
9	Pressure class rating	PN 16
10	Leakage Class	Bubble Tight shut off
11	Body	SS 304/316
12	Disc	ASTM A 351 gr. CF8/CF8 M
13	Seat	Nitrile/EPDM
14	Seat type	Integral seat
	Stem	SS 304/316
15	Stem bearing	PTFE
16	Throttling plate	SS
17	Handle unit	SS
18	Working temperature	10 to 80 Deg C

7.6 Non return valves (NRV):

S.no	Description	Specifications
1	Type	Wafer type dual plate, spring loaded check valve Wafer type, Flap type, spring loaded check valve
2	Make	Leader/Marck/Audco/L&T/Virgo/Microfinish/Velan/ Flowserve/Industrial enterprises
3	End connections	Wafer type to suit between the flanges of ANSI B16.5, 150 #, RF
4	Valve body	Stainless Steel SS 304 / 316
5	Valve size & Quantity required	As per BOM.
6	Testing code	API-598 / Equivalent std.
7	Pressure class rating	150#
8	Seat Leakage on Upstream Side	Bubble Tight shut off

9	Working temperature	10-80^{o}C
10	Body, Plate	ASTM A 351 CF8/CF8M
11	Stop Pins, Hinge Pin, Pin retainers	SS 304/316
12	Soft seals	PTFE

Quality assurance plan for manual valves:

S. No.	Description	Method of check	Sample	Ref. Std./ acceptance norms	Format of record	Inspection		Remarks
						Party	M/s SHAR	
1.	Surface defects of all parts	Visual	100 %	No scratch, cracks, pitting/corrosion	Inspection report	P	R	
2.	Dimensional check	Dimensional	100 %	As per Customer Approved drawing.	Inspection report	P	R	
3.	Physical and chemical properties of body, bonnet, ball & stem (ball valves), body, disc, stem, lever (butterfly valves)	Lab analysis	01 per heat/ lot	Relevant standard	Material test certificates	R	R	
4.	Hydro shell / body test	Testing on RIG	100 %	As per standard	Test reports	P	R	
5.	Hydrostatic seat test	Testing on RIG	100 %			P	R	
6.	Pneumatic seat test	Testing on RIG	100 %			P	R	
7.	Valve coating / painting	Visual	100 %	Customer P. O	Inspection report	P	R	
8.	Valve identification Tagging/labeling on valve/ End protection	Visual	100 %	Customer P. O	Inspection report	P	R	

Legend: P: Perform R: Review W: Witness

Details/ Documents to be submitted along with offer:

1. Technical data sheet confirming specifications mentioned in the tender document
2. Relevant product brochures, catalogues.
3. General Assembly drawing giving overall dimensions etc.

Details/ Documents to be submitted after awarding contract:

4. Detailed quality assurance plan, in compliance with QAP mentioned in tender document, to be prepared and submitted to the purchaser for approval.
5. Cross sectional drawing giving bill of Materials, design/test pressures, design standards etc.
6. Detailed quality assurance plan for approval

Final Documents to be submitted along with supply:

7. Final Inspection/ clearance report.
8. Final approved drawings.
9. Operational and maintenance manual.
10. Material test certificates.
11. Hydro & pneumatic test reports.
12. Functional test reports.

General conditions for supply of valves:

1. Material testing shall be done in approved laboratory.
2. QAP, dimensional and assembly drawings shall be submitted to purchaser for approval after receipt and acceptance of purchase order.
3. Valve to be supplied shall be strictly as per specification. Deviation if any from specification shall be clearly spelt out in the offer.
4. No extra welding shall be attempted on the valve body/parts.
5. The valve offered shall be guaranteed for proper performance for a period of minimum of 12 months from the date of supply.
6. The valves shall be tagged with details like serial number, size, class rating, material of Construction.
7. All castings shall be solution annealed to ASTM A 351.
8. All non-wetted parts like gland nut, sleeve nut shall also be of Stainless-Steel including lever/ handle with PVC lining. (Lever / Handle of GI with PVC lining is not acceptable).

9. All flanged faces shall be Raise Face (RF), serrated.

10. Inspection of valves shall be carried out by the purchaser prior to dispatch at manufacturers site as per QAP enclosed and supplier shall ensure that QAP is strictly followed in all stages of manufacturing, Testing & Inspection.

11. Ball shall be of solid construction for all sizes (applicable for ball valves only).

12. For all the EP control calves the following data to be submitted along with P.O. - Vendor shall submit Data sheets, Dimensional dwgs. showing outline dimensions, material of construction, test pressures, test codes, statutory and any special requirements, sizes, tag nos., mounting details, Weld end details, Actuator/stem removal spacing, Hand wheel orientation, Weight & part list etc., instructions manual.
13. Actuators, Air filter regulator, Dual coil solenoid valves/valve positioner etc., requiring tubing shall be mounted & tubed by valve vendor. It shall be indicated in the respective drawings. Pneumatic tubing shall be SS 316 and fittings shall have NPT threads.
14. Physical operation of valve in full load open & close along with status indicator to be performed at vendor site with clean water.

15. Tag plate shall be of SS /Aluminium.
16. End protection: Body, end ports, flange faces and welding ends shall be covered with suitable close-fitting protectors to protect the machined ends and prevent ingress of dirt and moisture.
17. Packing: valves shall be packed as to minimize the possibility of damage during storage or transit.
18. Spares: Spare servicing kits for valves shall be provided. Quantity of spare kits for all the above-mentioned valves shall be 10 % per each category mentioned in BOM.
19. All testing charges shall be included in the quoted price.

