

Opening Date: 2019-09-02   
Closing Date: 2019-09-16   
Closing Time: 11:00

## INSTITUTION DETAILS



Institution Name: King Edward VIII hospital   
Province: KwaZulu-Natal  
Department or Entity: Department of Health  
Division or section: Central Supply Chain Management  
Place where goods / services is required: KING EDWARD VIII HOSPITAL  
Date Submitted: 2019-08-29 

## ITEM CATEGORY AND DETAILS

Quotation Number: ZNQ:  
KM 239\19  
Item Category: Services   
Item Description: CARRY OUT WATER TREATMENT SERVICE AS PER SCOPE OF WORK  
ATTACHED ( 12 MONTHS CONTRACT)

Quantity (if supplies)

## COMPULSORY BRIEFING SESSION / SITE VISIT

Select Type: Compulsory Briefing Session   
Date : 2019-09-05   
Time: 11H00  
Venue: \*KING EDWARD VIII HOSPITAL

QUOTES CAN BE COLLECTED FROM: WILL BE HANDED OUT AFTER BRIEFING SESSION

QUOTES SHOULD BE DELIVERED TO: KING EDWARD VIII HOSPITAL TENDOR BOX

## ENQUIRIES REGARDING THE ADVERT MAY BE DIRECTED TO:

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Finance Manager Name: MISS NOMONDE NCHUME

Finance Manager Signature: 

No late quotes will be considered



**health**

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PROVINCE OF KWAZULU-NATAL

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SYSTEMS DEPARTMENT  
MECHANICAL MAINTANCE

## Water treatment for HVAC systems, Steam boilers 1 and 2, Water tower top and bottom tanks

### Safety note:

- Safety boots, overhall shall be worn at any time of working on or in any plant.
- Climbing of any equipment (in or out) will require safety harness to be worn and used.
- Climbing in any tank is prohibited.
- All handling of any chemical requires appropriate prescribed safety splash aprons, face

shields, acid resistant gloves and repertory equipment must be worn.

### 1. Specifications

#### 1.1 Water treatment specifications for general HVAC systems

##### 1.1.1. Summary

Provide complete chemical water treatment for the systems as listed in this document.

Provide chemicals as required to control scale, corrosion, biological fouling and biological foaming.

##### 1.1.2. Quality Assurance

The water treatment chemical and service supplier staff shall be qualified (attach qualifications).

**The supplier shall have water analysis laboratories, development facilities and a service department as well as full service personnel located within the geographical area of Durban.**

##### 1.1.3. Record documents

- Water analysis – The supplier shall submit a copy of the water analysis to illustrate water quality available at each of the treatment areas.
- Field Test Reports – The supplier shall indicate and interpret results for compliance with performance requirements.

## 2.1 Products

### General

- Introduce chemicals treatment through bypass feeder when required or indicated by test.
- Open loop system – Condenser water piping: Pump sequestering agent and corrosion inhibitor from the solution tank into the condenser water supply to the cooling towers.
  - Intermittently feed biocide to condenser water to achieve a toxic level of the chemical, to kill the organisms present.
  - Activate chemical solution pump via water meter which is connected via the make-up water line to cooling tower when condenser water pumps are running.
- Closed loop system – Chilled water piping: Supply corrosion inhibitor and biocides to chilled water to achieve a toxic level of chemicals to kill the organisms present and prevent corrosion. Ensure levels are correct at all times.

### Performance requirements:

- Maintain water quality for HVAC systems that controls corrosion and build-up of scale and biological growth for maximum efficiency of installed equipment without posing a hazard to operating personal or the environment.
- Base chemical treatment performance requirements on the quality of water at the King Edward VIII, HVAC equipment materials and the operating requirements of the maintenance personnel.
  - Conductivity: 1500 – 1600 mmhos (1500 – 1650 umhos)
  - Acceptable PH: Not less than 8 or greater than 9.5

### Chemical treatment test equipment

- Test kit: Manufacturer recommended equipment and chemicals, in a carry case, for testing PH, Total dissolved solids, biocount, chloride, and total alkalinity and for calcium hardness field tests.
- Corrosion Test coupon Assembly: Constructed of corrosion material, complete with piping, valves and mild steel and copper coupons. Locate copper coupon downstream from mild steel coupon in the coupon assembly.
- Four station rack for open condenser water systems.

