TERMOELEKTRARNA ŠOŠTANJ

TECHNICAL PART OF DOCUMENTATION

Cooling water treatment chemical

TECHNICAL REQUIREMENTS FOR CHEMICAL TREATMENT OF COOLING WATER AT UNIT 6

TEŠ has **an open-circulation cooling system.** The Contracting authority requires a solution in terms of chemical treatment of cooling water for a period of two years. The tenderer shall prepare the solution based on input data (Appendices 1 to 5 to Technical Documentation) which forms an integral part of the technical part of the contract award documentation. The tenderer's solution may entail one or several preparations (hereinafter referred to as: preparation). The product offered shall effectively **prevent corrosion** (cathodic, anodic and pitting), as well as **scale deposition**, and prevent contamination of the cooling system due to insoluble corrosion products and suspended inorganic matter introduced by the additional water. The Contracting authority allows the tenderer to provide several preparations in the framework of a single solution meeting the Contracting authority's requirements. However, variants are inadmissible.

The Contracting authority makes no permanent/continuous use of biocides. Biocides are used in exceptional cases only, consisting of bromine compounds and being administered in the form of shock dosing. Biocides are administered depending on the Contracting authority's needs and have not been used in the last year.

The Contracting authority included in the technical documentation the technical data on the cooling system (Appendix 1 to Technical Documentation), annual data on water quality (Appendix 2 to Technical Documentation) and water temperature (Appendices 4 and 5 to Technical Documentation) as well as on water balance/amount (Appendix 3 to Technical Documentation) for the tenderer to be able to make an optimal determination of the required active substance and the amount of the preparation.

1. Environmental requirements for cooling water quality after chemical treatment

The quality of the treated cooling water must be such that, if discharged, it can be discharged into River Paka in accordance with the environmental permit. The limit values for emission of substances and heat of industrial waste water from the open-circulation cooling system are given in Spreadsheet 1, while the maximum annual quantities of each pollutant discharged from the industrial waste water facilities at all outlets into River Paka are given in Spreadsheet 2.

Spreadsheet 1: Limit values for emission of substances and heat

Parameter	**Expressed as**	**Unit**	**Limit value**
I. GENERAL PARAMETERS			
Temperature		°C	30
pH-value			6.5–9.0
Undissolved substances		mg/l	80
Sedimentary substances		ml/l	0.5
II. BIOLOGICAL PARAMETER			
Toxicity to water fleas	S_D		3
III. INORGANIC PARAMETERS			
Zinc	Zn	mg/l	3.0
Total chromium	Cr	mg/l	0.2
Chlorine – free	Cl_2	mg/l	} = 0.3 (a)
Bromine	Cl_2	mg/l	
Nitrite-nitrogen	N	mg/l	1.0
Total phosphorus	P	mg/l	1.5
Hydrazine		mg/l	2.0
IV. ORGANIC PARAMETERS			
Chemical oxygen demand (COD)	O_2	mg/l	45 (b)
Biochemical oxygen demand (BOD_5)	O_2	mg/l	25
Adsorbable organic halides (AOX)	Cl	mg/l	0.15 (c)
Total hydrocarbons		mg/l	10

(a): the limit values for the concentration of the parameters chlorine-free and bromine are set at a value at which the sum of the concentrations of chlorine-free and bromine (expressed as chlorine Cl2) does not exceed 0.3 mg/l. The following calculation shall apply: 0.2 mg/l of free chlorine expressed as Cl2 corresponds to 0.45 mg/l of bromine expressed as Br2.
(b): If raw water which enters the system comprises a measurable concentration of COD, the latter shall be added to the admissible value of 45 mg/l.
(c): After the pulsed-power treatment the limit value shall be 0.5 mg/l.

Spreadsheet 2: Maximum annual quantities of pollutants

Parameter	Expressed as	Limit value
Copper	Cu	16.5 kg*
Zinc	Zn	101 kg*
Total chromium	Cr	21.55 kg*
Total hydrocarbons		89.78 kg*
Adsorbable organic halides (AOX)	Cl	35.91 kg*

Sign* means that the maximum admissible annual amount of pollutant has been calculated on the basis of the mean low flow of River Paka.

2. Requirements regarding the preparation

The tenderer shall offer a preparation for the chemical treatment of the cooling water at TEŠ which will enable the fulfilment of the requirement of not exceeding the **maximum admissible degree of corrosion for Fe being no more than 0.08 mm/year.** The different conditions of corrosion and scale formation must be taken into account, depending on the external temperatures and consequently the different temperatures of the cooling water in the cooling system (see Appendix: *Temp. of water in the cooling system in 2024 – aver. daily* and appendix *Temp. of condensate in 2024 – aver. daily*).
The corrosion measurements shall take place in the form of corrosion coupons. Optionally, the tenderer may also offer an on-line measurement of the degrees of corrosion (**Bonus points 1**).

The tenderer shall provide the preparation for the treatment of cooling water, including the associated dispensing equipment. If the tenderer offers on-line monitoring/measurements of the parameters they must also provide the servicing thereof (the tenderer shall include in their tender total cost of maintenance, consumables and spare parts).

The offered preparation for the treatment of cooling water shall not contain any heavy metals such as zinc, molybdenum etc.