8. Dual coil solenoid valves

GENERAL		
1	MAKE	ASCO/ NORGREN/ ELOMATIC
2	FLUID	Air
3	DUTY	Intermittent
DESIGN DATA		
4	PRESSURE	7 Kg/cm^2
5	TEMPERATURE	Ambient
VALVE		
6	VALVE TYPE	3/2 Way

7	BODY MATERIAL	SS 316
8	SEAT MATERIAL	VITON
9	PLUNGER MATERIAL	SS 316
10	PACKING MATERIAL	TEFLON
SOLENOID		
11	SOLENOID ASSEMBLY	ALUMINIUM DIE CASTING (HOUSING / COVER)
12	ENCLOSURE	The enclosure and terminal block shall be ex-proof to zone 0. GR IIA, IIB, T4 With IP67 protection
13	STYLE OF COIL	Dual coil for redundancy purpose. Both coils shall be energized and de-energized simultaneously.
14	COIL	EPOXY MOULDED EMBEDDED SCREW TERMINAL
15	INSULATION CLASS	Class F
16	POWER SUPPLY	24 V DC
17	ELECTRICAL CONNECTION	1/2'' NPT(F) (Terminal block shall be provided in the solenoid valves.)
CODES AND STANDARDS		
18	ASME, ASTM, IEEE, IBR	
ACCESSORIES		
19	FREE WHEELING DIODE	Required across the solenoid
20	PAINTING	1.Cleaning procedure as per ASTM A 380. 2. One coat of primer. 3. Two coats of enamel/paint. 4. Protection for rust prevention. 5. Painting as per IS-6005, 1970. 6. Paint Finish: 100-150 microns.
21	NAME PLATE	Required
TESTS		
1. Coil insulation test 2. Valve operational test 3. All test certificates shall be provided for purchaser’s approval.		
DRAWINGS		

Data sheet, Dimensional drawing indicating: mounting details, port opening details for energized and de-energized conditions, Electrical termination identification and Instruction manual for purchaser's approval.

8.1 Air Filter Regulator

GENERAL		
1	MAKE	PLACKA INSTRUMENT INDIA PVT. LTD / SHAVO
2	FLUID	Air
FEATURES		
3	INLET PRESSURE	0-7 Kg/cm^2
4	OUT LET PRESSURE	0-7 Kg/cm^2
5	MAX. AMBIENT TEMPERATURE	50^OC
6	DRAIN	Required
7	ENCLOSURE	IP 65
8	ACCURACY	+ / - 0.5 Psig
MATERIAL OF CONSTRUCTION		
9	BODY	Die cast Aluminium
10	SPRING	SS 304
11	TRIM	SS 304
12	FILTER ELEMENT	Ceramic
13	DIAPHRAGM	Neoprene
ACCESSORIES		
14	OUT LET PRESSURE GUAGE	Required
15	MOUNTING BRACKET	Required
16	NAME PLATE	Required
TESTS		
1. Calibration test 2. Accuracy test		
DRAWINGS		

1.Drawings, Data sheets and manuals for the equipment shall be supplied for approval

9. Seamless Stainless-Steel pipes

1. Standard : ASTM A312 TP
2. Manufacturing Process : Seamless, Cold drawn
3. Material of construction : SS304L / 316L
4. Edge preparation : As per ANSI B 16.25
5. Quantity : Refer BOM
6. Length : 5 to 7 m
7. Dimensional tolerance : As per ANSI B 36.19/ASTM A.999 (ID,OD & Wall Thickness)
8. Testing :
   a) All pipes shall be tested hydrostatically as per ***ASTM A530.***
   b) Minimum one test specimen from each heat (ladle)/lot for each size of pipe and material shall be carried out mechanical testing like UTS, yield & percentage of elongation as per ASTM A370 & Chemical analysis as per ASTM A751 and test results shall comply to ASTM A312.
   c) All the test certificates shall be produced during inspection.
   d) Dimensional tolerance of the pipes (i.e. ID, OD & wall thickness) shall comply as per ASTM A.999
8. Hot extruded mother hollows/Pipes shall be used for manufacturing of seamless pipes.
9. Suggested list of suppliers for pipe lines:
   - M/s Arvind Pipes
   - M/s REMI
   - M/s Subhalaksmi
   - M/s Streamline industries
   - M/s Tubacex (Prakash steelage)
   - M/s Welspun
   - M/s. Ratnamani

- M/s. Sandvik

10. Pipes shall be cleaned and dried before dispatch. Ends shall be protected with suitable plastic caps to avoid entry of dust, water and foreign materials during storage and transportation.

11. Material shall be wrapped in polythene sheet and properly dispatch to site.

GENERAL CONDITIONS:

a) Price quoted shall be inclusive of all the testing charges (i.e. chemical, mechanical, hydro testing).

b) **MARKING**: All pipes shall be clearly marked on each pipe indicating manufacturer's reference, material grade, dimensions, heat /Lot number.

c) Allowable Variation in quantity: one length of pipe.

d) Chemical, Mechanical tests (one sample per heat / lot for each size) shall be carried out as per standard procedure.

10. SS pipe fittings and flanges:

- All fittings are to be of seamless quality as per ASTM A 403 WPS. The details of the pipe fittings like size, material, class rating, schedule, quantity is given in BOM.

- Material of construction and Dimension of fittings and flanges shall conform to ASTM standards.

- All fittings shall be solution Annealed as per code.

- Suggested list of suppliers for pipe fittings:
  - M/s. Rajmani
  - M/s Arvind Pipes & fittings
  - M/s. Mechwell
  - M/s. Rajendra corporation
  - M/s. Tubeturn

- Chemical, Mechanical tests (one sample per heat / lot for each size) shall be carried out as per standard procedure.

Quality Assurance Plan (QAP) for SS pipes and Fittings:

S. No.	Description	Type of check	Sample	Ref. Std./ acceptance norms	Format of record	Inspection		Remarks
						Party	M/s SHAR	
1	Visual inspection	Visual	100 %	No scratch, cracks, pitting/corrosion	Inspection report	P	R	
2	Dimensional check	Dimensional	100%	As per standard	Inspection report	P	R	
3	Physical and chemical properties	Lab analysis	1 per heat /lot	As per standard	Material test certificates	R	R	
4	Leak test	Hydro test	100 %	As per ASTM A 530/999	test report	P	R	Applicable for SS pipes only

L**egend:**
P: Perform **R: Review** **W: Witness**

Details/ Documents to be submitted along with offer:

1. Technical data sheet confirming specifications mentioned in the tender document
2. Product catalogue

Details/ Documents to be submitted after awarding contract:

3. Detailed quality assurance plan, in compliance with QAP mentioned in tender document, to be prepared and submitted to the purchaser for approval.

Final Documents to be submitted along with supply:

4. Relevant material test certificates
5. Visual inspection report
6. Dimensional inspection report
7. Leak test report (Applicable for SS pipes)

11. SS studs, Nuts & washers:

Specifications for SS studs:

Stainless Steel fully threaded studs with two numbers of hexagonal nuts & two numbers of washers (one set consists of 1 no of stud + 2 nos. of nuts + 2 nos. of washers).

