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प्लाज्मा अनुसंधान संस्थान  
**INSTITUTE FOR PLASMA RESEARCH**  
परमाणु ऊर्जा विभाग, भारत सरकार का एक सहायता प्राप्त संस्थान  
**An Aided Institute of Department of Atomic Energy,  
Government of India**



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## ENQUIRY

ENQUIRY NO : IPR/EQL/18-19/227  
Date : 26-09-2018

**Due on : 18-10-2018 by 1:00 PM IST**

Please send your offer in sealed envelope specifying Enquiry No, Date & Due Date, ALONG WITH your credentials for the following items:

### Important Note:

Please note that e-mail quotations are not acceptable however you may send your queries (if any) to [localpurchase@ipr.res.in](mailto:localpurchase@ipr.res.in)

Please ensure your sealed quotation reaches this office not later than above mentioned due date and time.

Kindly go through the following documents properly before quoting which are available on the IPR web portal i.e., [http://www.ipr.res.in/documents/tender\\_terms.html](http://www.ipr.res.in/documents/tender_terms.html) / attached herewith.

- 1) Instructions to the bidders & Terms and conditions (refer Form No: IPR-LP-01.V4)
- 2) Bidding format

**GST for Goods and Services (IGST/CGST/SGST TAX BENEFITS):** Please refer clause no: 8 of Form No: IPR-LP-01.V4

### QUOTATION SHOULD BE ADDRESSED TO PURCHASE OFFICER ONLY

Sr No	Description	Quantity
1	SITC of 100 NB, Class-C MS pipes with accessories as per attached sheet.	220.0 Rmts
2	SITC of 80 NB, Class-C MS pipes with accessories as per attached sheet.	4.0 Rmts
3	SITC of 100 NB, PN-10, WCB/CS/CI Body wafer type butterfly valves with accessories as per attached sheet.	5.0 Nos.
4	SITC of 100 NB, PN-10, WCB/CS/CI Body wafer type Non Return Valves with accessories as per attached sheet.	1.0 Nos.
5	SITC of 40 NB, CS, Class 150, 3-Piece, Flanged end, full bore ball valves for CT drain with accessories as per attached sheet.	1.0 Nos.
6	SITC of 25 NB, CS, Class 150, 3-Piece, Flanged end, full bore ball valves for CT MU & QF with accessories as per attached sheet.	2.0 Nos.
7	SITC of 20 NB, SS-304/316, Class 150, single/ two piece, screw end, ball valves for drain with accessories as per attached sheet.	5.0 Nos.
8	SITC of 15 NB, SS-304/316, Class 150, single/ two piece, screw end, ball	3.0 Nos.

	valves for vent with accessories as per attached sheet.	
9	SITC of 40 NB, Class-B, GI pipes with accessories for CT drain as per attached sheet.	3.0 Rmts
10	SITC of 25 NB, Class-B, GI pipes with accessories for CT make-up, quick fill etc. as per attached sheet.	25.0 Rmts
11	SITC of 100 NB Flange Ended, 150 class, Pot-strainer of CI/CS casted body with accessories as per attached sheet.	1.0 Nos.
12	SITC of Pressure Gauges, 0-10 kg/cm <sup>2</sup> range as per attached sheet.	4.0 Nos.
13	SITC of Temperature Gauges, 0-100 degree C range as per attached sheet.	2.0 Nos.
14	Supply, fabrication and installation of MS structure works (Channel, angles, chequer plates, plain plates etc.) for pipes supports etc. with painting and grouting as per attached sheet.	600.0 Kgs
15	Minor civil and re-installation works includes re-installation of 80 NB Flanged Ended valve with Fittings, preparation of RCC foundation for Pump installation, installation of 15 HP Pump-Motor set, making and sealing of hole in PIR panels for pipe entry to the Laboratory Building and any other work related to complete the piping work.	1.0 Job

Note: Please quote with complete technical details (Technical compliance sheet and product data sheet).

Encl: a. a.

Sd/-

Mr. D. Ramesh  
Purchase Officer-II

**Information to Vendors:** We are working towards a single platform for our future requirement. Hence, please refer IPR website i.e, <http://www.ipr.res.in/documents/tendersenq.html> for our future requirement.

# MS PIPING WORK FOR DIVERTOR SYSTEM

## 1. SCOPE OF WORK:

MS piping work including valves, strainer, NRV, Temperature gauge, Pressure gauge, GI piping, pump installation etc. to connect Cooling Tower and HPHT Heat exchanger of Divertor System to be carried out at IPR (Laboratory Building). The scope of work shall be briefed as below.

The scope of work is supply, installation and testing of MS/ GI pipes, valves, NRV etc. with fittings confirming to tender specifications, relevant BIS codes, in accordance with proposed schedule of quantities in annexure –II.

