ESKOM

KOEBERG NUCLEAR POWER STATION

SPECIFICATIONS ENGINEERING

Specification Title

SPECIFICATIONS FOR CHEMICAL PRODUCTS & MATERIALS USED AT KNPS

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KOEBERG NULCEAR POWER STATION
NUCLEAR ENGINEERING
DSG-MECHANICAL

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RECORD OF REVISIONS

Rev	Date	Description of Revision	Prep.	Rev.	Appr.
0	07-12-99	Original	JRM	NGR	JHED
0a	26-03-01	Appendix 1 Specification DSG-317-093 added.	JRM	NGR	JHED
0b	03-05-01	Paragraph 9.6 added	JRM	NGR	JHED
0c	14-06-01	Added: DSG-317-069 to Appendix 1 (Continued); DSG-313-001Rev 2 HYDRAZINE HYDRATE 64% to Appendix 2	JRM	NGR	JHED
0d	26/09/01	Made changes on Appendix 1 and added Group 25.	JRM	NGR	JHED
0e	08/11/02	Removed DSG-313-019 from group 17 Added group 26 (Civil Works)	JRM	NGR	JHED
0f	15/05/03	Removed (if available) and GN from paragraph 9.4	JRM	NGR	ARL
0g	06/11/06	Added reference to Halogen and Sulphur content to group 15 as defined in KSA-106. Added reference 2.1.5 for KSA-106.	JRM	DCE	ARL
0h	11/03/09	All revision references on page 12 to be removed, and the wording (The latest revision of the relevant specification is to be used) inserted in Appendix 2.	JRM	DCE	ARL
1	2009/07/15	Complete revision. Included specs for PCBs in oils in appendix 1 p 12/13. Added KSM-001, ESKASAAC2 and PMUPS mandatory references in § 2.1. Corrected KSM 01 to KSM-001. Changed Maintenance Engineering to Component Engineering. Defined "No Spec" in Appendix 1. Removed references to Appendices 3 and 4. Changed all the page numbers.	MBF	JRM	AMK
1a	2010/05/26	Added Paragraph 1.2.2 to Scope Of Supply, and included the Materials Engineer as a reviewer	MBF	JRM / CAW	AMK

2	2011/07/01	Complete Revision. Added 12.0 Appendixes to index page. Added extra paragraph to Scope Of Supply Added CE 12901: Crack Programme Scope Change Memo to mandatory references in §2.1. Added section 12.0 in document. Added Appendix 3: Crack Programme Scope Change Memo. Changed all the page numbers.	LG	JRM / CAW	RG
3	2011/12/09	Complete Revision. Removed CE 12901: Crack Programme Scope Change Memo from mandatory references in §2.1. Added KAA-751: The Control of Chemical Products at Koeberg Nuclear Power Station to mandatory references in §2.1. Removed Appendix 3: Crack Programme Scope Change Memo. Changed all the page numbers.	LG	AL / CAW	RG
4	2013-07-31	Complete Revision Added the acceptance criteria for heavy metals in Section 4.1.1 as a proviso to close CA 28746. Expanded Appendix 1 to include specifications sheets for product category 1 to 24. Incorporated Appendix 2 into the Specification Sheet Product Category 21.	GPS	SW / CAW / AMAS	NR
4a	2016-07-15	Page 27 (Sheet 11): Removed drinking water; and added limits for sulphur to correspond with specifications listed on Page 44 – summary table. Pages 32 & 45: DSG-317-069 replaced with 331-170. Page 39: Updated Appendix 1 Sheet 21: Category 21 – Conditioning products: DSG-317-095 withdrawn; DSG-313-001, DSG-317-009 & DSG-317-012 titles updated. Page 44: Group 11 (water) halogens limit changed from 5 ppb to 150 ppb to correspond with limits in Sheet 11.	XB	SW / IN / AMAS	NR
4b	2019-03-27	Updated section 4.2 to clarify which analysis (total or soluble) is required.	UL	SS/PN /IN/SS	SE

TECHNICAL SPECIFICATION

INDEX

1.0 SCOPE

1.1 General

1.1.1 The products and materials that are covered by this specification are for application at Eskom's Koeberg Nuclear Power Station in the Republic of South Africa.