1. Studs and nuts shall confirm as follows:
   a) Studs : ASTM A 193 Gr.B8M
   b) Nuts : ASTM A 194 Gr.8M
   c) Washers : SS 316 (1.5 mm thick up to M12, 2 mm thick up to M16 sizes, 3mm for above sizes)
2. All threads shall be made by Thread rolling method only. **Threading by machining is not allowed.**
3. All Nuts shall be of forged quality, **Cast nuts will not be acceptable**.
4. Suggested list of suppliers:
   - M/s. APL
   - M/s UNBRAKO
   - M/s KUNDAN
   - M/s TVS
   - M/s. Venkateswara Industries, Chennai
   - M/s. Bharat Engg., Chennai
   - M/s. V.K Technical works, Hyd.
5. The pitch of the threads shall be as per the standard.

Quality Assurance Plan (QAP) for SS studs, nuts & washers:

S. No.	Description	Type of check	Sample	Ref. Std./ acceptance norms	Format of record	Inspection		Remarks
						Party	M/s SHAR	
1	Visual inspection	Visual	100 %	No scratch, cracks, pitting/corrosion	Inspection report	P	R	
2	Dimensional check	Dimensional	100%	As per standard	Inspection report	P	R	
3	Physical and chemical properties	Lab analysis	1 per heat /lot	As per standard	Material test certificates	R	R	
4	Thread verification	Thread gauge	1 per heat /lot	As per standards	Inspection report	P	R	

Legend:
P: Perform **R: Review** **W: Witness**

Details/ Documents to be submitted along with offer:

1. Technical data sheet confirming specifications mentioned in the tender document
2. Product catalogue

Details/ Documents to be submitted after awarding contract:

3. Detailed quality assurance plan, in compliance with QAP mentioned in tender document, to be prepared and submitted to the purchaser for approval.

Final Documents to be submitted along with supply:

4. Relevant material test certificates
5. Visual inspection report
6. Dimensional inspection report
7. Thread verification report

12. SS Tubes (1/4" dia. & ½" dia.):

Specifications for SS tubes:

1. Standard : ASTM A 269-04 Seamless
2. Material of Construction : SS 316 L/SS 304L
3. End Finish : Smooth & deburred ends
4. Length : 5 to 7 Mtrs –straight
5. Dimensional tolerance : As per ASTM 269
6. Size : ¼" (6.32 mm) OD X 1.22 mm thick
   : ½ "(12.7 mm) OD X 2.1 mm thick
7. Quantity : As per BOM.
8. Suggested list of suppliers: M/s. PARKER / GANDHI/ MAHALAKSHMI/ REMI/ Ratnamani / M/s.Tubacex /M/s. Swagelok / M/s. Panam
9. Testing : Chemical, Mechanical and hydro tests (one sample per heat / lot for each size) shall be carried out as per standard procedure.
10. Packing: Material shall be wrapped in polythene sheet and packed in a wooden box as seaworthy package.
11. Test certificate for chemical analysis, mechanical and hydrostatic test shall be supplied along with dispatch documents.

12. Material supplied shall be guaranteed for 18 months from the date of supply.

Quality Assurance Plan (QAP) for SS tubes:

S. No.	Description	Type of check	Sample	Ref. Std./ acceptance norms	Format of record	Inspection		Remarks
						Party	M/s SHAR	
1	Visual inspection	Visual	100 %	No scratch, cracks, pitting/corrosion	Inspection report	P	R	
2	Dimensional check	Dimensional	100%	As per standard	Inspection report	P	R	
3	Physical and chemical properties	Lab analysis	1 per heat /lot for each size	As per standard	Material test certificates	R	R	
4	Leak test	Hydro test	100 %	As per standards	test report	P	R	

Legend:
P: Perform R: Review W: Witness

Details/ Documents to be submitted along with offer:

1. Technical data sheet confirming specifications mentioned in the tender document
2. Product catalogue

Details/ Documents to be submitted after awarding contract:

3. Detailed quality assurance plan, in compliance with QAP mentioned in tender document, to be prepared and submitted to the purchaser for approval.

Final Documents to be submitted along with supply:

4. Relevant material test certificates
5. Visual inspection report
6. Dimensional inspection report
7. Leak test report

13. Pressure Gauges:

1. Type : Bourdon tube, with blow out disc, bottom entry, laminated safety glass window.
2. End connection : ½" NPT(M)

3. Dial Size : 4”
4. Make : M/s Baumer/ Wika / Wary/ Stauff/ Fiebig/ Manometer
5. Manufacturing Std. : AS Per manufacturer’s standard
6. Sensing Element : AISI 316 S.S Bourdon
7. Pressure Scale : in ‘KSc’
8. Over range protection : 130% of FSD
9. Accuracy : +/- 1 % of FSD
10. Window material : Shatterproof glass
11. Dial : Aluminum, white background with black numeral

Quality Assurance Plan for Pressure gauge:

S. No.	Description	Type of check	Sample	Ref. Std./ acceptance norms	Format of record	Inspection		Remarks
						Party	M/s SHAR	
1	Visual inspection	Visual	100 %	Cleanliness check for absence of oil, Moisture. etc.,	Inspection report	P	R	
2	Material test reports	Lab analysis	100%	As per standard	Material test certificates	R	R	
3	Calibration of Gauges	Lab analysis	100 %	As per standard	test report	P	R	

Details/ Documents to be submitted along with offer:

1. Technical data sheet confirming specifications mentioned in the tender document
2. Product catalogue

Details/ Documents to be submitted after awarding contract:

3. Detailed quality assurance plan, in compliance with QAP mentioned in tender document, to be prepared and submitted to the purchaser for approval.