- a) Supply, installation and testing of material/ equipment as per SOQ in annexure –II.
- b) Installation of items mentioned as FIM in Annexure-I.
- c) Installation of 15 HP pump motor set for cooling tower water circulation on RCC foundation, which shall be prepared by contractor.
- d) Most of the piping shall be laid at height of approx. 8 mtrs. from ground level. It needs scaffolding arrangement to do piping inside and outside of laboratory building. Arrangement of scaffolding etc. is in contractor's scope.
- e) Laboratory building is a PEB (Pre Engineered Building) building, made up of PIR panel. Making of hole in PIR panel by core cutting/ hole saw cutter for pipes entering to the building.
- f) Pipes support structures need to be prepared at regular interval for laying pipes.
- g) Supply and return pipes will pass through AHU rooms, which walls are prepared by "Dry Wall Panel". Making of hole by core cutter/ hole saw cutter in Dry Wall Panel for entering pipe lines and again proper sealing of gap by PUF spray and silicon sealant.
- h) Arrangement of manpower, welding equipment, welding consumables, material-handling equipment, gas, tools & tackles, scaffolding etc. needed to carry out installation, testing & commissioning needs to be arranged by the Vendor.
- i) Required metric thread studs / nuts / bolts / washers / anchor fasteners/ supports etc. need to be arranged by the contractor as per SOQ in annexure-II. The items supplied by the contractor should confirm relevant IS codes.
- j) The painting work for MS/GI pipes, fittings and support structures are in the scope of the vendor. Colour shade shall be decided by the IPR Engineer-in-Charge.
- k) The expenditures incurred for all the tests (including DPT) shall be met by the contractor.

The Bidder shall carry out work in every respect in conformity with the contract documents and with the directions of the Engineer in-charge.

## 2. FREE ISSUE MATERIALS / SERVICES AND EXCLUSIONS:

The vendor should employ required man power till the final commissioning of the project.

- a) IPR shall provide free power and water for fabrication and testing purposes.
- b) IPR shall provide single electric power point at one place from where the vendor should distribute it as per requirement.
- c) IPR will not provide covered site office cum stores for the execution of the job.
- d) IPR will supply material as per Annexure-1 as a free issue material.
- e) All the insurance after delivery of materials at the site will be in the vendor's scope.

ANNEXURE -I

### FREE ISSUE MATERIALS

Sr. No.	Items description	Qty.	Approx. Rates (Rs.)	Approx. total cost (RS.)
1	15 HP Pump motor sets.	01 Nos.	90000	90000
2	80 NB Flanged Ended Ball valve for by-pass line.	01 Nos.	9000	9000
<b>Approx. Total Cost (Rs.)</b>				<b>99000</b>

## 3. TECHNICAL SPECIFICATIONS OF COMPONENTS AND WELDINGS

Following components are to be interconnected to satisfy the system requirements. Bidder has to provide a separate sheet confirming to the following specifications. Change in the specifications will not be accepted.

**For Soft Water application:**

**3.1 Piping Specifications:**

- **Water Piping:** Water pipes and all fittings shall be MS Class 'C' (Heavy Class) as per SOQ conforming to relevant BIS Codes.
- **All jointing** in the pipe system shall generally be by welding, unless otherwise mentioned, or directed at site. All welding shall be done by qualified welders and shall strictly conform to BIS Code of practice for manual metal arc welding of Mild Steel. First butt weld joints of each welder shall be tested for DP and Radiography test. DP and radiography testing of sample joints shall be arranged by contractor on their own cost at reputed test lab. After satisfactorily test report of sample testing, welder shall be allowed to carry further welding of the pipes. Rest of the welds joints shall have 100% visual inspection, 10 % DP test and hydrostatic test. Before welding of pipes, make proper 'V' notch at the joints by chamfering the end of pipe with surface grinder. All electrodes shall be selected to match the mechanical and chemical properties of the parent material. The welding rods shall be selected as per AWS-E-7018 or Equivalent BIS code, subject to Purchaser's approval.

Radiography charges for sample piece shall be borne by contractor. Additional radiography required due to poor quality of contractor's welder, will be done at contractor's cost.

- **All pipes** and their supports shall be thoroughly cleaned and given one primary coat of red oxide paint/ zinc primer and two coats of enamel paints of approved shade.
- **Fittings and accessories: All fitting likes elbows, Tees, reducer/ expander, coupling etc.** shall be of heavy class –C. Fittings used on welded piping shall be of the weldable type.
- **Pipe flanges:** All flanges including flanges of valves are to be slip on serrated finished flanges (SORF) as per ASME B16.5, class 150 SORF flanges.
- **Piping Installation:**
  - Tender Drawings indicate schematically the size and location of pipes only. The Contractor, on award of the work, shall prepare detailed piping drawings with details of fittings, locations of isolating valves, drain and air vent with valves and all pipe supports. He must keep in view the specific openings in buildings and other structures through which pipes are designed to be passed. After completion of work, party has to submit as built drawing.
  - Piping shall be properly supported on, or suspended from, stands, clamps, and hangers as specified and as required. The Contractor shall adequately design all the brackets, saddles, anchors, clamps and hangers and be responsible for their structural sufficiency. All pipes shall be supported with MS structural steel like C-channel, I-Beam, angle and M S Class 'C' pipes, supported from floor or column. Where pipe and clamps are of dissimilar materials, a gasket shall be provided in between. Spacing of pipe supports shall not exceed the following:

Pipe size	Spacing between supports
Up to 12 mm	1.5 Meter
15 to 25 mm	2.0 meter
30 to 150 mm	2.0 meter
Over 150 mm	2.5 meter

- Vertical risers shall be parallel to walls and column lines and shall be straight and plumb. Risers passing from terrace floor, suitable flashing shall be provided to prevent water leakage. All piping work shall be carried out in a workmen like manner, causing minimum disturbance to the existing services, buildings, roads and structure. The entire piping work shall be organized, in coordination with other agency's work, so that laying of pipe supports, pipes and pressure testing for each area shall be carried out in one stretch.
- Pipe lines shall have a suitable clean/ drain out of 20 NB size at the lowest points and air vent of 15 NB size at the highest points.