1.1.2 Should any conflict arise between the requirements of this specification and any other documents, referenced or otherwise, the supplier shall not proceed but shall request clarification, in writing, from the approved Eskom buyer.

1.2 Scope of Supply

1.2.1 The scope of supply covers the admissible maximum content of halogens, sulphur and other chemical impurities for chemical products and materials in use at Koeberg Nuclear Power Station.

1.2.2 This specification is applicable to the scope of equipment as specified in [2.1.9.].

1.2.3 Reference 2.1.9 shall be used in conjunction with this specification.

1.2.4 If the chemical products and materials are supplied with a PMUC approval reference number it will be deemed to be acceptable for use at Koeberg Nuclear Power Station.

2.0 REFERENCES

2.1 Mandatory References

2.1.1 Occupational Health and Safety Act (OHSA), Act 85 of 1993;

2.1.2 Government Gazette Regulation No. 5549, 25 August 1995;

2.1.3 PMUPS: Chemical Specifications for Products and Materials used in Power Stations - D5710/IMC/1999/007111 (EDF Document);

2.1.4 ASME V 1992 T640;

2.1.5 SABS 1265 : 1995;

2.1.6 KSM-001: Compilation, Use and Adherence to Maintenance Working Procedures;

2.1.7 KSA –106: Requirements for Protective Coatings for use at Koeberg Nuclear Power Station;

2.1.8 32-245: Waste Management Procedure;

2.1.9 KAA-751: The Control of Chemical Products at Koeberg Nuclear Power Station.

3.0 EVIRONMENTAL CONDITIONS

Environmental control is to be in line with Government Gazette Regulation No. 5549 Section 15 (Page 11) and (Page 12).

4.0 CHEMICAL SPECIFICATIONS

4.1 Chemical Substances which are prohibited in the Primary System

The elements listed in the table below could, depending on their characteristics and concentrations, cause or produce corrosion, coolant pollution, activation products or be responsible for neutron poisoning, if they are present in the products or materials which come into contact with the primary coolant and the components of the primary system.

ELEMENTS		
Lead	Silver	Rare Earths
Mercury	Cobalt	Gallium
Tin	Aluminium	Indium
Zinc*	Bismuth	Ferric Iron salts
Cadmium	Arsenic	
Antimony	Copper	

The presence of these elements is not allowed as known constituent of a product, confirmed by a commitment of the manufacturer. A chemical analysis is not required.

In cases whereby the exclusion of these elements is practically impossible due to them being technologically irreplaceable, the following will apply;

i. The maximum permissible limit for each of the above-mentioned elements is 1% (10 000 ppm) if they are intentionally added, by design, to the products listed in APPENDIX 1.
ii. The only exceptions are lead and mercury, which must be limited to less than 0.00005 % for Category 21 products.
iii. The use of lead is admissible under the condition that its utilisation in the following fields is controlled and that there is no other replacement which can be used instead, such as, for biological protection, measuring vane clearance in turbines and etc.
iv. Zinc is permitted in the structures of galvanised sheet metal (raceway/cable support systems, ventilation ducts and metal frames). It is not recommended to use zinc as a component in paints.

4.2 Chemical Substances which are permitted in limited quantities

The content of sulphurous and halogenated (chlorine, fluorine and bromine) elements in the PMUPS is restricted in view of the risks involved concerning the corrosion of the metal components, and especially in order to limit the pitting phenomena and the cracking and stress corrosion of the austenitic stainless steels and nickel alloys, as well as the stress corrosion of the low alloy steels under certain environmental conditions.

The admissible maximum contents for each product category are displayed in the form of data sheets in **APPENDIX 1**. They are expressed in ppm ($mg.kg^{-1}$).

For each product, the primary aim of the programme is to determine compliance with regards to the total content of specified element.
Only in the case of the total content of specified element being exceeded, for certain product families an alternative analysis method may be performed to allow the use of the product. This analysis method tests for corrosive elements likely to be released (soluble contents obtained by leaching) under the appropriate conditions of use (including temperature).