Final Documents to be submitted along with supply:

4. Relevant material test certificates
5. Visual inspection report
6. Calibration report

14. Nylon braided PVC hose:

S.No.	Description	Specifications
1	Type	Clear transparent Nylon with cross weaving of polyester thread as reinforcement, PVC antistatic flexible hoses crimped with Stainless steel end adapters.
2	Size	80 mm NB and 50 mm NB
3	End connections	1. 80 NB- Both ends of hose shall be crimped with SS hexagonal threaded nipple (male- 3" BSP threaded). 2. 50 NB- both ends of hose shall be crimped with SS ferrule nipple (female- 2" BSP threaded).
4	Size & Quantity required	As per BOM
5	Neck ring	SS 304 /SS316
6	End-To- End dimensions	12 m length (80 NB hose) & 15 m length (50 NB hose)
7	No. of layers of braided	single
8	Medium to be circulated	DM Water
9	Operating /design pressure	7/10 ksc
10	Operating /design temperature	40/80 ^{o} C
11	Hydro test pressure	1.5 x working pressure

Quality Assurance Plan for Nylon braided PVC hose:

S. No.	Description	Type of check	Sample	Ref. Std./ acceptance norms	Format of record	Inspection		Remarks
						Party	M/s SHAR	
1	Visual inspection	Visual	100 %	No scratch, cracks	Inspection report	P	R	
2	Dimensional check	Dimensional	100%	As per standard	Inspection report	P	R	
3	Material test reports	Lab analysis	100%	As per standard	Material test certificates	R	R	

4	Leak test	Hydro test	100 %	As per standard	Test report	P	R	

Details/ Documents to be submitted along with offer:

1. Technical data sheet confirming specifications mentioned in the tender document
2. Product catalogue

Details/ Documents to be submitted after awarding contract:

3. Detailed quality assurance plan, in compliance with QAP mentioned in tender document, to be prepared and submitted to the purchaser for approval.

Final Documents to be submitted along with supply:

4. Relevant material test certificates
5. Visual inspection report
6. Hydro static test report

15. Quick Connect Quick Release Coupling (QCQR)

Specifications:

S. No.	Description	Units	Required	Remarks
1.	Make		M/s. STAUBLI	
2.	Model		TTX60-DN80.110A/IC6/JE	
3.	Type		Male and Female	
4.	Quantity	Nos.	As per BOM	
5.	Nominal diameter	mm	80	
6.	Max. allowable pressure	bar	7	
7.	Allowable temperature	°C	80	
8.	MOC	-	Stainless steel	
9.	Shut-off	-	Double	Tight shut-off with no spill
10.	Seal	-	NBR/EPDM	
11.	End Fitting	-	Female BSP 3”	
12.	Colour code	-	Blue and red	
13.	Medium	-	DM water	

Quality Assurance Plan for QCQR couplings:

S. No.	Description	Type of check	Sample	Ref. Std./ acceptance norms	Format of record	Inspection		Remarks
						Party	M/s SHAR	
1	Visual inspection	Visual	100 %	No scratch, cracks	Inspection report	P	R	
2	Material test reports	Lab analysis	100%	As per standard	Material test certificates	R	R	
3	Leak test	Hydro test	100 %	As per standard	Test report	P	R	

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5. Visual inspection report
6. Hydro static test report

16. Thermal Insulation

Material : Phenolic foam slabs.

Brand : Phenolic Therm.

Phenotherm specifications:

- Thickness: 50 mm.
- Covering: Rigid Phenolic foam covered with aluminium foil facing.
- Density: min. 48 kg/m³.
- Gaps in between Phenotherm slabs shall be sealed with 3-inch aluminium adhesive tape.
- Polyethylene sheet shall be wrapped on thermal insulation surface to avoid moisture entry.

- Water tank, water pipe line and all the flow components in the water circulation system shall be insulated with Phenotherm insulation. (For all flow components, rock wool insulation shall be provided).

The basic insulation material shall have the following features.

- No deterioration of K value on aging and linger life.
- Low water absorption.
- No shrinkage.
- Good adhesion to facings.

Quality Assurance Plan for thermal insulation:

S. No.	Description	Type of check	Sample	Ref. Std./ acceptance norms	Format of record	Inspection		Remarks
						Party	M/s SHAR	
1	Visual inspection	Visual	100 %	No cracks, surface damage	Inspection report	P	R	
2	Dimensional check	Dimensional	100%	As per tender document	Inspection report	P	R	
3	Material test reports	Lab analysis	100%	As per standard	Material test certificates	R	R	

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2. Product catalogue

Details/ Documents to be submitted after awarding contract:

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Final Documents to be submitted along with supply:

4. Relevant material test certificates
5. Visual inspection report
6. Dimensional inspection report

17. Gaskets:

Specification for CAF gaskets:

- Compressed Asbestos Fiber gasket for SORF flanges as per ANSI B 16.5
- Standard confirms: IS 2712.
- Quantity: as per BOM
- Thickness: 3mm
- Surface shall be smooth and uniform thickness shall be maintained at all places.
- Test certificate for the gasket shall be submitted along with the material.

Quality Assurance Plan for Asbestos gaskets:

S. No.	Description	Type of check	Sample	Ref. Std./ acceptance norms	Format of record	Inspection		Remarks
						Party	M/s SHAR	
1	Visual inspection	Visual	100 %	No scratch, cracks and smooth surface	Inspection report	P	R	
2	Dimensional check	Dimensional	100%	As per standard	Inspection report	P	R	
3	Material test reports	Lab analysis	100%	As per standard	Material test certificates	R	R	

Details/ Documents to be submitted along with offer:

1. Technical data sheet confirming specifications mentioned in the tender document
2. Product catalogue

Details/ Documents to be submitted after awarding contract:

3. Detailed quality assurance plan, in compliance with QAP mentioned in tender document, to be prepared and submitted to the purchaser for approval.

Final Documents to be submitted along with supply:

4. Relevant material test certificates
5. Visual inspection report
6. Dimensional inspection report

18. Stainless Steel U-clamps set:

Material of Construction:

U-Clamps	: Gr ASTM A 193 Gr. B8 (SS 304)
Nuts	: Gr ASTM A 194 Gr. B8 (SS 304)
Washers	: SS 304 / SS316
Shim plates	: SS 304 /SS316
Schedule of quantity	: As per BOM

Quality Assurance Plan for U-clamps set:

S. No.	Description	Type of check	Sample	Ref. Std./ acceptance norms	Format of record	Inspection		Remarks
						Party	M/s SHAR	
1	Visual inspection	Visual	100 %	No scratch, cracks	Inspection report	P	R	
2	Dimensional check	Dimensional	100%	As per standard	Inspection report	P	R	
3	Material test reports	Lab analysis	100%	As per standard	Material test certificates	R	R	

Details/ Documents to be submitted along with offer:

1. Technical data sheet confirming specifications mentioned in the tender document
2. Product catalogue

Details/ Documents to be submitted after awarding contract:

3. Detailed quality assurance plan, in compliance with QAP mentioned in tender document, to be prepared and submitted to the purchaser for approval.