**3.2 WELDING:**

- a) Only reputed brand electrodes like Advani / ESAB / D&H/ equivalent should be used for carrying out welding.

- b) The SS welding shall be TIG welding and arc-welding method may be followed for welding of MS/GI structures/ pipes.
- c) In case of defect being identified in any weld joint, the joint shall be grounded off to the base metal and shall be re-welded.
- d) The welding should be uniform and free from any welding defects.

### **3.3 Butterfly Valves (CI/ CS):**

Type	: Rubber lined Wafer type
Media	: Soft Water
Pressure rating	: PN 10
Operating temperature range	: 0 to 80 °C
MOC/ type of Body	: CI/ CS/ WCB with single piece body
MOC of disc and wetted parts	: CF8M/ CF8 as per SOQ
MOC of Seat	: EPDM/ Nitrile/ Neoprene with replaceable
MOC of Fasteners	: Stainless Steel
MOC of operating lever/ wheel	: MS/ SS/ Suitable
Seat leakage	: Bubble tight shut off (Class VI)
General design & face to face dimensions	: API 609 / ASME B16.10/ EN 593
Valve testing	: API 598
Flange standard conformity	: Class 150, ASME B16.5 SORF flanges

### **3.4 Ball Valves (Full bore CI/CS for 40 and 25 NB):**

Type	: Three piece full bore
Media	: Soft Water
Pressure rating	: 150 Class
Operating temperature range	: 0 to 80 °C
MOC of Body	: CS/WCS/CI/ SS 304 as per SOQ
MOC of ball	: SS 304/ SS316 solid
Seat	: PTFE
MOC of handle	: MS/ SS/ equivalent with plastic cover
Seat leakage	: Tight shut off (Class VI)
Valve testing	: API 598
End connection	: Flange end

### **3.5 Ball Valves (SS 304 for 20 nb and 15 nb):**

Type	: Single/ two piece/Three piece full bore
Media	: Soft Water
Pressure rating	: 150 Class
Operating temperature range	: 0 to 80 °C
MOC of Body	: ASTM A351 SS 304/ SS 316 as per SOQ
MOC of ball	: SS 304/ SS316 solid
Seat	: PTFE
MOC of handle	: MS/ SS/ equivalent with plastic cover
Seat leakage	: Tight shut off (Class VI)
Valve testing	: API 598
End connection	: BSP Thread/ Screwed end (female)

### **3.6 Non Return Valve (CI/CS/WCB):**

Valve type	: Swing type wafer check valve.
Media	: Soft water/ Raw Water
Disc type	: Single/ double plate with integral hinge pin
Seat and sealing	: Rubber "O" ring/ gasket/ metal seat
Pressure rating	: PN 10
Operating temperature range	: 0 to 80 °C
Seat leakage	: Bubble tight shut off (Class VI)
MOC of Body	: CS/ CI/ WCB as per SOQ
MOC of Disc and wetted parts	: ASTM A351 Gr CF8M/ SS 316/ CF8/ SS 304 as per SOQ
Seat	: EPDM

General design & face to face dimensions : API 6D / ASME B 16.10  
Valve testing : API 598  
Flange standard conformity : ASME B16.5, class 150 SORF flanges

### **3.7 Pot-Strainer (CS/CI):**

Strainer type : Casted Body Pot-Strainer  
Media : Soft Water  
Pressure rating : PN 10  
Operating temperature range : 0 to 80 °C  
MOC of Body & Cover : CI/ CS as per SOQ  
MOC of Screen and perforated sheet : SS 316/ SS 304  
MOC of drain plug : SS 316/ SS 304/ SS 410  
Screen Mesh size : 20/ suitable Mesh supported by perforated SS sheet. (One extra filter mesh element will be supplied as spare)  
Thickness of SS perforated sheet : Minimum 24 gauge thick for sizes from 15 NB to 50 NB, 20 gauge thick for sizes for 65 NB to 150 NB  
Sealing : PTFE/ CAF/ equivalent  
Testing standard : API 598  
Pressure drop : Maxi. 0.3 bar at rated flow  
End connection : ASME B16.5, class 150 SORF flanges

**Notes:** Bidder has to provide material test certificates, drawings etc. with all the details with the supplied materials.