### Chemicals

- Biocide: Chlorine release agents or microbicides.
- Open loop condenser water piping chemicals: Sequestering agent to inhibit scaling, acid to reduce alkalinity and PH, corrosion inhibitor and biocide.

**3.1 Items to be replaced prior any servicing as follows:**

- Install chemical drums at all open loop water tower units
- Install new dosing pumps with all piping valves and wiring
- Install new T.D.S. sensors with relevant controllers (for bleed off valves)
- Install new bleed off solenoids and connect accordingly.
- Install new water meters with pulsing sensor and connect accordingly (to dosing pulse controller).
- Replace all relevant tank ball float valves with new cobra (brass type)

**4.1 Required frequency of maintance**

- Frequency of service calls - Weekly
- Frequency of water analysis - Weekly
- Frequency of Legionella testing - Monthly

**5.1 Equipment to be treated below on specified maintance frequency above:**

1.	<b>New Block</b>		
	• Main chilled water plant	Cooling tower	Open loop system
2.	<b>N Block</b>		
	• Chilled water plant	Cooling tower	Open loop system
3.	<b>I Block</b>		
	• Chilled water plant	Cooling tower	Open loop system
4.	<b>Casualty</b>		
	• Chilled water plant		Closed loop system
5.	<b>Medical physics</b>		
	• Chilled water plant	Cooling tower	Open loop system

**6.1 REMOVED**

**7.1 CHEMICAL TREATMENT CHEMICALS (CONTRATOR TO SUPPLY AND APPLY THE FOLLOWING CHEMICALS)**

7.1 Chemical Treatments: corrosion and scale inhibitors which contains the following components, in the form of:

- 7.3.1 Sulphite as an oxygen scavenger.
- 7.3.2 Phosphate as a scale inhibitor.
- 7.3.3 Caustic as an alkalinity builder.
- 7.3.4 Neutralizing amine as a corrosion control agent.(Steam line protection)
- 7.3.5 A grade marked salt for softner brine tank
- 7.3.6 MSDS details of all chemicals used to be attached on wall at point of use.

**8.1 Chemically treat and maintain system water to meet following standards on a weekly basis:**

Parameter	Control Limits
<b>Boiler Water:</b>	
pH:	10.5-11.5
TDS, µS/cm:	2000-3000 neutralized sample
OH alkalinity, mg/L CaCO <sub>3</sub> :	150-300
M alkalinity, mg/L CaCO <sub>3</sub> :	<700
sulphite, mg/L SO <sub>3</sub> :	30-60
phosphate, mg/L PO <sub>4</sub> :	40-80
Dissolved oxygen	MAX 0
<b>Boiler Feed water:</b>	
hardness, mg/L CaCO <sub>3</sub> :	<2
<b>Softener Outlet:</b>	
hardness, mg/L CaCO <sub>3</sub> :	<2
<b>Boiler Condensate at steam line exit point:</b>	
pH (for systems <b>not</b> used for humidity control):	8.5-9.5
TDS, µS/cm:	<50
hardness, mg/L CaCO <sub>3</sub> :	<2

**9.1 WEEKLY WRITTEN REPORTING INFORMATION REQUIRED:**

Submit a written report of actual water treatment activities:

- 9.1.1 Times and date
- 9.1.2 System status.
- 9.1.3 Problems encountered.
- 9.1.4 Actions taken.
- 9.1.5 Compositions of all chemicals solutions used.(MSDS certificates to be attached on wall at place of adding chemicals).

