

**ANNEXURE – 1( BID INVITATION NO. 6300034119)**

**Annual Maintenance Contract / Service Contract for Treatment of Cooling Tower Water using Chemical Dosing OR Non-Chemical Method, valid for the period of Two years.**

**SCOPE OF WORK INCLUDES :** Supply of Materials/ Dosing Chemicals, Labour for dosing chemicals & its Supervision and Test Report / Record submitting, all as required at site, & Generally Confirm to IS: 8188: 1999 " code of Practice for Treatment of Water for Cooling Towers " for the water treatment of following cooling towers:

- i) Engine Test Cell cooling tower of tank capacity 1,50,000 Ltr (FRP type C.TWR)
- ii) EMA Induction Hardening m/c cooling tower of tank capacity 20,000 Ltr (FRP type C.TWR)
- iii) Compressor House cooling tower of tank capacity 15,000 Ltr approximately. (FRP type C.TWR)
- iv) New cooling tower for TC 7& 8 of tank capacity 85,000 Ltr (FRP type C.TWR)

Total no. of cooling towers = 4 and Total water Qty = 2,70,000 Ltrs.

1. Supply of Materials i.e., DOSING CHEMICALS LIKE SCALE & CORROSION INHIBITOR, OXIDIZING BIOCIDES, NON-OXIDIZING BIOCIDES, BIODISPERSANTS, ACIDS / Biocides / Chemicals / Additives etc. as required at site from time to time.
2. The entire responsibility of supervising and monitoring the cooling tower's water quality.
3. Dosing of chemicals to cooling towers from time to time should be carried out in co-ordination with Engineer in-charge, Plant maintenance dept.
4. Initial cleaning of cooling towers before filling of chemicals to be carried out by the firm.
5. PH value & TDS value to be controlled by the firm. Blowdown from time to time as required.
6. Following parameters are to be checked and the values are to be maintained mentioned against each parameter OR as per the Latest IS : STANDARD.

Parameter	Limitations	Parameter	Limitations
a)PH value :	7 -8	b) SS:	Less than 30 ppm
c)TDS :	Less than 500 ppm	d)P – Alkalinity :	Nil
e)M-Alkalinity :	400 ppm	f)Total Hardness : as CaCo3	50 ppm
g)Phosphate :	2-3 ppm	h)Sulphate :	60 ppm
i)TBC ( Total Bio Count): Total Bacteria Count	Less than 5X10 CFU / 1000 CFU per 100ml (colony formation unit)	j)SRB ( Sulphate reducing bacteria ) :	Less than 100
k)Control of Algae formation :	Nil	l)COC :	5

The above values are to be ensured by the firm and the same should be checked at our works every 15 days and report to be given.

(FIRM TO SUPPLY IS: 8188 – 1999 STANDARD COPY and highlight the required parameters & its values to be maintained, and the chemicals / methods considered for this offer).

**Other Terms& Conditions:**

- 1) The AMC validity for two years from the Date of 1<sup>st</sup> visit and start of Chemicals Dosing, after getting pre-cleaned the tanks.
- 2) Safety precautions to be taken for the workmen while they are in work inside BEML & to comply factory rules. BEML is not responsible for any accidents to the firm representatives at the time of carrying out work at BEML site.
- 3) Firm should carry out the work without hampering the Officers /Executives official activities.
- 4) Necessary work permits required for carrying out the job will be issued by BEML .You are advised to take work permit before commencement of work indicating the number of personnel's working.
- 3) Statutory requirement like PF, ESI to be submitted.
- 4) Quarterly payment after completion of services & up on certification by Dept. Head Plant Maintenance Dept.
- 5) Minimum two visits per month is required i.e., once in 15 days to monitor treated water quality values.
- 6) BEML reserves the right to extend the contract if performance is satisfactory or to terminate the contract if performance is not satisfactory without any prior notice.
- 7) In case of any dispute the decision of Dept. Head, Plant Engineering is final and binding on all the matters.
- 8) Material Safety Data Sheet (as per ISO/DIS 11014 ) & Certificate of Analysis along with Date of Mfg. and Date of Expiry, to be submitted for the chemicals used.
- 9) Payment: i) Immediate after completion of work for initial tank cleaning, ii) Quarterly payment for Labour – dosing chemicals, supervision & report submitting and up on certification by Dept. Head, Plant Engineering, iii) 30 days for receipt of materials at our store / supply of dosing chemicals.