### **4. MEASUREMENTS:**

Unless otherwise specified, measurement for piping for the project shall be on the basis of centre line measurements described herewith. Piping shall be measured in units of length corrected to centimeter along the centre line of installed pipes including all pipe fittings, flanges (with gaskets, nuts, and bolts for jointing), unions, bends, elbows, tees, concentric and / or eccentric reducers, inspection pieces, expansion loops etc. The above accessories shall be measured as part of piping length along the centre line of installed pipes, and no special multiples of pipe lengths for accessories shall be permitted. The quoted rates for centre line linear measurements of piping shall include all wastage allowances, pipe supports including hangers, MS/SS channel, wooden haunches, nuts, check nuts, vibration isolator suspension where specified or required, and any other item required to complete the piping installation as per the specifications. None of these items will be separately measured nor paid for. However, all valves (globe / check / butterfly / ball), thermometers, pressure gauges shall be separately counted and paid as per their individual unit rates, which shall also include their insulation as per specifications. Piping measurements shall be taken before application of the insulation. Fabrication of all types of pipe supports, provided as per the instruction of Engineer-in-Charge, will be paid on weight basis, excluding weight of fasteners. All temporary lines or equipment required for flushing, testing, draining or drying should be provided, installed and dismantled by the contractor within his quoted rates. Open end of the pipes shall be blanked within his quoted rates.

Radiography charges shall be borne by contractor. Additional radiography required due to poor quality of contractor's welder, will be done at contractor's cost.

### **5. PAINTING - COLOUR CODE:**

All MS equipment/ piping/ pipes support structures shall be thoroughly cleaned and given one primary coat of red oxide paint/ zinc primer and two coats of enamel paints of approved shade. All painting colour code shall be approved before execution. No separate payment shall be made for painting work. Reputed make like Asian/Berger etc are only to be used.

### **6. DRAWING:**

Drawing no.: IPR/WDS/DIVERTOR of P&ID for WDS of Divertor system is a typical drawing for reference.

### **7. TECHNICAL DATA SHEETS**

*(List of technical information's to be furnished by the bidder to IPR)*

#### **Notes:**

- Separate technical data sheets shall be furnished for different type/ model/ configuration for different items.
- Take copies of the data sheet for different sizes/ category and furnish the information asked for.
- All the data sheets shall be endorsed with stamp and signature by the bidder.

- Bidder has to provide minimum technical details as enclosed herewith, however shall also provide remaining / additional details. All the Items shall be ordered only after Technical specification approval.
- Attach Technical leaflets, performance curves, etc. for all products / system parts offered.
- Please refer technical specifications asked for before filling the blank data sheets

➤ **BUTTERFLY VALVES (CI/ CS):**

Type/ Class	Rubber lined Wafer type/ PN 10	
Make/ Model	Approved make	
Media	Soft Water	
Operating temperature range	0 to 80 °C	
MOC/ type of Body	CI/ CS/ WCB with single piece body	
MOC of disc and wetted parts	CF8M/ CF8 as per SOQ	
MOC of Seat	EPDM/ Nitrile/ Neoprene with replaceable	
MOC of Fasteners	Stainless Steel	
MOC of operating lever	MS/ SS/ Suitable	
Seat leakage	Bubble tight shut off (Class VI)	
General design & face to face dimensions	API 609 / ASME B16.10/ EN 593	
Valve testing	API 598	
Flange standard conformity	Class 150, ASME B16.5 SORF flanges	
Locking handle/ Lever	Yes	
Additional features if any:	--	

➤ **BALL VALVES (40 NB AND 25 NB):**

Type/ Class	Three piece full bore/ 150 Class	
Media	Soft Water	
Operating temperature range	0 to 80 °C	
MOC of Body	CS/CI/ SS 304 as per SOQ	
MOC of ball	SS 304/ SS316 solid	
Seat	PTFE	
MOC of handle	MS/ SS/ equivalent with plastic cover	
Seat leakage	Bubble tight shut off (Class VI)	
Valve testing	API 598	
End connection	Flange end	
Additional features if any:	--	

➤ **BALL VALVES (20 NB AND 15 NB):**

Type	Single/ two piece, full bore	
Media	Soft Water	
Pressure rating	150 Class	
Operating temperature range	0 to 80 °C	
MOC of Body	ASTM A351 SS 304/ SS 316 as per SOQ	
MOC of ball	SS 304/ SS316 solid	



Seat	PTFE	
MOC of handle	MS/ SS/ equivalent with plastic cover	
Seat leakage	Tight shut off (Class VI)	
Valve testing	API 598	
End connection	BSP Thread Screwed end (female)	
Additional features if any:	--	

➤ **NON RETURN VALVE (CI/ CS):**

Valve type/ Class	Swing type wafer check valve/ PN 10	
Media	Soft water/ Raw Water	
Disc type	Single/ double plate with integral hinge pin	
Seat and sealing	Rubber "O" ring/ gasket/ metal seat	
Operating temperature range	0 to 80 °C	
Seat leakage	Bubble tight shut off (Class VI)	
MOC of Body	CS/ CI/ WCB as per SOQ	
MOC of Disc and wetted parts	ASTM A351 Gr CF8M/ SS 316/ CF8/ SS 304 as per SOQ	
Seat	EPDM	
General design & face to face dimensions	API 6D / ASME B 16.10	
Valve testing	API 598	
Flange standard conformity	ASME B16.5, class 150 SORF flanges	
Additional features if any:	--	

