

PROCUREMENT PROCEDURE OF CPRI (NON WORKS)

Revision No. : 04  
 Dt of Revision : 27.08.2020  
 Page No. : 1 of 5  
 Section : Formats  
 Topic : Technical Specifications format

Issue No : 2  
 Issue Dt. : 30.06.2003  
 Issued by : P A  
 Documents : PPM

FORMAT NO.:CPRI/PUR/eTBID/GTP

**Section IV T -Technical Specification**

CENTRAL POWER RESEARCH INSTITUTE, BENGALURU/BHOPAL Web: [www.cpri.in](http://www.cpri.in)

Tender Enquiry No : CPRIBLR22HPL01C949

Description of the Equipment/Goods/Services : **Design, Supply, Errection, Testing and commissioning of 600 TR cooling water Tower**

Note : 1) The technical bid submitted in other than this format is liable to be rejected.

2) All blue fields are mandatorily to be filled in.

Name and address of the bidder

Quotation Number and Date

Sl.No.	Technical Specifications/Parameters	Parameters	Qty	To be completed by the Bidder		
				Detials of guaranteed technical parameters offered by the bidder	Guaranteed Technical Particulars (GTP)	Deviations from GTP
<b>1. CPRI Technical specifications</b>						
1	Total Capacity of Cooling Tower	: 600TR	01 No			
2	Required capacity of cooling tower	: 300 TR X 02 Nos.				
3	Type of Cooling Tower	: Counter Flow Induced Draught Type				
4	Type of Construction	: Square / Rectangle type				
5	No. of shell or compartment	: 2 Nos. (300TR X 02 Nos.)				
6	Water flow rate for 600 TR cooling tower	: 400 m3/hr				
7	Water Inlet temperature	: 42°C				
8	Water Outlet Temperature	: 32°C				
9	Design wet bulb Temperature	: 25°C				
10	Range (ΔT)	: 10°C				
11	Approach Temperature	: 7°C± 1°C				
12	Heat Exchanged	: 4604 KW				
13	Heat Transfer Rate	: 40,00,000 Kcal/hr				
14	volume of Air	: 231093 m3/hr				
15	Mass of the Air	: 257917 Kg/hr				
16	Cooling water drift loss	: 0.01 % ( 80-100 LPH)				
17	Blow Down	: 1,100 LPH				

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18	Evaporation loss	: 7000 LPH				
19	Make up Water Qty Required	: 8000 LPH				
<b>2 Supply of Components</b>						
2a	<b>Cooling Tower Construction details:</b>					
	Dimension of the Cooling Tower (L X W X H)	Supplier's scope (As per design)				
2b	<b>Cooling tower fan details:</b>					
	Fan Type	Axial flow Fan				
	<b>Fan diameter</b>	Supplier's scope (As per design)				
	No of blades	Supplier's scope (As per design)				
	<b>Fan Rotating Speed</b>	Supplier's scope (As per design)				
	Material of Blade and Hub	Cast Aluminum				
	<b>Type of Drive</b>	Direct Drive				
2c	<b>Cooling tower fills details:</b>					
	Infill Packing	Film Fills				
	Film Fills Martial	PVC				
	Type	Honey comp Type with Double Edge Folded				
	Flue Size	12 to 13 mm				
	Size of Single Fills	600 x 300 x 150 mm				
	Thickness	4 mm				
	color	Blue / black				
	Maximum Temperature With Standing Capacity of in fill fills	55 °C				
	Drift Eliminator Type	Counter Flow ,Cellular				
2d	<b>Fan Motor Details</b>					
	Power rating	Supplier's scope (As per design)				
	Operating Voltage &Frequency	415 Volts,50 HZ				
	Phase	3 Phase				
	Speed	Supplier's scope (As per design)				
	No of motor	Supplier's scope (As per design)				
	Motor Mounting Type	B5- flange mounted				
	Frame Size	Supplier's scope (As per design)				
	Enclosure	Totally Enclosed				
	Protection	IP55				
	Ins. Class	Class F				
	Energy Efficient	IE 2				
Motor Make	Hindustan/ Sabar/LEDL/SHARC/New Bharath					

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 Page No. : 3 of 5  
 Section : Formats  
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**3. Piping and water distribution system:**

3a	Hot Water Distribution Type	Forced Spray Nozzle System			
	Nozzle material	Polypropylene			
	Hot Water inlet & Cold Water Outlet pipe size	12" or to suit the existing pipe size			
	Cold Water Basin	RCC Civil Tank			
	Over Flow / Make up / Drain	Suitable pipe along with valve control			
	the supporting structures, angles bolts nuts, drift eliminators, fasteners, ladder, connecting pipes etc to be galvanized	To be provided with hot Dip Galvanized Steel			
	Cooling tower water Inlet and outlet flange	Carbon Steel			
	Paintings of structure and pipe lines system	Red oxide paint along with two coating of non-corrosive paint			
	Hardware and fastens material	SS 304			
	Cold Water Basin	RCC – Civil Tank			
Additional control valve & Piping system	Additional control valves may be provided depending upon the piping system if required.				

