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KOEBERG NUCLEAR POWER STATION
TECHNICAL SERVICES
DESIGN & SPECIFICATION GROUP


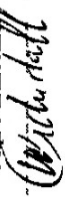

FILE NUMBER : DSG-313-001

TITLE : CATALYSED 100% HYDRAZINE HYDRATE

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KOEBERG NUCLEAR POWER STATION
 TECHNICAL SERVICES
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for
 CATALYSED 100% HYDRAZINE HYDRATE

APPROVED: 	DATE: 17-6-92	REVIEWED BY  M. W. ADENDORFF
PARAGRAPHS 1 TO 12 INCLUSIVE	PREPARED BY  J. W. ADENDORFF	(Blank)

RECORD OF REVISIONS

Rev	Date	Description of Revision	Prep.	Rev.	Appr.
1	17/6/88	Complete rewrite of D.S.G. 001	AM	DSF	RD
2	15/6/92	Check all properties reviewed and other minor changes	Jv/dll	MA	Kt

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TECHNICAL SPECIFICATION
FOR
CATALYSED 100% HYDRAZINE HYDRATE

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1.0 SCOPE

1.a General

- 1.a.1 Product covered by this specification is for application in Eskom's Koeberg Nuclear Power Station, Republic of South Africa.
- 1.a.2 If a conflict arises between this specification and other referenced documents, the Contractor/Vendor/Supplier shall not proceed, but shall request clarification, in writing, from the approved Eskom buyer.

1.b Scope of Supply

- 1.b.1 The scope of supply covers 100% Hydrazine Hydrate in 25 kg or 200 kg drums for use in the primary circuit, secondary side feedwater and the auxiliary boilers.

1.c Definition

- 1.c.3 Hydrazine Hydrate is the chemical $N_2H_4 \cdot H_2O$ (see chemical properties in paragraph 6 of this specification).

2.0 REFERENCES

2.a Mandatory references

- 2.a.1 MOSACT and regulations - Act 6 of 1983 - regulation 15B and list of high risk substances.
- 2.a.2 Koeberg Safety Manual - KSM-001 - chapter 3.1.

2.b Useful References

Perry's - Chemical Engineers Handbook

3.0 INTERFACES

- 3.1 Hydrazine is for use in the primary, secondary and auxiliary boilers circuits.

4.0 ENVIRONMENTAL CONDITIONS

See Safety - paragraph 7.0.

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5.0 SERVICE CONDITIONS

5.a Ambient conditions when stored:

Temperature (min to max) : -2°C to 35°C
 Pressure : atmospheric
 Relative Humidity : 100%

6.0 CHEMICAL PROPERTIES

6.1 PRODUCT DESCRIPTION

A water soluble, colourless or lightly straw coloured liquid having a faint amine-like odour.

It has a specific gravity of between 1,032 and 1,034 g/cm³, a viscosity of 1,5 cp and a boiling point between 120 and 121 degrees centigrade.

6.2 PRODUCT SPECIFICATION

Name	:	Catalysed Hydrazine Hydrate
Concentration	:	63 to 65 % H ₂ H ₄ w/w in H ₂ O
Ammonia	:	< 0,15 % w/w
Iron	:	< 1 mg Fe/kg
Sodium	:	< 2 mg Na ⁺ /kg
Chloride	:	< 2 mg Cl ⁻ /kg
Fluoride	:	< 2 mg F ⁻ /kg
Sulphate	:	< 2 mg SO ₄ ²⁻ /kg
Total Organic Carbone	:	< 0,5 % w/w

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Nickel	:	< 0,1 mg Ni/kg
Chromium	:	< 0,1 mg Cr/kg
Copper	:	< 0,1 mg Cu/kg
Cobalt	:	< 0,1 mg Co/kg
Lead	:	< 0,1 mg Pb/kg
Other Heavy Metals	:	Traces

Reaction Rate: Should reduce the oxygen content of pH 10 demineralised water containing 25 mg N₂H₄/kg at 60°C from a saturation value, to less than 0,1 mg O₂/kg in less than 30 minutes.

Catalyser: Only pure organic catalysers may be used. The use of inorganic, organometallic and Cl, F and S containing organic catalysers are prohibited.

7.0 Safety

- 7.1 Hydrazine is identified as a high risk substance on page 24; item 35; of the regulations in the MOSACT and Regulations, act 6 of 1983.
- 7.2 Due to hydrazines suspected carcinogenic and corrosive properties, as well as its high toxicity, inhalation of fumes, skin contact, eye contact and body internal contamination is to be avoided.
- 7.3 During transport, handling, storage and off-loading, any of the contacts mentioned in 7.2 are to be avoided by using rubber gloves, full face protection and air breathing safety apparatus. Compliance with the MOSACT and Regulations, act 6 of 1985, and the Koeberg Safety Manual, KSM 001 are to be strictly adhered to for handling hydrazine.
- 7.4 Should hydrazine be handled in an enclosure, regulation C16 of the Factories Machinery and Building Work Act and Regulations, Act 22 of 1941, shall apply

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8.0 VERIFICATION AND TESTS

- 8.1 The supplier shall submit to Eskom a chemical analysis report in accordance with this specification, at each delivery. This chemical analysis report shall demonstrate that the chemical characteristics meet every requirement of this specification and shall be signed by the supplier's responsible person
- 8.2 If the analysis report shows deviation from the requirements of this specification, Eskom's written approval as per 1.a.2 is required for acceptance.
- 8.3 Eskom reserves the right to have check analyses carried out by the analysing laboratory of its choice in order to verify the chemicals quality.
- 8.4 If the check analysis report should show that the chemical does not present the required characteristics, Eskom reserves the right to refuse the batch which has been received. This batch would be removed and replaced at the Vendors/Suppliers/Contractors expense.

9.0 QUALITY ASSURANCE

- 9.1 All conditions and requirements required by this specification shall comply with the Eskom Quality Assurance standard provided with the tender enquiry or purchase order.
- 9.2 The safety classification and quality level of the chemical provided in accordance with this specification is
- Classification No. - 131/88Q
- Classification
- Safety - NSF
- Quality Level - Q4
- 9.3 The Quality Assurance Data Package (QADP) shall consist of a guaranteed vendors chemical analysis demonstrating compliance with this specification. This analysis shall identify the batch or lot number of the chemical.

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10.0 DOCUMENTATION

10.1 The supplier shall provide the following documentation with the chemical delivery:

1. Chemical analysis report (as per 8.0)
2. Storage instructions to ensure chemical shelf life.
3. Technical literature on chemical handling (if available).

11.0 MARKING AND IDENTIFICATION

11.1 Each Hydrazine container shall be clearly labelled with the following information

- a. Name of contents
- b. Concentration of contents
- c. Name of manufacturer
- d. Batch/lot number
- e. Eskoic's National Stock number - 6810665513943
- f. Pictogram-triangular-(black border with yellow centre) depicting health hazard of contents (eg. corrosive)

11.2 Marking notices and signs shall be in accordance with regulation 15C, MOSACT and regulations, act 6 of 1983. These marking, notices and signs shall also correspond with Koeberg safety manual KSM-001 chapter 3.1

12.0 PACKAGING AND SHIPMENT

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

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

12.3 Handling precautions shall be prominently marked on the containers as per 11.0.