➤ **POT-STRAINER (CI/ CS):**

Strainer type/ Class	Casted Body Pot-Strainer/ PN 10	
Media	Soft Water	
Operating temperature range	0 to 80° C	
MOC of Body & Cover	CI/ CS as per SOQ	
MOC of Screen and perforated sheet	SS 316/ SS 304	
MOC of drain plug	SS 316/ SS 304/ SS 410	
Screen Mesh size	20/ suitable Mesh supported by perforated SS sheet.	
One spare filter element provided	Yes	
Thickness of SS perforated sheet	Minimum 24 gauge thick for sizes from 15 NB to 50 NB, 20 gauge thick for sizes for 65 NB to 150 NB	
Sealing	PTFE/ CAF/ equivalent	
Testing standard	API 598	
Pressure drop	Maxi. 0.3 bar at rated flow	
End connection	ASME B16.5, class 150 SORF flanges	
Additional features if any:	--	

➤ **FLANGES:**

• Type	SORF	
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• Class	150	
• MOC of flanges	As per SOQ/ Parent material	
• Design	ASME B16.5, SORF flanges	

➤ **MS PIPES:**

• Make	As per approved	
• Class	'C'- Heavy	
• MOC	MS	

**8. APPROVED MAKES**

The following makes are approved by IPR. Deviations in the approved make will not be allowed. So, the vendor has to consider this while submitting price bid. Also, refer technical specifications, accordingly select approved makes.

Description of item	Approved makes
<b>Piping</b>	
▪ MS pipe	Tata / Jindal / Surya/ Sail/ ISMT
▪ GI Pipes	Tata / Jindal / Surya/ Sail/ ISMT/ Asian
<b>Valves &amp; Strainers (DM water / CT water applications)</b>	
▪ Butterfly (manual)	L&T/ Intervale / Expert/ Weir-BDK / CRI/ Virgo/ Fisher control / AMRI/ Technova /Advance / Saunders / Crescent/ Deltech
▪ Ball Valves (manual)	L&T/ Expert/ Virgo/ Velan / Saunders / Accuflow / Weir-BDK /Trishul /Indian / Crescent/ Unimac/ CRI/ Lodha
▪ Non-Return Valves	L&T/ Expert/ Advance/ Intervale/ Danfoss/ CRI/ BDK
▪ Needle valves	Trishul/ Accuflow / Expert/ Unimac/ Panam/ Aptech/ PMT/ G-Tech/ Lodha
▪ Water Strainers	Triveni/ Trishul/ Sant/ Emerald/ Leader/ Advance/ Flowtech/ Crescent valves/ Flairs/ Emerald/ Unimac
<b>Instruments &amp; Controls (DM water / CT water applications)</b>	
▪ Temperature / Pressure gauges	WIKA / Baumer/ Forbes Marshall/ Emerald/ Fiebig/ Emerson/ Star

\* Subject to IPR approval

**9. STANDARDS/ CODES**

The following latest IS specifications / equivalent applicable codes are applicable for the proposed work.

IS : 3656	▪ Welds testing by DP
IS : 6392 – 1971/ ASME B16.5	▪ Steel pipe flanges.
IS : 628	▪ Rubber gasket, Teflon gasket for SS piping.
IS : 554 – 1975	▪ Dimensions for pipe threads for pressure tight joints
IS : 1367	▪ Bolts, nuts, and studs/ threaded fasteners.
ANSI - B36.19	▪ Stainless Steel pipes.
IS : 444/87	▪ Insulated rubber hose manufactured in woven textile / braided yarn reinforcement.

**10. TESTING & ACCEPTANCE:**

- VISUAL INSPECTION: 100% Visual Inspection of weld / flange joints shall be carried out.
- After the piping job is completed, the entire piping shall be flushed out with water.
- DP TEST: 10% Dye Penetration test shall be carried out for all piping work. The procedure shall be as per pressure vessel code.
- Pressure testing should be carried out at a pressure of 10 bar in MS pipe lines.
- Leakage, if any observed during testing shall be rectified immediately.

**11. SITE CLEARANCE:**

The scope of work includes site clearance (after completion of job), hence all area shall be cleared of debris and excess material left during the fabrication / commissioning related work.

**12. COMPLETION PERIOD:**

The total completion period is 15 weeks from the date of P.O.

**13. TERMS OF PAYMENT**

Unless otherwise agreed to in writing between the Purchaser and the Contractor, payment for the delivery of the tendered items, will be made as follows.

- a) 70% of basic price (supply part of SOQ) + 100% of all other charges of basic price will be paid against delivery of material at IPR site, its verification by IPR representative and on receipt of proforma invoice in triplicate on pro-rata basis (i.e. 70% of each item shall be made against delivery of that item); provided all working drawings have been submitted by the contractor if any. Note: Pro-rata payment shall be made up to maximum 3 (three) bills.
- b) Balance 30% (supply part of SOQ) and 100% of installation charges mentioned in SOQ will be paid within 30 days after successful testing and commissioning piping system by IPR; submission of documents by the contractor as listed in the tender; and also on submission of Performance Bank Guarantee for 10% of the order value from SBI/nationalized banks or any one of the scheduled banks mentioned in the bracket (Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank) valid throughout the warranty period and on receipt of final invoice. The Bank Guarantee submitted should cover all liabilities mentioned in the General Terms & Conditions.

**14. GUARANTEE:**

The overall job guarantee shall be of one year against any fault. Any repair / services shall be provided at no extra cost to the owner during this period.