5.0 WAIVING OF CHEMICAL SPECIFICATIONS

The waiving of chemical requirements for non-compliance to this specification is possible for products, which do not fulfil the necessary requirements, but which are necessary for functional reasons and which are technologically irreplaceable. This approval may be given by Component Engineering after careful study of the risks of deterioration or pollution of the metal systems which would be in contact with the product under the envisaged operating conditions, and only on the basis of a positive feedback which is possibly complemented by a bibliographical approach.

No waiver is definite but can be revoked or revised at any point in time in accordance with new utilisation experiences gathered about the product, or the appearance of a substitute which could ensure proper functioning while complying with the specifications.

6.0 SAFETY

6.1 Handling precautions shall be as referenced in the OHSA, Act 85 of 1993, Section 10 (3) (a) & (b).

6.2 When handling chemicals/materials, safety goggles and impervious clothing and/or gloves shall be worn, in addition to any other safety equipment normally required. A full-face shield may replace safety goggles. If working in an enclosed area, respiratory protection may be required. If this is the case, chemical cartridge respirator (CCR) or self-contained breathing apparatus (SCBA) should be used. If respiratory protection is required, then gloves shall be worn.

7.2 Should the Certificate of Chemical Analysis show non-conformance with the requirements of this specification, Eskom's written approval, as per 1.1.2, is required for acceptance.

7.2.1 Eskom reserves the right to have a verification analysis carried out by the analytical laboratory of its choice in order to verify the quality of the received chemical.

7.2.2 Should the verification analysis indicate that the supplied chemical does not meet the requirements of this specification, Eskom reserves the right to refuse the batch that has been received. This batch will be removed and replaced at the expense of the Vendor/ Supplier / Contractor.

7.3 On receipt of a consignment of the chemical or product, Eskom shall have the right to withdraw a sample at random from the batch and transfer it to a suitable container(s), which shall then be sealed and stored for future analysis in case of litigation. This container shall be appropriately labelled with sufficient detail to make it uniquely identifiable. Once the entire chemical in the batch has been used, this sample shall be disposed of in an appropriate manner.

The information to be recorded on the label is as follows: -

- Product Name:-
- Supplier's Name:-
- Batch Number:-
- Date:-
- Time:-
- Sampled by:- (signature and printed name of Eskom personnel)
- Witnessed by:- (signature and printed name of delivery person)

8.0 QUALITY ASSURANCE

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

8.2 The safety classification and quality level of the chemical provided in accordance with this specification is:

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

8.3 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.

9.0 DOCUMENTATION

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

- ❖ Certificate of Conformance

9.2 The Certificate of Conformance (COC) shall state that the chemical supplied meets the requirements of this specification. It shall include the Certificate of Chemical Analysis (in accordance with Section 7.0) of the chemical and the purchase order number.

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

9.4 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 which should be in the form of a Material Safety Data Sheet (MSDS).
- ❖ All of the above shall be in compliance with the General Administrative Regulations No. R.1449 Section 7.

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

9.6 If the Certificate of Chemical Analysis (COA) is not received the chemical can be released if the product is already included on the Koeberg Approved Chemical Product List.

10.0 MARKING AND IDENTIFICATION

10.1 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.

10.2 Marking notices and signs shall be in accordance with OHSA, Act 85 of 1993, requirements. These markings, notices and signs shall also correspond with Koeberg safety manual KSM-001 chapter 3.1.

10.3 Marking notices and signs shall be weather-proof.

11.0 PACKAGING AND SHIPMENT

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

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

11.3 Handling precautions shall be prominently marked on the containers as per 10.1

12.0 APPENDICES

APPENDIX 1 – Chemical Specifications for Products and Materials used in Power Stations