**4. Civil work**

4a	Capacity / volume of the tank	11000 liters			
	Size of RCC tank	Suitable size of L X H X B shall be decided by the supplier for 11000 liters capacity.			
	Type of tank	RCC rectangular tank			
	Foundation, & material	Suitable rectangular type RCC foundation to be laid with high quality steel and cement composite			
	Type of proofing	Tank shall be constructed with full water proofing to ensure no leakage of water			
	Water Outlet point	Suitable Tank outlet point shall be provided to maintain rated water flow with Higher gravity rate			

**5. Electrical and monitoring system:**

5a	Motor starter and panel	Starter to be provided to suit the capacity of the motor including panel			
	Cabling & wiring	Suitable size and length of cable and wire shall be provided up to the starter panel			
	Temperature monitoring (Range 0-100 °C)	Inlet and outlet pipe of the cooling tower to be provided with temperature sensors along with Digital monitoring system	<b>02 Nos.</b>		
	water level indicator system a. Low level -01 Nos. b. Very low level-01 Nos.	The RCC tank shall be provided with sensor's to monitor water level in the tank along with manual float valve	<b>02 Nos.</b>		

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Revision No. : 04  
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 Page No. : 4 of 5  
 Section : Formats  
 Topic : Technical Specifications format

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**6. Testing, Training and documentation:**

6a	Pressure test, UT & DP test	Pressure , UT & DP test shall be carried out at HPL before and after installation as per standard			
	Operating manual & Document /certificate	Supplier should provide operating manual along with test report document and other certificates			
	Spares/accessories	Mandatory spares if required to be specified by the supplier			
	Training on operation and maintenance	Training if necessary shall be arranged by the supplier at free of cost. O& M training shall be arranged at HPL by the supplier at free of cost			

**7. Terms and condition:**

7a	Similar work experience by the bidder	Suppliers shall have minimum 10 years of experience in the field of cooling tower supply and installation. Bidder should submit the proof (PO copy/installation and commissioning report) for supply of 600 TR and above capacity . And also enclose list of companies undertaken by the supplier)			
	Warranty period	12 months from the date of successful commissioning			
	Pre dispatch inspection	Pre dispatch inspection shall be carried out by one of the CPRI Engineer at OEM place is required at CPRI expenses			
	Payment terms	Payment shall be made within 30 days after successful completion of work			

**8. Supplier's scope of work:**

8a	Design Supply, installation, Testing & Commissioning of Cooling Tower including completion civil and electrical works			
8b	Suppliers shall submit the drawings and general layout arrangement sketch of cooling tower for approval before start of work			

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8c	Suppliers shall submit all the electrical, mechanical and civil drawing along with offer				
8d	Construction of RCC – civil basin of Cooling Tower including material , Foundation, Work man ship, pillars , with cold water outlet line, drain, overflow, make lines (RCC Basin will be Constructed to suit the gravity flow of water through existing piping system)				
8e	Pipe line adjustment and Fabrication work with material from existing piping system to New Cooling tower				
8f	RCC Civil Basin plan Drawing to be submitted by the supplier along with quotation Mentioning complete material and dimensions for evaluation				
8g	Interested Bidders shall visit HPL-CPRI, Bangalore site before submission of tender quotation for detail information and further clarification				
8h	Persons safety and necessary insurance shall be borne by the vendor				
8i	Supply & Transportation of material to CPRI Bangalore shall be arranged by the vendor to CPRI, Bangalore at their own cost.				
8j	Vendors shall deploy Sufficient manpower for completion of commissioning work of cooling tower system				
<b>9. CPRI scope of work:</b>					
9a	Supplying/ Arranging power For installation and Erection Work along with Supply of Water For Civil Construction Work				
9b	Supply of Power Cable for new Cooling tower motors				
9c	All types Approvals For Civil Construction plan and Work				
9d	Confirming the place/Site/location for Civil Construction work				
9e	Work Permissions for bidders and their Vehicles gate pass				
9f	Removing/dismantling of existing old Cooling tower from site/existing place And moving to dump yard.				
9g	Water level sensors control cable laying and testing				

- PN: 1) Mere statement of "Complied" do not suffice the requirement. The details of technical parameters in proof of CPRI requirements shall be furnished along with technical write-up, catalogues, brochures, literatures, phamplates, or any other documents shall be submitted in hard copy along with technical bid.
- 2) Calibration reports/certificates, factory test reports/certificates from an accredited agencies/facilites shall be submitted wherever applicable.
- 3) CPRI reserves the right to conduct "predispatch inspection" prior to dispatch at the works of the supplier and the expenditure towards PDI shall be borne by CPRI. However information regarding the rediness of the equipment/machinery for the PDI shall be communicated in writing at lease 70 days in advance.