**15. INSTRUCTION TO BIDDERS:**

- The Bidder shall have studied in detail the site conditions, scope of work and specifications.
- Most of piping will be carried out at approx. 8 mtrs. height.
- The Bidder shall have got clarified for any confusion regarding the tender terms and conditions and specifications.
- The Bidder shall timely complete the scope of work, through better planning, management, execution and coordination with all concern without compromising the quality of material and finished work, as the time is the most critical requirement of the work.

**15. SCHEDULE OF QUANTITIES:**

*Please refer Annexure-II for Schedules of Quantities in Quotation format.*

## SCHEDULE OF QUANTITIES (QUOTATION FORMAT)

(To be filled in completely by bidder and returned to IPR)

### NOTES:

- All the prices should be in Indian rupees.
- The rate mentioned in the Schedule of quantities shall include cost of all materials, accessories, operation, tools, loading, transport, unloading, handling, labour and any other expenditure incurred during supply, fixing, execution, testing, balancing, commissioning and completion of the work, etc.
- All equipments, quantities and technical data indicated in this Schedule (SOQ) are based on the engineering by IPR. These quantities shall be adjusted / amended after detail engineering and in accordance with the actual requirement. Contractor shall be paid for the actual quantity of work executed by him based on joint measurements.
- There will not be any payment for wastage of material / labour.
- The contractor is encouraged to visit the site before submitting the offer, as the actual pipe routing at site may have important bearing on preparation of the offer.
- Any deviation from the scope of job, will lead to the rejection of the offer.

Sr. No	Item Description	Qty	Unit	Supply Part			Installation part			Total amount (Rs.)
				Rate (Rs.)	Amount (Rs.)	GST (%)	Rate (Rs.)	Amount (Rs.)	GST (%)	
				A	B	C=AxB	D	E=AxD	F=C+E	
1.	<b>MS CLASS 'C' PIPING:</b> Providing and laying in position the following <b>MS class 'C' (heavy class) pipes</b> , cut to required lengths and installed with all welded joints, necessary fittings like flanges, elbows, tees, reducers, fasteners, gasket, purge tapings, drain points etc. <b>complete as per instruction of Engineer-in-Charge and attached technical specification.</b> Before bringing pipes within IPR, estimate the pipes lengths requirements according to the final route of piping.									
	(i) 100 NB, MS, Class 'C' pipes	220	RMT							
	(ii) 80 NB, MS, Class 'C' pipes	4	RMT							

2.	<p><b>BUTTERFLY VALVE (WCB/CI):</b> Supply and installation in position of following PN-10 class Wafer type butterfly valves center disc type with slim seal, WCB/ CS/ CI body, all SS-316/ SS-304 wetted parts, centering lugs, locking lever handle, bubble tight shut off class-VI, replaceable EPDM/ Nitrile/ Neoprene Rubber seat, high Cv values including required qty. of 150 class (B16.5) matching SORF flanges and metric thread nut-studs fasteners sets etc. as per attached technical specification.</p>									
	(i) 100 NB, WCB/ CS/ CI, Class 150	5	Nos.							
3.	<p><b>NON RETURN VALVE (WCB/ CI):</b> Providing and fixing in position of following wafer type dual-plate/ single plate flapper <b>Non return valve – Class -150, WCB/ CS/ CI body and SS 304 other wetted parts</b>, including matching flanges and metric thread nut-studs fasteners sets for cooling tower water pumps as per attached technical specification.</p>									
	(i) 100 NB, WCB/ CI, Class 150	1	Nos.							
4.	<p><b>BALL/ NEEDLE VALVES:</b> Providing and fixing in position of following Ball/ Needle valves of MOC as specified below, Class 150 construction including body with bubble tight shut off and Teflon seat. This also includes matching flanges, metric thread SS nut-studs fasteners sets and PTFE gaskets for flanged end valves as per attached technical specification.</p>									
	(i) 40 NB, Carbon Steel body, Class 150, Flanged end, full bore, 3-piece for CT drain lines.	1	Nos.							
	(ii) 25 NB, Carbon Steel body, Class 150, Flanged end, full bore, 3-piece for CT inlet and quick fill.	2	Nos.							
	(iii) 20 NB, Class 150, SS-316/ 304, Screw end, ¾" BSP female, Single/two/three piece for pipe lines drain.	5	Nos.							
	(iv) 15 NB, Class 150, SS-316/ 304, Screw end, ½" BSP female thread ball valves for air vent in pipe lines.	3	Nos.							