APPENDIX 1

CHEMICAL SPECIFICATIONS FOR PRODUCTS AND MATERIALS USED IN POWER STATIONS

SPECIFICATION SHEETS PER PMUPS CATEGORY

Sheet No.	Category Heading
1	CLEANING PRODUCTS
2	PRODUCTS AND MATERIALS USED FOR DECONTAMINATION
3	PRODUCTS AND MATERIALS FOR TEMPORARY PROTECTION
4	ANTI-GALLING, LUBRICATING OR UNJAMMING PRODUCTS FOR CONNECTIONS
5	PLASTIC AND COMPOUND MATERIALS AND COMPOSITES
6	ADHESIVE TAPES
7	PRODUCTS USED TO FIND AND SEAL LEAKAGES
8	PRODUCTS FOR NON-DESTRUCTIVE TESTS
9	NON-METALLIC THERMAL INSULATION MADE OF FIBRE GLASS OR MINERAL FIBRE
10	ABRASIVES
11	WATER
12	COMPRESSED AIR
13	DESICCATION PRODUCTS
14	MARKING PRODUCTS
15	PAINTS AND COATING PRODUCTS
16	GLUES
17	GASKETS AND PACKING SEALS
18	HYDRAULIC FLUIDS
19	OILS, GREASES AND LUBRICANTS
20	FUELS
21	CONDITIONING PRODUCTS
22	WELDING PRODUCTS AND RELATED COATINGS
23	PESTICIDES
24	FIRE FIGHTING PRODUCTS

SHEET 1

CATEGORY 1 – CLEANING PRODUCTS

1. DEGREASING PRODUCTS

Definition:

Products used for all kinds of dust removal, grease removal, removal of dirt marks and non-radioactive deposits.

Product range:

- Solvents and volatile degreasing agents (ethyl alcohol, isopropyl alcohol, acetone etc.);
- Water;
- Aqueous solutions;

Specifications:

Admissible maximum contents:

	Total of halogens (Cl + F + Br)	Total of sulphur	Observations
Volatile solvents	200 ppm	200 ppm	
Water	Demineralised water (1) Drinking water (1)		
Aqueous solutions	10 ppm in the ready-for-use solution	10 ppm in the ready-for-use solution	Final rinsing (2) with demineralised water obligatory

(1) The properties/qualities of "drinking" and "demineralised" water are specified in sheet 11.

(2) The pH and the conductivity of the final rinsing water are checked and verified immediately after the operation and must conform to the said characteristics of "demineralised" water. If this is not the case, continue the rinsing procedure.

Note: Products used for decontamination are not equivalent to cleaning products.

2. CHEMICAL CLEANING PRODUCTS

Definition:

Products used for pickling/oxide film removal, decarbonisation, rust removal, surface passivation, descaling.

Product range:

- Acids;
- Bases;
- Related inhibitors;

Specifications:

These products are not subject to the specifications concerning content limitations for halogens and sulphur, but a verification of their compatibility with the surfaces to be treated must be commissioned and carried out beforehand to show that the solutions used are in fact harmless for the metals in question. Any chemical cleaning process must be followed by a rinsing with grade A water (see sheet 11) and an examination, whether the reagents used have been eliminated before the cleaned materials can be put back into service (physico-chemical measuring of the pH and the conductivity).

The implementation procedures must be recorded in writing in the form of a Quality Plan in which the used products and the different stages and units such as the holding time, the temperature etc., as well as the check-ups which are to be carried out, are clearly stated (if necessary, refer to chapter F 6530 of the RCCM for the implementation instructions).

Descaling and passivation procedures by means of pastes are permitted if the application of the solutions by dipping is technically difficult. If these pastes are being used, the rinsing process must be carried out with particular care.

3. ABSORBING AND DISPERSING AGENTS

Definition:

Products used to soak up water, hydrocarbons and various fluids.

Product range:

Products on a foundation of natural clay (aluminium silicates) or of synthetic origin (polymers). They are available in the form of powder or granules.

Specifications:

Admissible maximum contents:

Admissible **soluble** maximum contents:	Halogens (Cl + F + Br)	200 ppm
	Sulphur	200 ppm

In view of the potential danger of silica pollution, the use of products, which are made on a foundation of aluminium silicates, is prohibited in the primary system.

No traces of the products must remain after usage.

4. MATERIALS – CLOTHS

These items are not subject to specifications. The bleaching process used for the fabrics must be devoid of halogenated reagents (for example chlorine bleaching). Ensure total removal of these materials once the work is completed.

SHEET 2

CATEGORY 2 – PRODUCTS AND MATERIALS USED FOR DECONTAMINATION

1. CHEMICAL PRODUCTS

Definition:

Products used for all kinds of dust removal, grease removal, the removal of marks and spots and attached or unattached radioactive deposits, which are either utilised on their own or as part of a **decontamination procedure**.

