Eskom Generation	**Specification**	**Operating Unit – Koeberg Nuclear Power Station**

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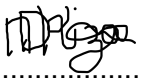		
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Abbreviations

AR	Availability Related
COA	Certificate of Analysis
COC	Certificate of Conformance
CSR	Critically Safety Related
DER	Design Extension Related
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
KNPS	Koeberg Nuclear Power Station
LS	Linked to Safety
MFR	Manufacturer
MSDS	Material Safety Data Sheet
NC	Not Classified
NEV	Non-environmental classification (for all mechanical equipment)
NSA	Not Safety or Availability Related
NSF	No Safety Function
OHSAct	Occupational Health and Safety Act No. 85 of 1993
QA	Quality Assurance
SANS	South African National Standards
SAQA	South African Qualification Authority
SR	Safety Related

Definitions

Anion	Anions are ions with a negative charge. Examples of anions include: Hydroxide anion: OH^- Chloride anion: Cl^- Suphate anion: SO_4^{2-}
Certificate of Analysis	Certificate of Analysis is a manufacturer/testing laboratory data sheet indicating the total halogens, total sulphur, and heavy metal content of the tested product on the manufacturer/testing laboratory letterhead
Cation	Cations are ions that have a positive charge. Examples of cations include: Sodium cation: Na^+ Calcium cation: Ca^{2+} Hydronium cation: H_3O^+ Ammonium action: NH_4^+
CRACK	Control of Chemical Products at Koeberg Nuclear Power Station.
Environmental categories	0, 1, 2, 3, 4 or NEV.

Globally Harmonized System of Classification and Labelling of Chemicals	Means an internationally agreed-upon system to standardize chemical hazard classification and communication.
Importance categories	CSR, SR, AR, NSA, or DER.
Material Safety Data Sheet	Mean a document that is aligned to the GHS, providing information on hazard classification, properties of hazardous chemicals, procedures for handling or working with hazardous chemicals in a safe manner, and the effects of the hazardous chemical on health and safety at a workplace and that is prepared in accordance with regulation 14A of the Regulations for Hazardous Chemical Agents of 2021 (OHS Act 85 of 1993).
Quality levels	Q1, Q2, Q3, Q4
Safety classes	1, 1E, 2, 3, LS or NSF.
Seismic classes	1A, 1P, ND or NC.

1. Introduction

This User Requirements Specification is for the supply and delivery of various types of ion exchange resins and Boric Acid for the application at Koeberg Nuclear Station within Eskom's Generation Division.

2. Background:

Koeberg Nuclear Power Station (KNPS) is situated at Duynefontein, 27km north of Cape Town on the Atlantic coast. It has been operated safely and efficiently for 40 years and is currently Eskom is performing upgrades to the plant and structures for long term operations.

Nuclear power stations are complex facilities that require meticulous attention to detail. At the heart of KNPS lies a culture of adherence to standards and quality, which forms the backbone of all activities. This unwavering dedication to excellence, demands the chemistry the primary, secondary and waste operations to comply with international specifications.

This document outlines the user requirements for the various types of ion exchange resin to be supplied at Koeberg Nuclear Power Station (KNPS). The purpose of this specification is to ensure that ion exchange resin supplied to KNPS meet the necessary requirements for efficient and safe plant operation.

3. Generic scope of ion exchange resin to supplied:

Water treatment at Koeberg nuclear power plant is extremely critical as it correlates to various plant issues associated with radioactive contamination, equipment corrosion, safety and maintenance.

Therefore, it is important to use the high quality of ion exchange resins providing the good quality feed water, steam-water cycle, and reactor water chemistry; that maintains overall high level efficiency of the plant.

Ion exchange resins shall be strictly designed for the use in nuclear power plant circuits. Nuclear grade and high quality resins must be manufactured and processed specially to achieve high purity, precise specification and maximum conversion to their ionic form, in a regenerated condition. The resins must have followed stringent quality requirements for chloride, hydroxide, and metal ion content and organic impurities.

