

	Grootvlei Power Station Scope of work for Demin Plant Resin Procurement	SAP notification №	
		Date	
		№ of pages	

Unit	WTP	Plant area	Demineralisation
Responsible Department	Chemical Services		

Background: Grootvlei Power Station receives its raw water source from the Vaal dam. This water is treated through coagulation, flocculation, clarification and sand filtration before being fed to the ion exchange vessels. The purpose is to produce demineralised water as per Eskom Standard 240-53113712 suitable for used on steam boiler for power generation.

Objective: The procurement and delivery of strong base anion (SBA) and Strong Acid Cation (SAC) resin to be used at Grootvlei Power Station ion exchange vessels. The resin is required for full replacement of existing resin in the plant.

Scope

Required works

The Supplier/Contractor is required to supply and deliver Strong Base Anion (SBA) and Strong Acid Cation (SAC) Resin to be used on the anion and cation vessels respectively.

Plant Full Specifications

Number of Trains: 3
Flowrate per train: 70m³/hr

The required works includes the following

1. Supply and deliver ion exchange resin for demineralisation plant. The demineralisation plant resin selected or supplied must be able to match or better the current expected plant throughput performance. The supplier is required to provide a computer simulation output that demonstrates the performance of the selected resin. The selection of the resin shall be on the evaluation of the computer simulation output provided by the supplier. The supplier shall use the information provided in Table 1 to conduct the simulation.
2. Perform annual and emergency ion exchange resin analysis of demin plant resins as part of the resin price. Resin analysis to be performed shall include, but not be limited to:
 - Total exchange capacity
 - Moisture holding capacity
 - Dry matter
 - swelling
 - optical aspects – perfect beads, cracked and broken beads
3. Offer technical support (resin loading, troubleshooting, optimisation and training) as part of the resin price.

All deviations from the attached scope of work must be approved by Engineering

4. Perform annual plant optimisation or performance reviews/audits at the power station with Eskom Representative using approved or licenced ion exchange design software and issue a formal recommendation report as part of the resin price.
5. Provide batch numbers for all resin products delivered to Eskom, for traceability during troubleshooting.
6. All ion exchange resin products must be supplied in pallets of 25 litres bags amounting to 1000 litres.
7. All ion exchange resin products must be delivered in an open loaded truck to allow accessibility by the fork lift during offloading.
8. Both cation and anion resins supplied must have perfect beads exceeding 99% and broken beads must be less than 1%.
9. The uniformity coefficient for both cation and anion resin must be less 1.2 and 90% of the resin beads must be in the range of 0.60 – 0.70 mm.
10. The safety data sheets (SDS) and technical data sheet (TDS) must be provided per product.
11. An extra 2000L for each resin type must be added to carter for top up purposes in case of resin losses during operations.
12. The following documents shall be submitted to Grootvlei Power Station personnel in the Water Treatment Plant Control Room upon arrival at the power station:
 - a. Ion exchange resin certificate of analysis and batch numbers.
 - b. Delivery note, which must include the order number, the name of the power station and the power station address.

Technical Evaluation

Table 1: Average Data for computer simulation for period of 01/08/2019 to 25/08/2020

DATA			
Average Water Analysis		Units	
	Ca	ppm as CaCO ₃	34.64
	Mg	ppm as CaCO ₃	31.11
	Na	ppm	11.73
	K	ppm	3.61
	Cl	ppm	12.367
	SO ₄	ppm	17.9
	NO ₃	ppm	0
	HCO ₃ or M-Alkalinity	ppm as CaCO ₃	78.17
	SiO ₂	ppm	7.615
	pH	Value	7.85
	Conductivity	µS/cm	214.47
	Organics	mg/L as KMnO ₄	0
	Organics (TOC)	ppm	4.18
	EMA	ppm	24.26

All deviations from the attached scope of work must be approved by Engineering

	Al	ppm	0.28
	Fe	ppm	0.18
Temperature		°C	
Flow Rate	Gross	m³/h	80
	Net	m³/h	70
Number of lines		Number	3

