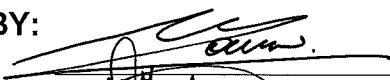
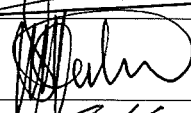
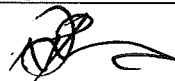
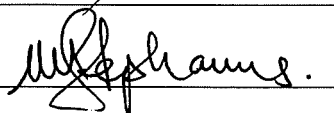
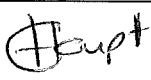


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ESKOM
KOEBERG NUCLEAR POWER STATION
SPECIFICATIONS ENGINEERING

Specification Title

NUCLEAR GRADE ION EXCHANGE RESINS

CO-PREPARED BY:		UW Louw
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REVIEWED BY:		NP Daniels (Chemistry)
APPROVED BY:		AMA Stephanus
DATE:	2018-08-27.	
DATA CAPTURED:		C Haupt

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KOEBERG NUCLEAR POWER STATION

NUCLEAR ENGINEERING

	APPROVED: AM Kotze	DATE: 2008/12/17
PARAGRAPHS	PREPARED BY	REVIEWED BY
Original	JRM	ARL/YSM

RECORD OF REVISIONS

Rev	Date	Description of Revision	Prep.	Rev.	Appr.
4	2008-12-10	Added record of revisions page. Added trigrammes 1/2 RCV 001 and 002 DE for resin type IRN 317. Added trigrammes 9 TEU 003 and 004 DE, 9TEP 003 and 004 DE, 1/2 PTR 001 DE and 1/2 RCV 001/002DE oxygenation for resin type IRN 9882 Added trigrammes 1/2 ATE 011 to 015 FI for resin type AMBERSEP 252 H. Added trigrammes 1/2 APG 001 and 002 DE for resin type IRN 99, and trigrammes 1/2 APG 003 and 004 DE for resin type IRN 170. Added trigrammes 1/2 ATE 011 to 015 FI for resin types AMBERJET 1500 (H) and 4400 (OH) Removed from section, Marking and Identification, the reference to document Koeberg Safety Manual, KSM-01 as it no longer exists. Removed from section, Documentation, the reference to document, General Administrative Regulations No. GNR1449, as a copy could not be sourced.	JRM	YSM/ ARL	AMK
5	2011-07-27	Removed from the cover page 'Attachments and STG catalogue ref: STG-000-026'. Removed list of trigrammes.	XB/ PNC	FWM/ NWB	RG
6	2015-09-21	Removed 'Amberlite' as the specification shall be applicable to all nuclear grade ion exchange resins.	XB	AS/ SRW	NR
7	2018-08-31	Included physical properties	UWL/ MM	SS	AMAS

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ESKOM

KOEBERG NUCLEAR POWER STATION

PROCUREMENT SPECIFICATION

PRODUCT: NUCLEAR GRADE ION EXCHANGE RESINS

TECHNICAL DESCRIPTION: NUCLEAR GRADE ION EXCHANGE RESINS AS DETAILED ON THE ESKOM KOEBERG ORDER TO CONFORM TO THE FOLLOWING PARAMETERS:

CATION EXCHANGE POLYSTYRENE RESINS IN THE FORM OF H⁺

Property	Parameter	Unit	Value
Content of cationic impurities	Sodium	mg/kg of the dry resin	<60
	Iron		<100
	Copper		<30
	Aluminium		<50
	Cobalt		<30
	Lead		<30
	Mercury		<20

Property	Parameter	Unit	Value
Physical properties	Total exchange capacity	eq/l	≥ 1.7
	Particle size	mm	0.4 – 1.2
	Conversion to H ⁺ form	%	99% (min)
	Proportion of fines with diameters < 0.29 mm	%	1.2 (max)
	Whole beads	%	95

ANION EXCHANGE POLYSTYRENE RESINS IN THE FORM OF OH⁻

Property	Parameter	Unit	Value
Content of cationic impurities	Sodium	mg/kg of the dry resin	<20
	Iron		<100
	Copper		<30
	Aluminium		<50
	Cobalt		<30
	Lead		<30
	Mercury		<20
Content of anionic impurities	Ionic chlorides	% of the total capacity	<0.2
	Ionic sulphates		<0.3
	Total of chlorides	mg/kg of the dry resin	<500
	Total of sulphates		<600
	Total of silica		<100