3. Performing measurements

The tenderer/contractor must ensure automatic, continuous and direct measurements of the content/concentration of the preparation in the cooling water, and ensure direct monitoring at all times, with point 3.1 covering the measurements required by the Contracting authority as a prerequisite for the fulfilment of the technical requirements, and point 3.2 covering the measurements which the tenderer may offer additionally and for which they will receive bonus points.

3.1 Mandatory/required measurements:

- pH-value readings;
- specific conductivity;
- degree of corrosion on material (Fe) (to be performed mandatorily through the corrosion coupons);
- measuring the content/concentration of the preparation in the cooling system;
- water turbidity;
- the tenderer must provide internet access to the database and current values of the parameters in the cooling water, i.e., of all parameters listed herein;
- the offered dosing equipment shall be capable of automatically adjusting the dosage of the preparation for the treatment of cooling water as conditions in the cooling system change, i.e., by

increasing or decreasing the concentration of the preparation in the cooling water (control of the preparation dosing pump), all with the aim of protecting the cooling system at any time.

3.2 Additional (optional):

- degrees of corrosion on material (Fe) in the event of an on-line metering device (**bonus points 1**),
- content/concentration of the offered preparation active component in the cooling system (**bonus points 2**),
- the tenderer uses reusable packaging and undertakes to accept from the Contracting authority all empty packaging used to deliver the preparation to the Contracting authority (**bonus points 3**)**.**

4. Requirements for the technical qualifications of the tenderer

The tenderer must provide professionally qualified personnel (at least 1 person) who, throughout the term of the agreement, shall provide:

- At least 1 (one) regular visit (periodically, maximum every 45 days) and 2 (two) inspections following an emergency call-out within 24 hours (if it turns out this is absolutely necessary). During a regular visit they shall perform the cleaning check-ups and verify the correctness of the equipment, the amount of the preparation and the parameters in the cooling water subject to analysis (the analytical department of the TEŠ laboratory).
- Preparation of periodic report to be sent to the Contracting authority at least 2 times a year.
- Preparation of a detailed annual (summary) report on the treatment process of cooling water (for a 12-month period).
- Submission of proposals and measures aimed at optimising the process to the Contracting authority.
- Giving expert recommendations and advice to the Contracting authority.

The tenderer shall also be obliged to engage, within its technical service, suitably qualified persons who will be responsible for periodic monitoring and reporting to the Contracting authority on the functioning of the condenser, and calculating the fouling factor for the relevant period within the meaning of poorer heat transmission, effect on the Unit's efficiency, etc. all due to the potential scale deposition and/or deposition of micro-organisms on the capacitor's walls. The calculation shall be made based on the input parameters provided/delivered to the tenderer by the Contracting authority. The fouling factor calculation shall be made once every three months (i.e. 4-times a year).

The tenderer declares in the tender (Annex No. 6) that they have the appropriate professional staff available to meet the requirements under point 4. The condition must be fulfilled by the tenderer. A group of tenderers can fulfil the stated condition through any member of the joint offer. If the tenderer is using subcontractors, the condition can also be fulfilled by a subcontractor, but only if the subcontractor, through whom the tenderer fulfils the condition, will supply goods or perform services related to fulfilling the condition in this public contract.

5. Required documentation to be included in the tender:

- Technical description of the offered chemical treatment for the cooling system in Slovene and/or English language;
- List of required equipment (to be provided by the Contracting authority for the term of the agreement).
- Safety data sheet of the offered preparation in Slovene.
  The safety data sheet shall comply with the requirements under Regulations (EC) Nos. 1907/2006 and 878/2020, and shall also comprise the information on the assessment of PBT and vPvB (in the event the chemical safety report was required for the preparation).
- REACH registration number of the preparation.
- Declaration that the preparation for the chemical treatment of cooling water is free of heavy metals such as zinc, molybdenum (included in Appendix No. 2 - Declaration). The mere safety data sheet for the preparation shall not suffice as a supporting document.

- Declaration that the offered preparation for the chemical treatment of cooling water in the cooling system works in such a way that does not exceed the maximum allowed corrosion for FE < 0.08 mm/year. (Included in Appendix No. 2 - Declaration).
- Declaration/supporting document of eligibility under point 4 – requirement for the technical qualifications of the tenderer (included in Appendix No. 2 – Declaration).
- Statement on professionally qualified personnel (Appendix No. 6).
- List of individual items (preparation, pumps, gauges etc.) included in the tender (the items shall be indicated in Appendix No. 11).
- Authorisation to market hazardous chemicals.
- Submit at least one reference demonstrating that the bidder has, within the last 5 years, counted from the deadline for tender submission, carried out cooling water treatment in comparable cooling systems, which included the minimum mandatory/required measurements according to point 3.1 of this document (Appendix No.7 and Appendix No.7a).

If a specific document within the tender is not submitted and the existence of the fact before the tender submission deadline can be objectively verified, the contracting authority reserves the right to request the tenderer to submit the document in accordance with ZJN-3.

6. Appendices to the technical part of tender documentation (in Slovene and English):

- Appendix 1 to technical documentation_cooling system of Unit 6 - technical data
- Appendix 2 to technical documentation_water quality
- Appendix 3 to technical documentation_Unit 6 cooling system balance for 2024
- Appendix 4 to technical documentation_temp. of water in the cooling system in 2024 – average daily
- Appendix 5 to technical documentation_ temp. of condensate in 2024 – average daily