The chemical products, which are used in **decontamination procedures,** are detailed in the "Decontamination Guide for Power Stations". A study must first be carried out before using any of these products and procedures in order to establish that they are in fact harmless for the surfaces they will be used on and that they can be approved. The "Groupe Action Décontamination" spearheaded by the UTO takes charge of this study (refer to the technical notes by the UTO, reference No. NTD 9613340 dated 07/04/97). In certain cases, the chemical solutions which are used in the procedures may not conform with the specifications and be nevertheless permitted (EMMAC procedure or electrochemical decontamination for example). The procedures are only to be implemented in compliance with the conditions laid down in the instruction files of the Decontamination Guide.

Product Range:

- Volatile solvents (ethyl alcohol, acetone etc.);
- Water;
- Aqueous solutions of acids, bases, oxidizing or reducing agents used either on their own or in mixtures;
- Gels: Products in this form are not recommended as they are difficult to remove. In certain cases, their use may, however, be justified (for the decontamination of vertical walls for example).

Specifications:

Admissible maximum contents:

	Halogens (Cl + F + Br)	Sulphur	Observations
Volatile solvents	200 ppm	200 ppm	
Water	Demineralised water (1) Drinking water (1)		

Aqueous solutions	10 ppm in the ready-for-use solution	10 ppm in the ready-for-use solution	Final rinsing (2) with demineralised water obligatory
Laundry products	30 ppm	30 ppm	After dilution

The presence of EDTA in the products is prohibited. The use of sequestering agents is generally banned due to the discharge into the environment or the responsibilities of storing the waste.

The presence of phosphates and phosphoric acid in the products is prohibited in order to ensure proper functioning of the TEU evaporators.

(1) The properties/qualities of "drinking" and "demineralised" water are specified in sheet 11.

(2) The pH and the conductivity of the final rinsing water are checked and verified immediately after the operation and must conform to the said characteristics of "demineralised" water. If this is not the case, continue the rinsing procedure.

(3) Most of the aqueous solutions are prepared by diluting the commercial products in concentrations of 1 to 20% in weight with grade A water as defined in sheet 11.

2. MATERIALS USED IN MECHANICAL DECONTAMINATION PROCEDURES

Definition:

Materials which are used for decontamination purposes, by means of mechanical processes, and which come into direct contact with the surfaces which are to be decontaminated.

Product range:

- Beads (glass, corundum) and sand which are used for decontamination by means of blast cleaning or sandblasting.
- Removable skin-forming paints, peel films.

The conditions for the use of these materials are specified in the Decontamination Guide.

Specifications:

Admissible maximum contents:	Halogens (Cl + F + Br)	200 ppm
	Sulphur	200 ppm

N.B.: The rubbing or brushing utensils such as the cotton, swabs, nylon brushes, sponges etc., which are used for the decontamination, are not subject to chemical specifications.

SHEET 3

CATEGORY 3 – PRODUCTS AND MATERIALS FOR TEMPORARY PROTECTION

Definition:

Products and materials which are used temporarily to shield the surfaces, which must be protected, against detrimental effects from the environment prior to the installation and putting into operation of the items (for example during the storage period).

These products must be removed completely prior to putting the equipment into operation and this must be done in such a manner, that no residues are left in inaccessible areas.

This category also includes products which are used as a permanent protection against corrosion on the equipment.

Product range:

- Removable skin-forming varnishes, peel films;
- Paints;
- Waxes;
- Oils and protective liquids;
- Plastic film or paper wrapping which are used for the above mentioned functions are subject to the chemical specifications of category 5 "Plastic and Compound Materials and Composites" (Sheet No. 5).

Specifications:

Admissible maximum contents:

	Halogens (Cl + F + Br)	Sulphur	Observations
Removable skin-forming varnish, peel film	200 ppm	200 ppm	Cleaning with an appropriate solvent obligatory
Paints – oils - waxes	200 ppm	**Molybdenum disulphide prohibited** (*)	

(*) In products of mineral petroleum origin, apart from additives, sulphur is present in the form of a chemical compound, which is stable under normal operating temperatures. If the conditions of use are compatible with the stability range of the product, it will not have a negative effect on the materials. Only the sulphurous form is prohibited.