Final Documents to be submitted along with supply:

4. Relevant material test certificates
5. Inspection/test reports.
6. Visual inspection report
7. Dimensional inspection report

19. Anchor fasteners:

Type	: Pin (HST)
MOC	: Carbon steel

Make : HILTI

Schedule of quantity : As per BOM

Quality Assurance Plan for Anchor fasteners:

S. No.	Description	Type of check	Sample	Ref. Std./ acceptance norms	Format of record	Inspection		Remarks
						Party	M/s SHAR	
1	Visual inspection	Visual	100 %	No scratch, cracks	Inspection report	P	R	
2	Dimensional check	Dimensional	100%	As per standard	Inspection report	P	R	
3	Material test reports	Lab analysis	100%	As per standard	Material test certificates	R	R	

Details/ Documents to be submitted along with offer:

1. Technical data sheet confirming specifications mentioned in the tender document
2. Product catalogue

Details/ Documents to be submitted after awarding contract:

3. Detailed quality assurance plan, in compliance with QAP mentioned in tender document, to be prepared and submitted to the purchaser for approval.

Final Documents to be submitted along with supply:

4. Relevant material test certificates
5. Inspection/test reports.
6. Visual inspection report
7. Dimensional inspection report

20. Structural steel for pipe supports:

- Party has to supply required quantity of structural steel for pipe supports and equipments support as per the site condition.
- Party shall submit the following test certificates
- Material test certificates
- Visual inspection report

Bill of Material of Water Circulation System for Process Facilities -1 & 2 (Bldg. Nos. 683 & 684), Process Facility-3 (Bldg. No. 686) and Process Facility-4 (Bldg. No. 687), SPAG

S.No.	Item Name	Specification	Description	MOC	Quantity Nos. / mts
1	Water tank	3000 ltr	1.5 x 1.4 x 1.5 m	SS	2
2	Water tank	3000 ltr	Dia. 1.5 m X Length 2.0 m	HDPE tank	2
3	Water pump	67 mlc & 72 m^3/hr	Centrifugal pump coupled with electric motor	ss	4
4	Water pump	67 mlc & 7.2 m^3/hr	Centrifugal pump coupled with electric motor	ss	4
5	Hot water generator	210 kw	Electric type hot water generator (3 heater banks each 70 kw with 1 as thyrister) with Heater control panel	SS	2
6	Heat Exchanger	83 kw	Plate type heat exchanger	SS	2
7	Pipe	125 NB	Sch. 10	SS	20
8	Pipe	100 NB		SS	330
9	Pipe	50 NB	Sch. 40	SS	115
10	Pipe	25 NB		SS	330
11	SS tube	1/2" (12 mm)	12.7 mm OD X 2.1 mm Thick	SS	80
12	SS tube	1/4 " (6 mm)	6.32 mm OD X 1.21 mm Thick	SS	100
13	Flange	125 NB	SORF,# 150	SS	30
14	Flange	100 NB	SORF,# 150	SS	130
15	Flange	65 NB	SORF,# 150	SS	30
16	Flange	50 NB	SORF,# 150	SS	45
17	Flange	32 NB	SORF,# 150	SS	5
18	Flange	25 NB	SORF,# 150	SS	95
19	Dummy flanges	25 NB	SORF,# 150	SS	10
20	Studs	125 NB	M20 x 2, 150 mm length	SS	65
21			M20 x2, 100 mm length	SS	50

S.No.	Item Name	Specification	Description	MOC	Quantity Nos. / mts
22			M16x2, 150 mm length	SS	200
23		100 NB	M16 x2, 100 mm length	SS	500
24		65 NB	M16 x2, 100 mm length	SS	75
25		50 NB	M16 x2, 100 mm length	SS	160
26		32 NB	M14 x 1.75, 75 mm length	SS	20
27		25 NB	M12 x 1.75, 75 mm length	SS	250
28	Elbow	125 NB	90 deg. LR (Butt Weld), sch 10	SS	5
29	Elbow	100 NB	90 deg. LR (Butt Weld), sch 10	SS	80
30	Elbow	50 NB	90 deg. LR (Butt Weld), sch 40	SS	20
31	Elbow	25 NB	90 deg. LR (Butt Weld), sch 40	SS	35
32	EqualTee	125 NB	Butt Weld type, sch 10	SS	3
33	EqualTee	100 NB	Butt Weld type, sch 10	SS	18
34	EqualTee	80 NB	Butt Weld type, sch 10	SS	6
35	EqualTee	50 NB	Butt Weld type, sch 40	SS	6
36	EqualTee	25 NB	Butt Weld type, sch 40	SS	20
37	Reducer	125 NB X 100 NB	Ecentric, Butt Weld type, Sch 10	SS	6
38		100 NB X 65 NB	Concentric, Butt Weld type, sch 10	SS	15
39		100 NB X 80 NB	Concentric, Butt Weld type, sch 10	SS	6
40		32 NB x 25 NB	Concentric, Butt Weld type, sch 40	SS	5
41	Coupling male	65 NB	Quick Connect Quick Release	SS	16
42	Coupling female	65 NB	Quick Connect Quick Release	SS	30
43	Coupling	25 NB	Female socket coupling, sch 40 Make: M/s. Parker / M/s. Swagelok / M/s. Panam	SS	10
44	Hexagonal reducer nipple	25 NB x 50 NB	Both side threaded, sch 40 Make: M/s. Parker / M/s. Swagelok / M/s. Panam	SS	10
45	Hexagonal reducer nipple	50 NB x 80 NB	Both side threaded, sch 10 Make: M/s. Parker / M/s. Swagelok / M/s. Panam	SS	10
46	Strainer	125 NB	Y type strianer	SS	5
47	Strainer	50 NB	Y type strianer	SS	5