## Annexure-I

### Design, Supply, Errection, Testing and commissioning of 600 TR cooling water Tower

#### **1. Technical Specification:**

Sl. No.	Description	Parameters
01	Total Capacity of Cooling Tower	: 600TR
02	Required capacity of cooling tower	: 300 TR X 02 Nos.
03	Type of Cooling Tower	: Counter Flow Induced Draught Type
04	Type of Construction	: Square / Rectangle type
05	No. of shell or compartment	: 2 Nos. (300TR X 02 Nos.)
06	Water flow rate for 600 TR cooling tower	: 400 m3/hr
07	Water Inlet temperature	: 42°C
08	Water Outlet Temperature	: 32°C
09	Design wet bulb Temperature	: 25°C
10	Range ( $\Delta T$ )	: 10°C
11	Approach Temperature	: 7°C $\pm$ 1°C
12	Heat Exchanged	: 4604 KW
13	Heat Transfer Rate	: 40,00,000 Kcal/hr
14	Volume of the Air	: 231093 m3/hr
15	Mass of the Air	: 257917 Kg/hr
16	Cooling water drift loss	: 0.01 % ( 80-100 LPH)
17	Blow Down	: 1,100 LPH
18	Evaporation loss	: 7000 LPH
19	Make up Water Qty Required	: 8000 LPH

## **2. Supply of Components:**

<p><b>2a. cooling tower construction details:</b></p> <ul style="list-style-type: none"> <li>- Dimension of the Cooling Tower (L X W X H)</li> </ul>	<p>Supplier's scope (As per design)</p>
<p><b>2b. cooling tower fan details:</b></p> <ul style="list-style-type: none"> <li>- Fan Type</li> <li>- Fan diameter</li> <li>- No of blades</li> <li>- Fan Rotating Speed</li> <li>- Material of Blade and Hub</li> <li>- Type of Drive</li> <li>- No of Fan</li> </ul>	<p>Axial flow Fan</p> <p>Supplier's scope (As per design)</p> <p>Supplier's scope (As per design)</p> <p>Supplier's scope (As per design)</p> <p>Cast Aluminum</p> <p>Direct Drive</p> <p>One per cell or (one per 300 TR)</p>
<p><b>2c. Cooling tower fills details:</b></p> <ul style="list-style-type: none"> <li>- Infill Packing</li> <li>- Film Fills Material</li> <li>- Type</li> <li>- Flue Size</li> <li>- Size of Single Fills</li> <li>- Thickness</li> <li>- Color</li> <li>- Maximum Temperature With Standing Capacity of in fill fills</li> </ul> <p>Drift Eliminator Type</p>	<p>Film Fills</p> <p>PVC</p> <p>Honey comp Type with Double Edge Folded</p> <p>12 to 13 mm</p> <p>600 x 300 x 150 mm</p> <p>4 mm</p> <p>Blue / black</p> <p>55 °C</p> <p>Counter Flow ,Cellular</p>
<p><b>2d. Fan Motor Details:</b></p> <ul style="list-style-type: none"> <li>- Power rating</li> <li>- Operating Voltage &amp; Frequency</li> <li>- Phase</li> <li>- Speed</li> <li>- No of motor</li> </ul>	<p>Supplier's scope (As per design)</p> <p>415 Volts, 50 HZ</p> <p>3 Phase</p> <p>Supplier's scope (As per design)</p> <p>Supplier's scope (As per design)</p>

- Motor Mounting Type	B5- flange mounted
- Frame Size	Supplier's scope (As per design)
- Enclosure	Totally Enclosed
- Protection	IP55
- Ins. Class	Class F
- Energy Efficient	IE 2
- Motor Make	Hindustan/ Sabar/LEDL/SHARC/New Bharath

### **3. Piping and water distribution system:**

- Hot Water Distribution Type	Forced Spray Nozzle System
- Nozzle material	Polypropylene
- Hot Water inlet & Cold Water Outlet pipe size	10" or to suit the existing pipe size
- Cold Water Basin	RCC Tank
- Over Flow / Make up / Drain	Suitable pipe with valve control to be provided
-	
- All the supporting structures, angles bolts nuts, drift eliminators, fasteners, ladder, connecting pipes etc	To be provided with hot Dip Galvanized Steel
-	
- Cooling tower water Inlet and outlet flange	Carbon Steel
-	
- Paintings of structure and pipe lines system	Red oxide paint along with two coating of non-corrosive paint
-	
- Hardware and fastens material	SS 304
- Additional control valve & Piping system	Additional control valves may be provided depending upon the piping system if required.