**Note: Firm to visit our works before quoting & rate to be quoted separately for Materials & Labour.**

Details for flow rate calculations:

- i) Test cell old cooling tower: 5nos. of cold water pumps + 5nos. of hot water pumps. A)20 hp cold water pumps are of type: KDI 2050+ Head 30Mtr Flow Rate: 29LPS Range—Head: 30-46M &29-18LPS B)12.5hp hp hot water pumps are of type: KDI 1331+ Head18Mtr Flow Rate: 32 LPS Range – Head: 18-30M & 32-18 LPS

ii) Test cell new cooling tower: 2nos. of 11kw/15hp cold water pumps + 2nos. of 11kw/15hp hot water pumps. All these 4 pumps are of type KDS 1537++ Head: 31Mtr Flow: 26LPS Auxiliary pumps - 2nos. for cold water circulation / boosting pressure pumps of type: 5hp

iii) Compressor House cooling tower: 1no. of 11kw/15hp kirloskar pump of type KDS1537++ Head: 31M Flow: 26LPS Range—Head: 10-35M Flow: 39-18LPS

iv) EMA m/c cooling tower: 1no. of 7.5kw/10hp pump Model: KDS 1040+ Head Range: 11-39 M & Flow: 23.5-9.5 LPS Avg. flow : 14.0 LPS

v) EMA M/c cooling tower: 2nos. of 5.5kw / 7.5hp pumps Model: KDS 830+ Head: 26M Flow: 14LPS Range: 18-29M LPS: 18-11 LPS & 1no. of 1.5kw / 2hp pump model: SP-1AN 1.5kw/2hp Head: 13.5M Flow: 4.56LPS Range: 9-18M 6.20-1.50LPS

vi) Type of Cooling Water System: Open Recirculating System.

vii) Sources of Water: Surface Water / River Water

viii) Material of Construction of Cooling System: a) Piping = MS / GI pipes b) Pumps = Cast Iron c) coolers & condensers = Copper / Brass d) Cooling Tower = FRP & RCC Construction sumps / tanks.

**Common Rate Format: (Price to be quoted for Two Years Maintenance)**

Item No.	Supply / Service	Item Description	Qty	Quoted Price (Rs)	Firm's comment- if any
1	Service	COOLING TOWER CLEANING MANUALLY ( LABOUR )	01 AU		
	OR Labour	Item Text: Initial cleaning of all 7 tanks of 4nos. of cooling towers is in Firm's scope. Firm to take up manual cleaning of these tanks, before start dosing the chemicals. Firm to Quote Lump sum for one time cleaning of tanks, as one complete job.	One time job		
2	Service	AMC FOR C.TOWER WATER TREATMENT (LABOUR)	01 AU		
	OR Labour	Item Text: Annual Maintenance Contract (Validity for TWO YEARS) for water cooling system treatment for total 4nos. of cooling towers. Scope of work - supply of labour for water testing, dosing, report submitting etc. as mentioned in the Annexure-1.	For Two Years (8 Quarters) & quarterly payment		
		OR alternately labour for water testing, routine maintenance of firm's supplied EST equipment, report submitting etc.	For Two Years (8 Quarters) & Quarterly Payment		
3	Supply	BEML Part No. :000800804043 -- DOSING CHEMICALS FOR C.TOWER WATER TREATMENT	08 set		
	OR Material	Material Test: Combination of required chemicals used in cooling tower water treatment. Each set consist of i) Scale and Corrosion Inhibitor YESTREAT 902 OR EQVLT. ii) Non Oxidizing Biocide YESTREAT 903 OR EQVLT. iii)Non Oxidizing Biocide YESTREAT 904 OR EQVLT. iv)Additive – Lump sum	1 set of chemicals composition / combination for 1 quarter		
		OR alternately Supply of EST Equipment OR Hiring Charges for Firm's supplied EST equipment	For two years & Quarterly payment.		
		Item Text: Annual Maintenance Contract ( Validity for TWO YEARS ) for water cooling system treatment for total 4nos. of cooling towers. Scope of work - supply of labour for water testing, dosing, report submitting etc. as mentioned in the Annexure-1. Combination of required chemicals for treatment of cooling tower water, generally confirm to IS: 8188 . Each set of dosing chemicals consist of i) Scale and Corrosion Inhibitor ii) Non-Oxidizing Biocide type1 iii) Non-Oxidizing Biocide type2 iv)Additive if any required. Supply of all the required biocides / Chemicals etc. as required at site, to maintain water quality as per standard / acceptable limits and QUANTITY OF DOSING CHEMICALS AND TYPE OF DOSING CHEMICALS MAY VARY FROM TIME TO TIME AS PER SITE CONDITION AND IT IS IN FIRM'S SCOPE TO OPTIMIZE THE DOSING CHEMICALS QTY. AND COMBINATION, THROUGHOUT THE CONTRACT PERIOD, WITHOUT ANY LIMIT. IF NECESSARY, FIRM TO SUPPLY EXCESS DOSING CHEMICALS WITHOUT EXTRA COST, UP TO THE END OF CONTRACT PERIOD.	Chemicals to be supplied as 1 set for every Quarter and payment for every quarter		

ALTERNATELY, THE AMC FOR TREATMENT OF COOLING TOWER WATER USING NON-CHEMICAL METHOD, MAY ALSO BE QUOTED, IN LINE WITH THE ABOVE CHEMICAL DOSING METHOD.