Thorough drying of the metals, which are to be protected, is necessary before these products are applied.

SHEET 4

CATEGORY 4 – ANTI-GALLING, LUBRICATING OR UNJAMMING PRODUCTS FOR CONNECTIONS

Definition:

Liquids, oils, pastes, greases or aerosol sprays, which are used for threaded fasteners and bolting, the studs of the reactor vessel etc.

Product range:

- Unjamming/releasing agents;
- Lubricants;
- Sliding varnishes and coatings;
- Assembly pastes.

Specifications:

Products, which are made on a basis of molybdenum disulphide (MoS_2), are prohibited due to the considerable risks of stress corrosion of the stainless steels and the low alloy steels.

Admissible maximum contents:	Halogens (Cl + F + Br)	200 ppm
	Sulphur	200 ppm

SHEET 5

CATEGORY 5 – PLASTIC AND COMPOUND MATERIALS AND COMPOSITES

Definition:

All forms of plastic polymers and composites.

The compound products used for the rework or resurfacing of metal items are specified in category 15 (sheet 15).

The cable ducts and conduits for electrical wiring, the insulating cases for electric and electronic equipment and tools and materials, which are not in direct contact with the metal systems or coolants, are not subject to chemical specifications.

Product range:

- Wrapping materials of a temporary or permanent kind which are used to protect materials and equipment: Films, protective covers, air locks, seals, protections against contamination etc.
- Garbage bags;
- Protective clothing;
- Plastic materials used as components in tools and equipment, especially those for non-destructive testing;
- Permanently fixed signal plates or indicators;
- Compound materials and composites in the form of finished products (for example: various connections and assemblies).

Specifications:

Admissible maximum contents:	Halogens (Cl + F + Br)	1000 ppm
	Sulphur	1000 ppm

Soluble content (*):	Halogens (Cl + F + Br)	100 ppm
	Sulphur	100 ppm

(*) always associated with a maximum utilization temperature. This specification allows the use of halogenated plastics such as PVC (polyvinyl chloride). Under normal conditions of use (temperatures below 100°C) in a humid or dry environment, the PVC does not pose any pollution risks through the release of chloride ions (this must first be confirmed for each material by means of a leaching test). Deterioration of the material will occur at temperatures exceeding 250°C. Consequently, the use of PVC is permitted under the condition that the temperature limitations are complied with. In this regard it is **absolutely imperative** that all PVC films used directly on the piping in the course of maintenance operations are **completely removed** before the temperature is increased.

SHEET 6

CATEGORY 6 – ADHESIVE TAPES

Definition:

Adhesive tapes and adhesives which are used in direct contact with the metal systems/circuits.

Product range:

Tapes, which consist of a textile support base or plastic material with an adhesive coating and which are used for:

- the identification and marking of materials and equipment;
- the protection of materials and equipment;
- the attaching or fastening of protections made of plastic materials, wrappings, radiographic (X-ray) films etc.

Specifications:

Admissible maximum contents:	Halogens (Cl + F + Br)	1000 ppm
	Sulphur	1000 ppm

The adhesive materials must be removed completely (as well as any sticky residues) before the equipment they were used on can be put into operation and before the temperature can be increased.

Adhesive tapes of the kind used by electricians (insulating tape) are not part of the PMUPS control and they may only be used for this purpose.

SHEET 7

CATEGORY 7 – PRODUCTS USED TO FIND AND SEAL LEAKAGES

Definition:

- Products, which are used to find leaks and leakages (gas, liquids);
- Products, which are used to seal off leakages (thermosetting/heat-hardening pastes, sealing compounds and putty) and which remain in contact with the metals and/or fluids/coolants of the systems/circuits during their operation. Cryogenic products (ice plugs) belong to this category.

Specifications:

Admissible maximum contents:	Halogens (Cl + F + Br)	Sulphur
Detection of leakages	200 ppm	200 ppm
Sealing of leakages	1000 ppm	1000 ppm

The use of sealing products for leakages is prohibited on all installations of the primary system as well as in the safeguard and related safety and security systems and in the secondary part of the steam generators.

Cryogenic products:

Permissible products are carbon dioxide snow (dry ice) and liquid nitrogen. The specifications for the purity characteristics of the quality of additives must be approved by Chemistry before they can be utilized on any part of the plant.