The systems currently utilising ion exchange resin are:

- Chemical and volume control system (RCV)
- Steam Generator blow down system (APG)
- Condensate Polishing Plant (ATE)
- Demineralisation Plant (SDA)
- Boron recovery and recycle system (TEP)
- Reactor and spent fuel cooling system (PTR)
- Generator Stator Coolant System (GST)

Nuclear Grade Boric Acid is used for reactivity control on the Nuclear Primary System.

The scope of work includes, but are not limited to the supplier:

3.1 Suppling and delivering of nuclear grade ion exchange resins to Koeberg Nuclear Power Station.

3.2 Provide batch numbers for all resin products delivered to Koeberg Nuclear Power Station, for traceability during troubleshooting.

3.3 Supplying all ion exchange resin products must supplied in pallets of 25 or 50 litres bags and drums.

3.4 Deliver all ion exchange resin products in an open loaded truck to allow accessibility by the forklift during offloading.

3.5 Strong acid cation, strong base anion and mixed bed resins must be strictly designed for use in the nuclear power plant primary circuits.

3.6 Provide the technical data sheet (TDS) and safety data sheets (SDS) for each resin product supplied.

3.7 Provide temporary storage of Resin.

3.8 Any testing of resin as required.

3.9 The following documents shall be submitted to the Koeberg personnel upon arrival at the power station:

3.9.1 Ion exchange resin certificate of analysis and batch numbers.

3.9.2 Delivery note, which must include the Eskom order number, the name of the power station and the power station address.

Table 1: Specific description of ion exchange resins to be supplied.

Material	Description	Unit of Measure	Internal Comment	5 Year Estimated Demand
527731	NULEAR GRADE MIXED BED RESIN; AMBERLITE IRN 150	L	DSG-317-003; 0029/99Q; Q3:NSF:NC:NEV;RESIN; TYPE: AMBERLITE; FORM: IRN 150; CONTAINER: DRUM BLUE 50 L; (CRACK APPROVED - CATEGORY 1); (MATERIAL SAFETY DATA SHEET (MSDS) AND OR TECHNICAL DATE SHEET (TDS) REQUIRED WITH EVERY DELIVERY AND MUST INCLUDE MANUFACTURING DATE,EXPIRY DATE AND ALLOWABLE DEVIATION OF PRODUCT;ALL CHEMICALS WITH A SHELF-LIFE,SHALL NOT EXPIRE WITHIN ONE (1) YEAR); OR ANY EQUIVALENT THAT IS ACCEPTABLE TO ESKOM REFERENCE IRN 150; DIMEN:50 LITRE BLUE DRUM	81 000
224383	NUCLEAR GRADE CATION RESIN; AMBERLITE IRN 99	L	DSG-317-003; 0029/99Q; Q3:NSF:NC:NEV; RESIN; MNF: DOW DUPONT; P/NO: IRN 99; TYPE: CATION; FORM: BEAD; CONTAINER: DRUM BLUE 50 L; (MATERIAL SAFETY DATA SHEET (MSDS) AND OR TECHNICAL DATE SHEET (TDS) REQUIRED WITH	130 000