Property	Parameter	Unit	Value
Physical properties	Total exchange capacity	eq/l	*
	Particle size	mm	0.4 – 1.2
	Conversion to OH ⁻ form	%	95 (min)
	Proportion of fines with diameters < 0.29 mm	%	≤ 0.5
	Whole beads	%	90 (min)

*COA to stipulate total exchange capacity

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MIXED BED POLYSTYRENE RESINS IN THE FORM OF H⁺ / OH⁻

			Cation	Anion
Content of cationic impurities	Sodium	mg/kg of the dry resin	<60	<20
	Iron		<100	<100
	Copper		<30	<30
	Aluminium		<50	<50
	Cobalt		<30	<30
	Lead		<30	<30
	Mercury		<20	<20
Content of anionic impurities	Ionic chlorides	% of the total capacity		<0.2
	Ionic sulphates			<0.3
	Total of chlorides	mg/kg of the dry resin		<500
	Total of sulphates			<600
	Total of silica			<100

Property	Parameter	Unit	Cation	Anion
Physical properties	Total exchange capacity	eq/l	≥ 1.7	*
	Particle size	mm	0.4 – 1.2-	
	Conversion to H ⁺ /OH ⁻ form	%	99	95
	Proportion of fines with diameters < 0.29 mm	%	≤ 0.5	
	Whole beads	%	90 (min)	

*COA to stipulate total exchange capacity

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MIXED BED POLYSTYRENE RESINS IN THE FORM OF Li^+ / OH^-

			Cation	Anion
Content of cationic impurities	Sodium	mg/kg of the dry resin	<60	<20
	Iron		<100	<100
	Copper		<30	<30
	Aluminium		<50	<50
	Cobalt		<30	<30
	Lead		<30	<30
	Mercury		<20	<20
Content of anionic impurities	Ionic chlorides	% of the total capacity		<0.2
	Ionic sulphates			<0.3
	Total of chlorides	mg/kg of the dry resin		<500
	Total of sulphates			<600
	Total of silica			<100

Property	Parameter	Unit	Cation	Anion
Physical properties	Total exchange capacity	eq/l	≥ 1.7	*
	Particle size	mm	0.4 – 1.2-	
	Conversion to Li^+/OH^- form	%	99	95
	Proportion of fines with diameters < 0.29 mm	%	≤ 0.5	
	Whole beads	%	90 (min)	

*COA to stipulate total exchange capacity

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MARKING AND IDENTIFICATION

Each chemical container shall be clearly labelled with the following information:

- Name of contents
- Concentration of contents
- Name of manufacturer
- Batch lot number
- Pictogram -triangular - (black border with yellow centre) depicting health hazard of contents.

Marking notices and signs shall be in accordance with OHSA, Act 85 of 1993, requirements.

Marking notices and signs shall be weatherproof.

QUALITY ASSURANCE

All conditions and requirements contained in this specification shall comply with the Eskom Quality Assurance standard provided with the tender enquiry or purchase order.

The safety classification of the chemical provided in accordance with this specification is:

- 0029/99Q (NSF/NC/Q3/NEV)

The Quality Assurance Data Package (QADP) shall consist of a guaranteed vendor's chemical analysis demonstrating compliance with this specification. This analysis shall identify the batch or lot number of the chemical.

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DOCUMENTATION

The supplier/vendor shall provide the following documentation with each chemical delivery:

- Certificate of Compliance

The Certificate of Compliance shall state that the chemical supplied meets the requirements of this specification. It shall include a certified chemical analysis (COA) of the chemical and the purchase order number.

Eskom authorised personnel shall review the Certificate of Compliance prior to release and use of the chemical. All documentation must be completely legible and of microfilm quality.

In addition, at the time of, or prior to, the first delivery to Eskom, the supplier/vendor shall furnish the following documentation:

- Storage instructions to ensure chemical shelf life
- Technical literature on chemical handling (if available) which should be in the form of a Material Safety Data Sheet (MSDS).

The supplier shall undertake to provide updates of the above as and when they become available.

PACKAGING AND SHIPMENT

The chemical materials shall be supplied in sealed containers to prevent loss, contamination or deterioration of contents during transport, handling and storage.

The sealed containers shall be of a robust nature to facilitate the prevention of personnel contact during transport, handling and storage.