Table 2: Cation data for simulation

DATA			Current Plant Conditions
		Units	
Regen Type	*CFR, RFR or T&B		RFR
Resin Type			-SAC
Stratified bed		Y/N	N
Resin Volume per vessel	Cation (WAC)	L	N
	Cation (SAC)	L	8725
	Inert	L	N
Column Diameter		mm	2130
Cation Regeneration	H ₂ SO ₄ Concentration (used)	%	2-4
	H ₂ SO ₄ Concentration (storage)	%	98
	H ₂ SO ₄ Price	R	2.14/kg
Cation Outlet Expected Quality	pH		~3
	Sodium	ppb	<150ppb
Degasser		Y/N	Y
Number of Cation Vessels		Number	3

Note: Extra 2000L of cation resin is to be supplied for top up purposes in case of resin losses during production or equipment failures

All deviations from the attached scope of work must be approved by Engineering

Table 3: Anion data for simulation

DATA			Current Plant Conditions
		Units	
Regen Type	*CFR, RFR or T&B		CFR
Resin Type			SBA
Stratified bed		Y/N	N
Resin Volume per vessel	Anion (WBA)	L	N
	Anion (SBA)	L	6650
	Inert	L	N
Column Diameter	WBA	mm	N
	SBA	mm	2130
Anion Regeneration	NaOH Concentration (used)	%	4
	NaOH Concentration (storage)	%	50
	NaOH Price	R	6.22/kg
Anion Outlet Expected Quality	Conductivity (WBA)	µS/cm	N/A
	Conductivity (SBA)	µS/cm	<10 (CFR)
	Silica	ppb	<50 (CFR)
Number of Anion Vessels		Number	3
Expected Throughput of the Demin Train		m³	2000

Note: Extra 2000L of cation resin is to be supplied for top up purposes in case of resin losses during production or equipment failures

Total Resin Quantities Required

Strong Acid Cation (SAC) Resin - 29000 L
Strong Base Anion (SAB) Resin - 29000 L

All deviations from the attached scope of work must be approved by Engineering

Table 4: Demin Cation and Anion Resin Technical Tender Returnable for complete replacement

	Technical Tender Returnable	Mandatory Evaluation for
1	Complete electronic simulation output of the demineralisation process (cation and anion) and mixed bed showing calculated throughput and leakages for each demineralisation plant in Eskom based on the water qualities and plant data provided.	x
2	Kilograms of regenerant per regeneration and regenerant level in g/L resin (as per the Technical Data Sheet) for the product offered.	x
3	List of services included in the price.	x
4	Resins lead times.	x
5	Product data sheets for all resins recommended.	x
6	References (where the products are used in similar application to Eskom).	x



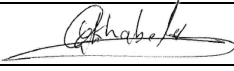
Table 5: Demin Cation and Anion Resin Technical Evaluation Criteria

	Technical Evaluation Criteria	Weight of Criteria used for Evaluation
1	Throughput from simulation compared to the plant desired throughput	40
2	Regenerant kilograms provided in the simulation compared to the average regenerant dosage for the specific resin offered (calculated from resin g/L as per Technical Data Sheet and installed resin volume)	25
3	List of services included in the price.	15
4	Resins lead times offered compared to Eskom's expected resin lead times	10
5	Product data sheets for all resins recommended.	5
6	References (where the products are used in similar application to Eskom).	5

All deviations from the attached scope of work must be approved by Engineering

Table 6: Rating for Technical Criteria

Rating for Individual Technical Criteria	%
Completely Meets Technical Requirement	100
Mostly Meets Technical Requirement	75
Partially Meets Technical Requirement	50
Mostly Does Not Meet Technical Requirement	25
Does not Meet Technical Requirement	0

	Compiled by System Engineer	Reviewed by Chief Scientist Chemistry	Approved by Engineering Line Manager	Accepted by Chemical Services Line Manager
Designation				
Name	Bongumusa Bungane	Sidwell Muthavhine	Menelisi Mkhabela	Mathuhlwe Malebana
Signature				
Date	2020/08/31	31 August 2020	31/08/2020	

All deviations from the attached scope of work must be approved by Engineering