			EVERY DELIVERY AND MUST INCLUDE MANUFACTURING DATE,EXPIRY DATE AND ALLOWABLE DEVIATION OF PRODUCT; ALL CHEMICALS WITH A SHELF-LIFE,SHALL NOT EXPIRE WITHIN ONE (1) YEAR); CATION RESIN; (CRACK APPROVED - CATEGORY 1)	
157146	NUCLEAR GRADE CATION RESIN; AMBERLITE IRN 77	L	DSG-317-003\0029/99Q\Q3:NSF:NC:NEV AMBERLITE CATION RESIN CRACK APPROVED - CATEGORY 1 P/NO: IRN 77 CONTAINER:50 L DRUM FUNCT.LOC: 1/2APG 001DE	60 000
211507	AMBERLITE IRN 9882; MIXED BED RESIN	L	DSG-317--003; 0029/99Q; Q3:NSF:NC:NEV; RESIN; MNF: ROHM AND HAAS; TYPE: AMBERLITE IRN9882 H/OH; FORM: GRANULAR; CONTAINER: DRUM BLUE 50 L; MATRIX:POLYSTYRENE; BULK DENSITY:665 TO 740 G/L; (MATERIAL SAFETY DATA SHEET (MSDS) AND OR TECHNICAL DATE SHEET (TDS) REQUIRED WITH EVERY DELIVERY AND MUST INCLUDE MANUFACTURING DATE,EXPIRY DATE AND ALLOWABLE DEVIATION OF PRODUCT;ALL CHEMICALS WITH A SHELF-LIFE,SHALL NOT EXPIRE WITHIN ONE (1) YEAR); INDUSTRIAL GRADE NUCLEAR GRADE MIXED BED RESIN	6000
608257	AMABERLITE IRN 317 Li/OH	L	DSG-317-003; 0029/99Q; Q3:NSF:NC:NEV; SEE EQUIVALENCE M035/15E REV1; RESIN; MNF: ROHM AND HAAS; TYPE: AMBERLITE IRN317 LI/OH; FORM: BEADS 0.2 MM; CONTAINER: 25 L PLASTIC DRUM; COMMERCIAL NAME: AMBERLITE IRN317; FUNCTIONAL GROUP: SULFONIC ACID/QUATERNARY AMMONIUM; MATERIAL SAFETY DATA SHEET (MSDS) AND/OR TECHNICAL DATA SHEET (TDS) REQUIRED WITH EVERY DELIVERY AND MUST INCLUDE MANUFACTURING DATE, EXPIRY DATE AND ALLOWABLE DEVIATION OF PRODUCT; ALL CHEMICALS WITH A SHELF-LIFE SHALL NOT EXPIRE WITHIN (1) ONE YEAR;	2000
157284	AMBERLITE HPR 1600 H;	L	DSG-317-003;0029/99Q; Q3:NSF:NC:NEV; SEE EQUIVALENCE M066/13E; RESIN; MNF: DOW DUPONT; P/N: AMBERJET 1600 H; TYPE: CATION EXCHANGER; MAKE: RHOM AND HAAS; NOTE: CRACK APPROVED, CATERGORY 1 FOR UNIT 1/2 ATE; DSE:	129 600

501211	AMBERLITE HPR 9000 OH	L	DSG-317-003; 0029/99Q; Q3:NSF:NC:NEV; RESIN; MNF: DOW DUPONT; P/N: 9000 OH; TYPE: AMBERJET; FORM: BEADS; CONTAINER: BAG 25 L; ; STRONG ANION EXCHANGE; TECHNICAL DATA SHEETS ARE REQUIRED WITH EVERY DELIVERY AND MUST INCLUDE DATE OF MANUFACTURING; MATERIAL SAFETY DATA SHEET WITH ENVIRONMENT INFORMATION IN THE 16 POINT FORMAT TO BE PROVIDED WITH EVERY DELIVERY AS REQUIRED BY THE OHS ACT:	52 600
157280	AMBERLITE HPR 650 H	L	DSG-317-009; 0029/99Q; Q3:NSF:NC:NEV; (TECHNICAL DATA SHEET REQUIRED WITH EVERY DELIVERY); INDUSTRIAL GRADE STRONG ACID CATION; RESIN: TYPE: AMBERJET HPR 650 H CATION; FORM: BEADS; IONIC FORM: H+; CONTAINER: BAG 25 L;	14 400
180017	AMBERLITE, IRA96 WEAK BASE ANION	L	DSG-317-003; GROUP-21\0354; 86Q\Q4:NSF:NC:NEV; RESIN: TYPE: AMBERLITE IRA96 WB ANION; FORM: LIQUID; CONTAINER: DRUM 50 L; (MATERIAL DATA SHEET REQUIRED WITH EVERY DELIVERY) 1; CRACK APPROVED - CATEGORY 1 MFR:ROHM AND HAAS;	8000
1685 /	AMBERLITE HPR 550 OH, STRONG BASE ANION	L	DSG-317-003; 0029/99Q; Q3:NSF:NC:NEV; RESIN: TYPE: AMBERJET ION EXHANGE; HPR 550 OH, SB ANION; FORM: BEAD; CONTAINER: BAG 25 L ROHM & HAAS; “OR ANY EQUIVALENT THAT IS ACCEPTABLE TO ESKOM” CRACK APPROVED - CATEGORY 1 FOR UNIT 1/2ATE;	9000
157145	INERT AMBERLITE RF14	L	DSG-317-009; 0304/87Q; Q4:NSF:NC:NEV; DESCRIPTION CONFIRMED-STG/COD-92/01 AMBERLITE INERT RESIN P/NO: RF14 DIMEN: MATL: KBA:0914E00153 ITM: KBY: / S/LIST:M09/17 M/MAN:017 ASMT: TRI:	4800