**10.1 Interpret inspection results as follows:**

Current operating boiler water and standby boiler:

- 10.1.1 PH level.

c	health			
Protozoan Parasites d Cryptosporidium spp Giardia spp	Acute health Acute health	Count per 10 L Count per 10 L	Not detected Not detected	
Total coliforms e	Operational	Count per 100 mL	≤ 10	
Heterotrophic plate count f	Operational	Count per mL	≤ 1 000	
Somatic coliphages c, g	Operational	Count per 10 mL	Not detected	

**Table 10 Physical, aesthetic, operational and chemical 2014 Blue Drop determinand limits 2014 Blue Drop Limits (derived from SANS 241: 2006 and SANS 241: 2011)**

SANS 241: 2006			SANS 241: 2011			Results
Determinand	Unit	Risk	Standard Limits	Risk	Standard Limits	
<b>Physical and aesthetic determinands</b>						
Total chlorine	mg/L	-	-	-	-	
Monochloramine	mg/L	-	-	-	-	
Colour	mg/L Pt-Co	Aesthetic	< 20	-	-	
Conductivity at 25°C	mS/m	-	-	Aesthetic	≤ 170	
Total dissolved solids	mg/L	-	-	Aesthetic	≤ 1 200	
Turbidity	NTU	-	-	Operational	≤ 1	
pH at 25 C	pH units	-	-	Operational	□ 5 to ≤ 9,7	
<b>Chemical determinands — macro-determinands</b>						
Ammonia as N	mg/L	-	-	Aesthetic	≤ 1,5	
Calcium	-	-	-	-	-	
Chloride as Cl-	mg/L	-	-	Aesthetic	≤ 300	
Fluoride as F-	mg/L	-	Health (chronic)	-	≤ 1,5	
Magnesium as Mg	-	-	-	-	-	

**2014 Blue Drop Limits (derived from SANS 241: 2006 and SANS 241: 2011)**

SANS 241: 2006			SANS 241: 2011			Results
Determinand	Unit	Risk	Standard Limits	Risk	Standard Limits	
To be loaded on BDS, but not for compliance (if analysed) (Nitrate and Nitrite):						
Nitrate as N	mg/L	-	-	Acute health	≤ 11	
Nitrite as N	mg/L	-	-	Acute health	≤ 0,9	
Nitrate and Nitrite as N	mg/L	Health	< 10	-	-	
Potassium as K	-	-	-	-	-	
Sodium as Na	mg/L	-	-	Aesthetic	≤ 200	
Sulfate as SO42-	mg/L	-	Health (acute)	-	≤ 500	
Zinc as Zn	mg/L	-	-	Aesthetic	≤ 5	
<b>Chemical determinands — micro-determinands</b>						

Aluminium as Al	µg/L	-	-	Operational	≤ 300	
Antimony as Sb	µg/L	-	-	Health (chronic)	≤ 20	
Arsenic as As	µg/L	Health	< 10	-	-	
Cadmium as Cd	µg/L	Health	< 5	-	-	
Chromium (total) as Cr	µg/L	Health	< 100	-	-	
Cobalt as Co	µg/L	Health	< 500	-	-	
Copper as Cu	µg/L	-	-	Health (chronic)	≤ 2 000	
Cyanide (recoverable) as CN <sup>-</sup>	µg/L	-	-	Health (acute)	≤ 70	
Iron as Fe	µg/L	-	-	Aesthetic	≤ 300	
Lead as Pb	µg/L	Health	< 20	-	-	
Manganese as Mn	µg/L	Aesthetic	< 100	-	-	
Mercury as Hg	µg/L	-	-	Health (chronic)	≤ 6	
Nickel as Ni	µg/L	Health	< 150	-	-	
Selenium as Se	µg/L	Health	< 20	-	-	
Uranium as U	µg/L	-	-	-	-	
Vanadium as V	µg/L	Health	< 200	-	-	
<b>Chemical determinands — organic determinands</b>						
Dissolved organic carbon as C	mg/L	Health	< 10	-	-	
Total organic carbon as C	mg/L	-	-	Health (chronic)	≤ 10	
Trihalomethanes (total)	mg/L	Health	< 200	-	-	
Trihalomethanes	µg/L	-	-	Chronic health	≤ 300	
Chloroform	µg/L	-	-	Chronic health	≤ 100	
Bromoform	µg/L	-	-	Chronic health	≤ 100	
Dibromochloro methane	µg/L	-	-	Chronic health	≤ 60	
Bromodichloro methane	µg/L	-	-	-	-	
Microcystin as LR	µg/L	-	-	-	-	
Phenols	µg/L	-	-	Aesthetic	≤ 10	