S.No.	Item Name	Specification	Description	MOC	Quantity Nos. / mts
48	NRV	100 NB	Swing type check valve	SS	5
49	NRV	25 NB	Swing type / Flap type check valve	SS	5
50	Manual valve	125 NB	Butterfly valve	SS	8
51	Manual valve	100 NB	Butterfly valve	SS	30
52	Control valve along with air filter regulator & dual coil solenoid valve	100 NB	2 -wayON-OFF (ball vlave)	SS	12
53	Control valve along with air filter regulator & smart positioner	100 NB	2-way modulating (globe valve)	SS	3
54	Control valve along with air filter regulator & smart positioner	100 NB	3-way modulating (globe valve)	SS	3
55	Manual valve	50 NB	Ball valve, Full bore, two piece	SS	8
56	Manual valve	25 NB	Ball valve, Full bore, two piece	SS	15
57	Manual valve	50 NB	Ball valve, Reduced bore, two piece	SS	5
58	Manual valve	25 NB	Ball valve, Full bore, two piece	SS	15
59	Manual valve	25 NB	Ball valve, Reduced bore, two piece	SS	8
60	Manual valve	15 NB	Ball valve, Reduced bore, two piece	SS	35
61	Nipple male	65 NB	100 mm length (Both side weldable) sch 10 Make: M/s. Parker / M/s. Swagelok / M/s. Panam	SS	12
62	Nipple male	65 NB	100 mm length (one side thread and other side weldable) sch 10 Make: M/s. Parker / M/s. Swagelok / M/s. Panam	SS	12

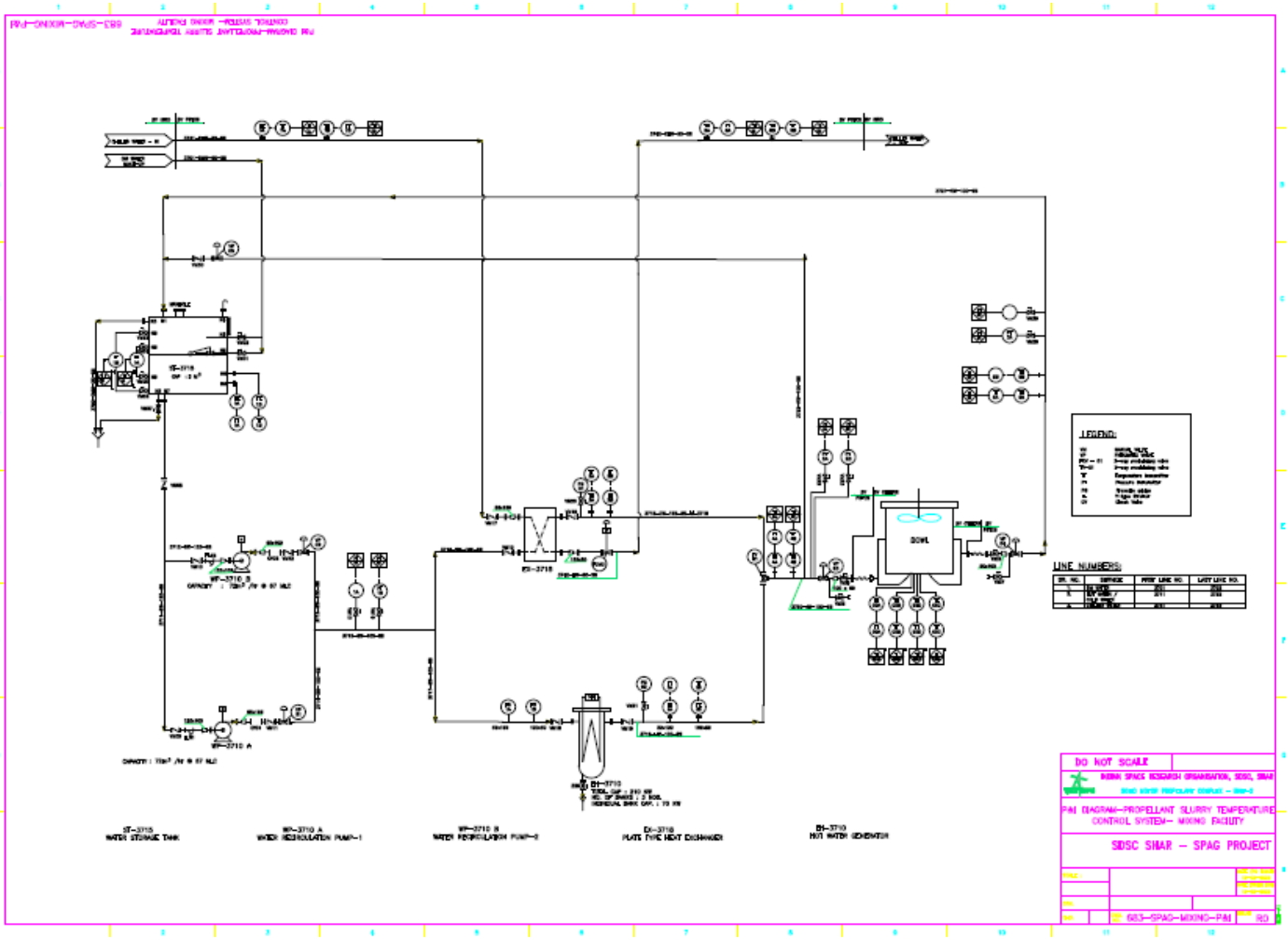
S.No.	Item Name	Specification	Description	MOC	Quantity Nos. / mts
63	Nipple male	25 NB	100 mm length (one side thread and other side weldable), sch 40 Make: M/s. Parker / M/s. Swagelok / M/s. Panam	SS	12
64	Nipple male	25 NB	150 mm length (Both side weldable) sch 40 Make: M/s. Parker / M/s. Swagelok / M/s. Panam	SS	45
65	Nipple male	15 NB	100 mm length (one side thread and other side weldable), sch 40 Make: M/s. Parker / M/s. Swagelok / M/s. Panam	SS	40
66	Nipple male	15 NB	100 mm length (both sides threaded)sch 40 Make: M/s. Parker / M/s. Swagelok / M/s. Panam	SS	15
67	Thermal insulation for piping	125 NB	Phenotherm		20
68	Thermal insulation for piping	100 NB	Phenotherm		330
69	Pr. Guages	0-10 bar	Bourdan type pr. Guages		20
70	Water hose	65 NB	Nylon braided PVC hose with both ends crimped with SS hexagonal threaded nipple (male).	PVC	16
71	Water hose	50 NB	Nylon braided PVC hose with both ends crimped with SS ferrule nipple (female).	PVC	16
72	Manifold (female)-NPT thread	15 NB	Make: M/s. Parker / M/s. Swagelok / M/s. Panam	SS	16
73	Adapter	½ inch NPT (M)x 12.7 mm (M) ferrule	Make: M/s. Parker / M/s. Swagelok / M/s. Panam	SS	60
74	U-clamps set			SS	150
75	Anchor fasteners (Carbon steel)			CS	450