157140	INORGANIC ACID BORON:HIGH PURITY; NUCLEAR	L	DSG-313-005; GROUP-21; 0343/86Q; Q3:NSF:NC:NEV; (MATERIAL SAFETY DATA SHEET (MSDS) AND OR TECHNICAL DATE SHEET (TDS) REQUIRED WITH EVERY DELIVERY AND MUST INCLUDE MANUFACTURING DATE,EXPIRY DATE AND ALLOWABLE DEVIATION OF PRODUCT;ALL CHEMICALS WITH A SHELF-LIFE,SHALL NOT EXPIRE WITHIN ONE (1) YEAR); BORIC ACID CRACK APPROVED - CATEGORY 1; NUCLEAR GRADE HIGH PURITY 100% MIN99,95%; BORON TRIOXIDE(B2O3)56,30%; WATER(H2O)43, 70%; BORIC ACID(H3BO3)100,00%;	80500

4. Categories of labour required.

4.1 The Contractor shall be responsible for the safe delivery of ion exchange resin to KNPS Site Stores using roadworthy vehicles that comply with all relevant legislation including the following:

- National Road Traffic Act 93 of 1996
- National Road Traffic Regulation, 2000

4.2 The Contractor shall ensure that drivers delivering of ion exchange resin to KNPS meet Koeberg Nuclear Power Station access requirements:

- Have valid national driver's license.
- Not under the influence of intoxication substances including drugs and alcohol.
- Have no criminal record.

5. Timing and planning

5.1 Start Date 1 May 2025

5.2 Completion Date 30 October 2029

6. Shift work.

Not applicable, however the supplier might be expected to supply outside the normal working hours including public holidays and weekends.

7. Training

7.1 The Contractor shall ensure that the Contractor's staff responsible for the delivery of ion exchange resins are suitably qualified and have undergone an inhouse training specific to the work to be executed under the contract.

7.2 Specific training

7.2.1 No specific training required.

6.2 Generic Training

7.2.2 Site access training for delivery personnel, where applicable and required.

8. Access Formalities

8.1 Access to the Koeberg Nuclear Power Plant is controlled and reserved. The Supplier shall comply with the various access requirements as stipulated in the KAA 777: “PROCESS FOR ACCESS TO KOEBERG NUCLEAR POWER STATION” and 335-68: “FITNESS FOR DUTY PROCESS”

8.2 The mandatory Personal Protective Equipment (PPE) is displayed in various sections/areas at Koeberg Nuclear Power Station. However, the following are required as a minimum:

8.2.1 Hard hat with a chin strap,
8.2.2 Safety boot with a toe cap,
8.2.3 Gloves,
8.2.4 Ear protection and
8.2.5 Safety glasses

8.3 The service provider is responsible to supply all his/her staff with this PPE and any safety equipment required to perform work safely.

8.4 Eskom shall supply the following in support of the works:

- Access to Site.
- On / Offloading goods on KNPS Site

9. Quality requirements

As described in the contract document.

10. Documentation and References

10.1 DSG-317-094 Chemical Restrictions And Controls At Koeberg (CRACK) Programme
10.2 KAA 777: Process for access to Koeberg Nuclear Power Station
10.3 DSG-317-003
10.4 DSG-317-009
10.5 OHSAct