SHEET 8

CATEGORY 8 – PRODUCTS USED FOR NON-DESTRUCTIVE TESTS

Definition:

Products, which are used to perform non-destructive tests.

Product range:

- Products used for penetration testing: Emulsifying agents, degreasing agents, coloured or fluorescent penetrants, developers;
- Ultrasound coupling products;
- Products for magnetic particle testing: bright fields, dark fields, fluorescent solution, solvents for bright ground/field, developers;
- Varnishes and moulding products for duplicates;
- Products used to test surface evenness;
- Products used beyond the usual tests and controls.

Plastic materials or composites which are part of the structure of the test equipment and which are used in direct contact with the metal surfaces of the systems/circuits or fluids, are subject to the chemical specifications of category 5: Plastic and Compound Materials and Composites (sheet 5).

Specifications:

Admissible maximum contents:	Halogens (Cl + F + Br)	Sulphur
Penetration tests	200 ppm	200 ppm
Coupling	200 ppm	200 ppm
Magnetic particle testing	200 ppm	200 ppm
Varnish and moulds for duplicates	1000 ppm	1000 ppm
Surface evenness tests	200 ppm	200 ppm
Products used beyond usual control	200 ppm	200 ppm

These products must be removed completely and no traces may remain on the treated surfaces before the temperature is increased or the equipment is put into operation.

The cleaning products used to achieve this must comply with the specifications in sheet 1.

SHEET 9

CATEGORY 9 – NON-METALLIC THERMAL INSULATION MADE OF GLASS FIBRE OR MINERAL FIBRE

Definition:

Non-metal heat insulation material made on a basis of glass fibre, rock fibre, glass or ceramic powder.

Product range:

Products in the form of:

- Blankets (reinforced or not reinforced with metal threads);
- Rolls;
- Panels;
- Packings;
- Insulation blocks and jackets
- Tissue.

Specifications:

Admissible maximum contents:	Halogens (Cl + F + Br)	600 ppm
	Sulphur	2000 ppm

The presence of silicate and sodium ions in the products, which are made of glass wool, promotes the inhibition of halogenated ions, which can be released by lixiviation (leaching) of the insulation material, bringing the pH to an alkaline level with regards to the corrosion of the stainless steel.

INSTALLATION PRECAUTIONS

The metal shells must be leak-proof in order to avoid the penetration of water by seepage or spraying. The connections between the shells must be welded in such a manner that they prevent the penetration of fluid seepage.

CHANGING OF THE INSULATION MATERIAL

In the case of accidental spraying or leakage, which results in the wetting of the insulation, the insulating material must be replaced with a new insulation product which complies with the specifications. Before this can be done, all systems/circuits will first have to be cleaned with

SED or SER demineralised water, especially in the case of spraying with borated water, or appropriate solvents which conform to the specifications of category 1 which must then be dried off before the new insulating material is installed.

To find out more about the prevention of corrosion under the insulation material or the proper measures to be taken in the case of accidental spraying, refer to the EDF "Recommendations Report" D. 4002-36-01 No. 93/8860 which was compiled by the Coordination Department in connection with the Park Affair AP 9202 "Corrosion under insulation material".

SHEET 10

CATEGORY 10 - ABRASIVES

Definition:

Non-metallic materials which are used for mechanical abrasion processes: Polishing, grinding, blasting, sand-blasting, lapping, sanding of metal surfaces.

Product range:

Abrasives are available in the following forms:

- solid: disks, cloth, sheets with a mixed structure: support base, abrasive and bonding material;
- pasty: lapping or honing paste;
- liquid: liquids containing abrasive corundum or diamond powder.

Specifications:

When stainless steel is being treated, only those abrasives may be used which leave the treated surfaces devoid of any halogens (Cl + F + Br), sulphur or ferrous pollutants (i.e. the abrasive must not have been used previously to treat surfaces made of cast iron, carbon or low alloy steel).

Abrasive materials, which are made of metal only, are not included in the PMUPS categories.