#### **4. Supply of Cold water storage tank/basin:**

<b>Storage Tank details:</b>	
- Capacity / volume of the tank	11000 liters
- Size of RCC tank	Suitable size of L X H X B shall be decided by the supplier for 11000 liters capacity.
-Type of tank	RCC rectangular tank
- foundation, & material	Suitable rectangular type RCC foundation to be laid with high quality steel and cement composite
- Type of proofing	Tank shall be constructed with full water proofing to ensure no leakage of water
- Water Outlet point	Suitable Tank outlet point shall be provided to maintain rated water flow with Higher gravity rate

#### **5.Control and Monitoring system:**

- Motor control and panel system	Suitable Starter with control panel system to be provided to suit the capacity of the motor
- Cabling & wiring	Suitable size and length of cable and wire shall be provided up to the starter panel
- Temperature monitoring (Range 0-100 °C) -02 Nos.	inlet and outlet pipe of the cooling tower to be provided with temperature sensors along with Digital monitoring system
- Water level indicator system a. Low level -01 Nos. b. Very low level-01 Nos.	The RCC tank shall be provided with sensor's to monitor water level in the tank along with manual float valve

## **6. Testing, Training and documentation:**

<ul style="list-style-type: none"><li>- Pressure test, UT &amp; DP test</li> <li>- Operating manual &amp; Document /certificate</li> <li>- Spares/accessories</li> <li>- Training on operation and maintenance</li></ul>	<p>Pressure , UT &amp; DP test shall be carried out at HPL before and after installation as per standard</p> <p>Supplier should provide operating manual along with test report document and other certificates</p> <p>Mandatory spares if required to be specified by the supplier</p> <p>Training if necessary shall be arranged by the supplier at free of cost</p> <p>O&amp; M training shall be arranged at HPL by the supplier at free of cost</p>
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## **7. Terms and condition:**

<ul style="list-style-type: none"><li>- Similar work experience by the bidder</li> <li>- Warranty period</li> <li>- Pre dispatch inspection</li> <li>- Payment terms</li></ul>	<p>Suppliers shall have minimum 10 years of experience in the field of cooling tower supply and installation. Bidder should submit the proof (PO copy/installation and commissioning report) for supply of 600 TR and capacity system. And also enclose list of companies undertaken by the supplier)</p> <p>12 months from the date of successful commissioning</p> <p>Pre dispatch inspection shall be carried out by one of the CPRI Engineer at OEM place if required at CPRI expenses</p> <p>Payment shall be made within 30 days after successful completion of work</p>
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## **8. Supplier's scope of work:**

Sl No	Supplier's Scope of work
01	Design Supply, installation, Testing & Commissioning of 600TR Cooling Tower
02	Suppliers shall submit the drawings and layout sketch of cooling tower for approval before start of work
03	Suppliers shall submit all the electrical, mechanical and water storage basin drawing along with offer
04	Construction of RCC storage tank form Cooling Tower including material , Foundation, Work man ship, pillars , with cold water outlet line, drain, overflow, make lines (RCC Basin will be Constructed to suit the gravity flow of water through existing piping system)
05	pipe line adjustment and Fabrication work with material from existing piping system to New Cooling tower
06	Cold water storage Basin plan Drawing to be submitted by the supplier along with quotation Mentioning complete material and dimensions for evaluation
07	Interested Bidders shall visit HPL-CPRI, Bangalore site before submission of tender quotation for detail information and further clarification
08	Persons safety and necessary insurance shall be borne by the vendor
09	Supply & Transportation of material to CPRI Bangalore shall be arranged by the vendor to CPRI, Bangalore at their own cost.
10	Vendors shall deploy Sufficient manpower for completion of commissioning work of cooling tower system

## **9. CPRI scope of work:**

Sl No	CPRI Scope of work
01	Supply of water and electricity for installation and commissioning of cooling tower
02	Supply of Power Cable for new Cooling tower motors
03	Approvals and confirmation of the place for installation and commission works
04	Arrangement of gate pass for material and vehicles
05	Removing/dismantling of existing old Cooling tower from site/existing place & moving to dump yard.
06	Water level sensors control cable laying and testing