S.No.	Item Name	Specification	Description	MOC	Quantity Nos. / mts
76	Structural steel			MS	7.5 tonnes
77	Tig welding, Inch -dia.				2700
78	Erection, testing, commissioning & Painting, Inch -m				1850

SECTION -D

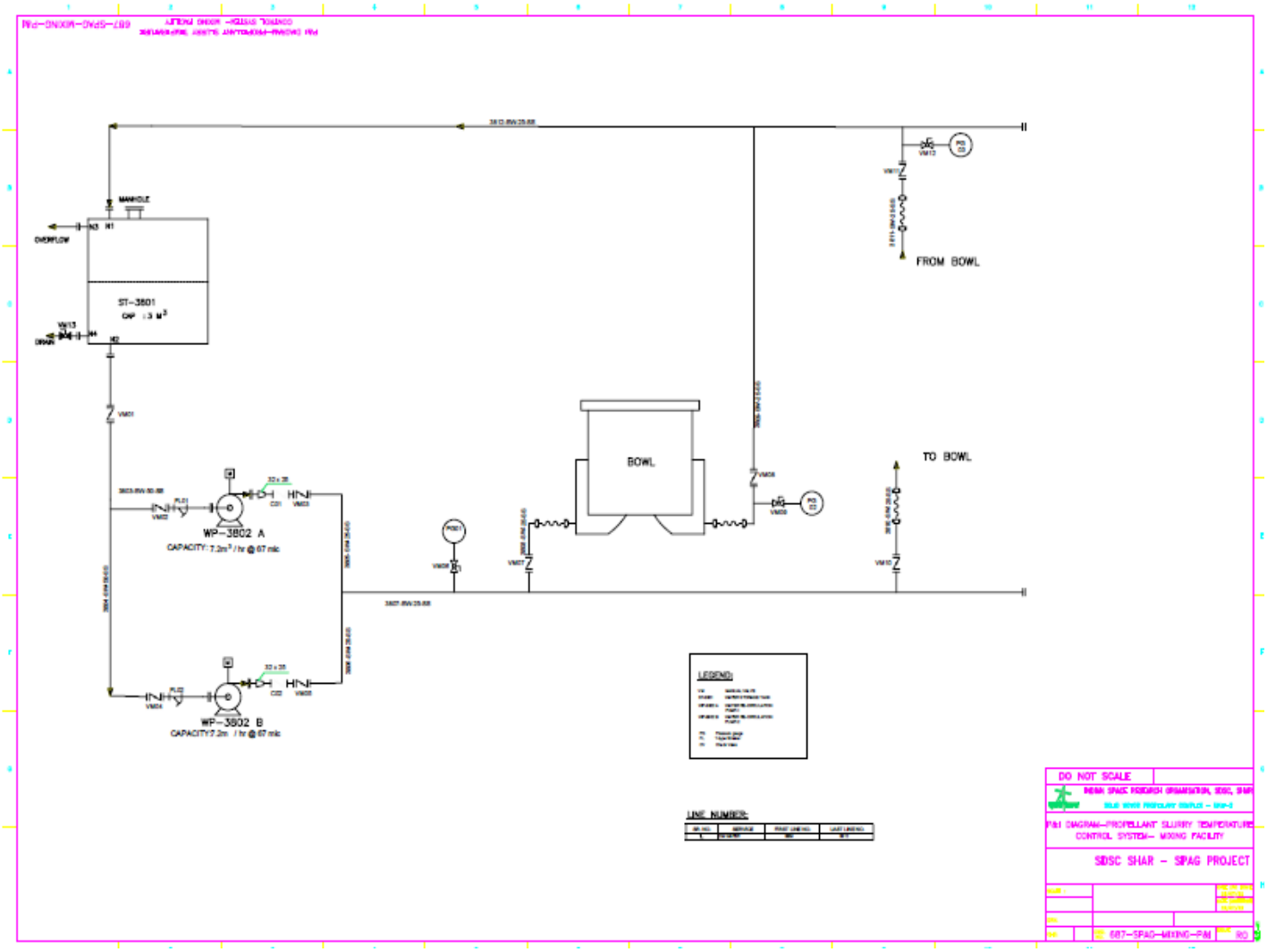
ANNEXURES

Annexure-1



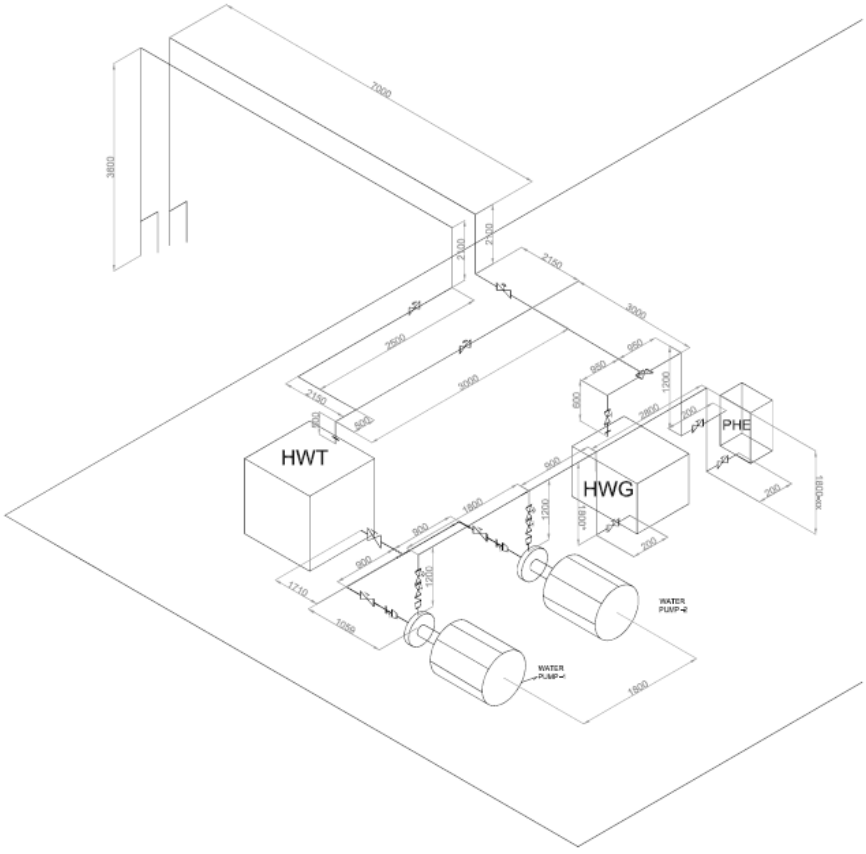
P & I Diagram of Water Circulation System for Process Facilities -1 &2