5.	<p><b>GI CLASS 'B' PIPING FOR COOLING TOWER :</b></p> <p>Supply and installation in position the following <b>GI class 'B' pipes</b> cut to required lengths and installed with all welded joints with necessary fittings, like elbows, union, metric thread stud-nut fasteners sets, gaskets (Sch-10) etc. and painting complete as per instruction of Engineer-in-Charge. Painting shall be of one coat of zinc chrome/ red oxide with two coats of enamel paint. All painting colour code shall be approved by Engineer-in-Charge before execution as per attached technical specification. Underground pipes shall be bitumen coated. Before bringing pipes within IPR, estimate the pipes lengths requirements according to the final route of piping.</p>														
(i)	40 NB, Class-B, GI pipes for CT drain.	3	RMT												
(ii)	25 NB, Class-B, GI pipes for CT make up and quick fill.	25	RMT												
6.	<p><b>POT STRAINER (CI):</b></p> <p>Providing and fixing in position of following <b>Class 150, flange ended Pot-strainers</b>, with CI/MS casted body and SS 304 filter element of 20 mesh / suitable including matching flanges, metric thread nut-studs fasteners sets and PTFE gaskets for cooling tower loop as per attached technical specification.</p>														
(i)	100 NB, Class 150, CI/ MS	1	Nos.												
7.	<p><b>PRESSURE GAUGES:</b></p> <p>Providing and fixing in position, water pressure gauges with all SS accessories like shutoff needle valve, siphon pipe, etc. with Range: 0 – 10 bar, Accuracy <math>\pm</math> 1% FSD and Dial size: 100 mm as per attached technical specification.</p>	4	Nos.												
8.	<p><b>TEMPERATURE GAUGES:</b></p> <p>Providing and fixing in position the dial type industrial Temperature gauges with all SS accessories like thermowell etc. Range - 0 – 100 °C, Accuracy <math>\pm</math> 1% FSD and Dial size 100 mm as per attached technical specification.</p>	2	Nos.												
9.	<p><b>MS STRUCTURE WORK FOR PIPE SUPPORT ETC.:</b></p> <p>Supply and fabrication of MS structural steel (Channel, angles, chequer plates, plain plates etc.) for support structure of water</p>														

	<p>pipes etc. MS structural steels cut to required sizes and fix with all welded joints with necessary U-clamps, Nut-bolts, fasteners, rubber pad etc. and painting complete as per instruction of Engineer-in-Charge. Painting shall be of one coat of zinc chrome/ red oxide with two coats of enamel paint. All painting colour shade shall be approved by Engineer-in-Charge before execution. The approximate weight of structural steel as following:</p>									
	(i) MS Structural steel work for support.	600	Kgs.							
10.	<p><b>Minor civil and other works:</b></p> <ul style="list-style-type: none"> <li>• Installation of 15 HP Pump-Motor set. Pump-motor set will be provided by IPR. It includes preparation of RCC foundation for Pump installation, grouting of pump base frame on RCC foundation by T-bolts, rubber vibration isolator sheet etc.</li> <li>• Making and sealing of hole in PR panel (PEB Building)/ Dry Wall Panel (AHU rooms) for pipe entries to the Laboratory Building. After laying pipes, sealing of remaining portion of cutout by PUF spray/ silicon sealant to make water proof.</li> <li>• Necessary arrangement of scaffolding for piping work at height of approx. 8 mtrs. from ground level.</li> <li>• Re-installation of 01 no. 80 NB Flanged Ended valve with supply of matching flanges, metric standards fasteners, gaskets etc.</li> <li>• Arrangement of required sizes and quantity of blind flanges on temporary basis for pressure testing.</li> <li>• During the work execution all necessary civil work/structure work/ Digging work/refilling work will be carried out by contractor. After completion of the work, site should be properly cleaned.</li> </ul> <p>- Any other work related to complete the piping work.  <b>Whole minor civil and dismantling work must be carried out to IPR satisfaction and as per the instructions of Engineer in-Charge, IPR.</b></p>	1	Job							
<b>Total Price, in Rs. (In Figures)</b>										

Total Price (in words) .....

	Indicate percentage except Freight			
	Percentage	Amount (Rs.)	Included*	Excluded*
Packing and forwarding				
Applicable GST on supply part				
Applicable GST on installation part				
Insurance				
Freight (Rs.)	Rs.			

\* Filling of tick marks (√) either in included or in excluded column for each in above table is mandatory.

*Important Note:*

- IPR reserves the right to add / delete any or all of the items mentioned in SOQ.
- Bidder must understand all the specifications, terms & conditions of this tender thoroughly, visit the site and contact the Engineer-in-Charge for any clarification if necessary.
- **Deviations if any shall be clearly specified on separate sheet with all details.**

The bidder should sign all pages in token of acceptance of the terms and condition, scope of work and all the specifications and return the same to us.

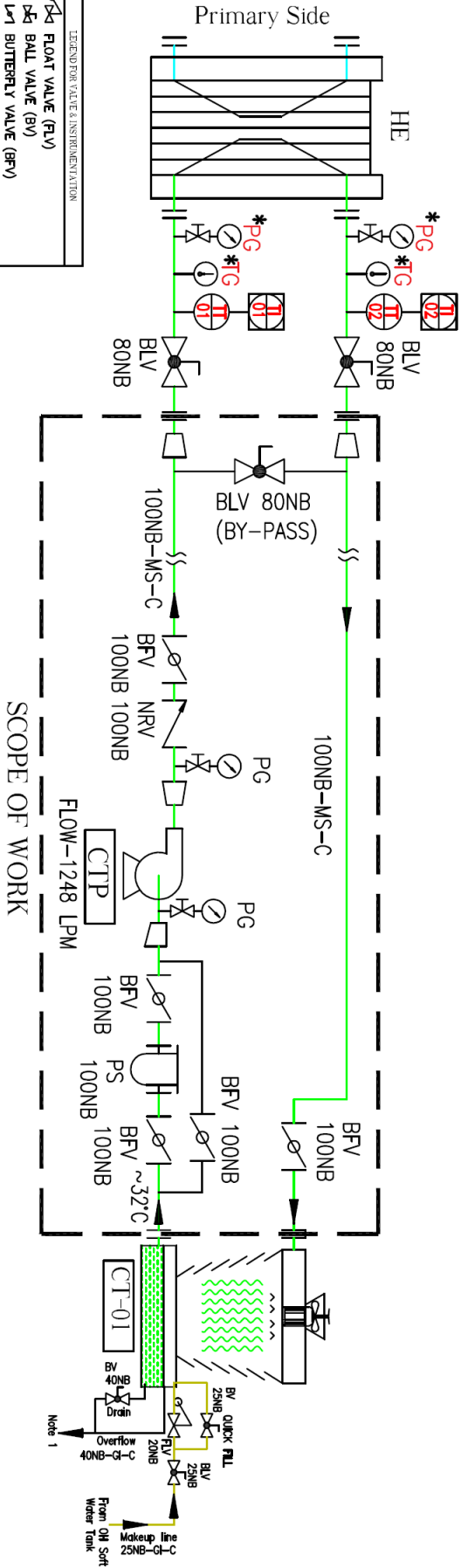
Place:

Date: (Office Seal)

Name & Signature of Bidders



# P&ID FOR SECONDARY LOOP OF HPHT SYSTEM



## SCOPE OF WORK

- Scope of works:
1. MS Piping with instru. & accessories marked above. Existing pump set utilized.
  2. Fitting of 2 nos. PG and 2 nos. TG at PHE in/out lines.\*#
  3. Arrangement of soft water make-up, fast filling, drain, overflow for CT.
  4. Foundation for 1 no. of secondary pump and pump installation.
  5. Provision of drain point with 20 NB ball valve at the lowest points in MS lines.
  6. Provision of vent with 15 NB isolation ball valve at all top points in MS lines.

- IPR's Scope:
1. Installation of Cooling Tower with foundation work.
  2. Fitting of 2 nos. 80 NB flange at in/ out of PHE for pipe interconnections.
  3. Providing 1 no. of 80 NB FE Ball valve for installation in by-pass line.
- Note: 1. All pressures are shown in P&ID are gauge pressure.  
2. Drain of CT & storage tank in CT area to be layed to nearest drain point.

Sr.no.	Description	Qty.
1.	100 NB MS Class-C pipes	220 mtrs.
2.	80 NB MS Class-C pipes	4 mtrs.
4.	40 NB G1 Class-B pipes	3 mtrs.
5.	25 NB G1 Class-B pipes	15 mtrs.
6.	100 NB Butterfly valves	5 nos.
7.	100 NB Pot-strainer	1 no.
8.	100 NB Non Return Valve	1 no.
7.	80 NB Ball valve, By-pass	1 no.
8.	40 B Ball valve, CT drain	1 no.
9.	25 NB Ball valve, CT drain	2 no.
10.	20 NB Ball valve for drain	5 nos.
11.	15 NB Ball valve for vent	3 nos.
12.	Pressure Gauge - 100 mm	4 nos.
13.	Temp. Gauge - 100 mm	2 nos.
14.	MS Structural Work	600 kgs.

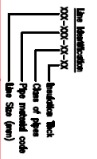
LEGEND FOR VALVE & INSTRUMENTATION

	FLV : FLOAT VALVE (FLV)
	BV : BALL VALVE (BV)
	BFV : BUTTERFLY VALVE (BFV)
	GLV : GLOBE VALVE (GLV)
	NRV : NON RETURN VALVE (NRV)
	NV : NEEDLE VALVE (NV)
	BLV : BALANCING VALVE (BLV)
	GV : GATE VALVE (GV)
	YS : Y TYPE STRAINER (YS)
	PS : POT STRAINER (PS)
	PRV : PRESSURE REGULATING VALVE (PRV)
	PRV : PRESSURE REGULATING VALVE (PRV)
	PSV : PRESSURE RELIEF VALVE (PSV)
	VRV : VACUUM RELIEF VALVE (VRV)
	SV : SOLENOID VALVE (SV)
	PV : PNEUMATIC VALVE (PV)
	MV : MOTORIZED VALVE (MV)
	EV : EXPANSION VALVE (EV)
	TW : 3-WAY VALVE (TW)
	EE : ECCENTRIC EXPANDER/REDUCER

TG :	TEMPERATURE GAUGE
PG :	PRESSURE GAUGE
CT :	CONDUCTIVITY TRANSMITTER
TT :	TEMPERATURE TRANSMITTER
OT :	OXYGEN TRANSMITTER
PH :	PH METER
FM :	FLOW METER
TI :	TEMPERATURE INDICATION
PI :	PRESSURE INDICATION
CI :	CONDUCTIVITY INDICATION
FI :	FLOW INDICATION
F :	WATER FLOW
DV :	DRAIN VALVE
PV :	PURGE VALVE
NC :	NORMALLY CLOSE
NO :	NORMALLY OPEN
HE :	HEAT EXCHANGER

Line colour code

Red	Hot Water Line
Green	Cooling Water Line
Blue	Soft Water Make-up Line



DATE	BY	CHKD	REV	DESCRIPTION	APPROVED BY	DATE