Annexure-2



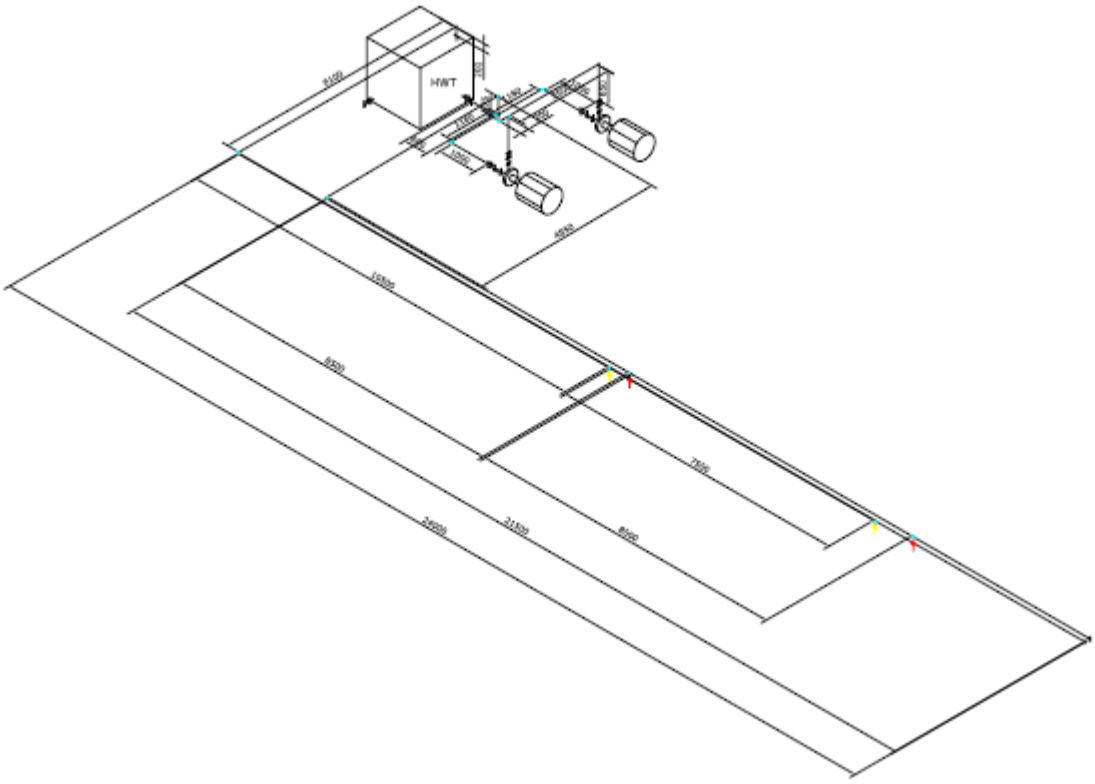
P & I Diagram of water circulation system in Process Facilities – 3 & 4

Annexure-3



ISOMETRIC View of water circulation system in Process Facilities – 1 &2

Annexure-4



ISOMETRIC VIEW OF WATER CIRCULATION SYSTEM FOR PROCESS FACILITIES – 3 & 4

Annexure-5

EXCEPTIONS AND DEVIATIONS

In line with Proposal Document, supplier may stipulate Exceptions and deviations to the Proposal conditions if considered unavoidable.

SL. NO	Reference in Specification		Dept. Spécification	Offered Spécification	DEVIATION
	PAGE NO	CLAUSE NO			

NOTE :

Only deviations are to be written.

Any deviations taken by the Bidder to the stipulations of the Proposal document shall be brought out strictly as per this format and enclosed along with the bid.

Any deviations not brought out as per this Proforma and written elsewhere in the Proposal document shall not be recognized and the same is treated as null and void.

Any willful attempt by the Tenderer to camouflage the deviations by giving them in the covering letter or in any other documents that are enclosed may render the Bid itself non-responsive.

(SIGNATURE OF SUPPLIER)

Annexure -6

CHECK LIST

S. No	Description	Response by Supplier
1.	The detailed scope of work and technical specifications are under stood and price was quoted accordingly	Yes / No
2.	All the general conditions of the contract as per the section-A are acceptable.	Yes / No
3.	In case of some general conditions of the contract as per the section-A are not acceptable, deviation statement is to be enclosed as per Annexure-3	Yes / No
4.	The supplier evaluation format as enclosed along the proposal document is filled-in and necessary supporting documents are enclosed.	Yes / No
5.	Un-priced copy of schedule of prices, payment schedule is enclosed in the techno-commercial bid.	Yes / No
6.	Taxes are quoted in the price bid	Yes / No
7.	List of essential spares and material are enclosed to the priced bid with unit rate	Yes / No
8.	Delivery schedule is acceptable. If not, the deviation is brought-out in the deviation statement (Annexure-3)	Yes / No
9.	Terms of payment are acceptable. If not, the deviation is brought-out in the deviation statement (Annexure-3)	Yes / No
10.	Liquidate damages clause is acceptable. If not, the deviation is brought-out in the deviation statement (Annexure-3)	Yes / No

Signature of Supplier with Seal

Annexure-7

Compliance Report

Party shall comply all the points and same shall be uploaded along with price bid.

Sl. No.	Description	Party's compliance
1	Delivery period shall be maximum ***Six months*** from the date of placement of Purchase Order for supply and ***Three months*** for erection and commissioning at SDSC SHAR.	
2	PBG at 3% of the value of the Purchase Order shall be submitted through bank guarantee from any of the Scheduled Banks executed on non-judicial stamp paper of appropriate value, and shall be valid for a period of sixty days beyond the date for completion of warranty period.	
3	Time is the essence of this order. If the supplier's defined scope of work is not made by the end of delivery period, liquidated damage will be levied @ 0.5 % per week or part thereof subject to a maximum of 10% of P.O. value.	
4	The validity of quotation offered by the party shall be at least for 3 (three) months	
5	Party shall supply all items listed in Tender document	
6	Party shall comply all points mentioned in the QAP. Deviation, if any, shall be communicated to SDSC-SHAR for acceptance	

Signature of Supplier with Seal