The support base and/or the bonding material used for the construction of the abrasive product must comply with the following specifications:

Admissible maximum contents:	Halogens (Cl + F + Br)	200 ppm
	Sulphur	200 ppm

These specifications do not apply for the use of such products on non-metals such as concrete, plaster, wood etc.

PRECAUTIONS

All traces of the abrasives and the resulting fragments must be removed from the treated surfaces by means of careful dusting and cleaning. Dipping/pickling and/or passivation may be necessary after the procedure.

Special precautions must be taken to avoid that fragments lodge in parts of the systems from where they would be difficult to remove.

SHEET 11

CATEGORY 11 – WATER

Definition:

Water used for cleaning and rinsing metal surfaces.

Specifications:

- Demineralised water, having the physico-chemical characteristics of Grade A water as defined in the annexe F IV of the RCC-M code.

The table below indicates the characteristics of demineralised water:

Parameter	Units	GRADE A Demineralised water
pH at 25°C (1)		6.0 to 8.0
Total conductivity at 25°C	µS/cm	<2
Chlorides	mg/kg	<0.15
Fluorides	mg/kg	<0.15
Sulphur	mg/kg	<0.15
Silica	mg/kg	<0.1
Suspended solids	mg/kg	<0.1
Turbidity	no cloudiness or deposits	

(1) Due to the potential carbonization of the water, a less restrictive pH value is permitted: pH = 5.5 to 8.0.

SHEET 12

CATEGORY 12 – COMPRESSED AIR

Definition:

The air used in the control systems, instruments and for certain specific uses such as the performance of helium test, for example.

Specifications:

This category is not subject to chemical specifications and the PMUPS control.

If necessary, a specification can be issued based on the specific function the air is used for.

SHEET 13

CATEGORY 13 – DESICCATION PRODUCTS

Definition:

Products used to absorb excess moisture in packing material or packages in order to avoid alteration of the contents, and also the products used in the air drying systems.

Product Range:

Products which are based on silica (gels) or aluminium silicates.

Specifications:

Desiccation products are not subject to the control of halogen or sulphur contents but must comply with the requirements listed in the following paragraphs in accordance with the French standard NF H 00-320 which governs dehydrating agents. This standard defines the measurement methods which are to be applied and the acceptance limits for the required criteria.

- Paragraph 7.1: Homogeneity of the granulometry;
- Paragraph 7.3: Absorption capacity;
- Paragraph 7.5: Water extraction capacity;
- Paragraph 7.6: pH;
- Paragraph 7.7: Reactivity and degradation;
- Paragraph 7.8: Corrosion test.

NB: This standard is equivalent to the military standard: GAM-EMB 01 H and DIN 55473.

The desiccation products are used in a bagged form (packed in packages which conform with the specifications listed in category 5). They may not come into direct contact with the surface of the material or system they protect.

The use of desiccants in sachets which are made on a basis of silica and aluminium are prohibited in the primary system. On the other hand, aluminium or aluminium silicates can be used in the dehydrating equipment and installations used for drying the operating or control air, treatment of the control fluid etc.

The design concept of the installation must make it possible to limit the risks of entrainment or carry-over of the particles by means of a suitable filtration system.

Mobile air drying equipment which uses lithium chloride is not subject to specifications. Special implementation procedures are required for its use in order to avoid the accidental release of the desiccants.

SHEET 14

CATEGORY 14 – MARKING PRODUCTS

Definition:

Products used to mark and identify metal items (during disassembly, dismounting, controls etc.).

Product range:

These products are available in the following form:

- Solid: Pens, chalk, crayons;
- Liquid: Ink or paint used in felt-tip pens, markers, tubes or other utensils.

Identification stickers and labels, which are in direct contact with the metal surface, are subject to the specifications of category 5: Plastic and Compound Materials and Composites.

Specifications:

Admissible maximum contents:	Halogens (Cl + F + Br)	200 ppm
	Sulphur	200 ppm

Soluble maximum contents	Halogens (Cl + F + Br)	200 ppm
for solid products:	Sulphur	200 ppm

Note: The specifications relate to the "active" parts of the marking tools, i.e. the ink, pencil lead etc. for which the analyses were carried out. With regards to the ink which is used in felt-tip pens etc., the analysis is valid for both the support and the ink when a separation of the two components is difficult.

Cleaning of the marked surfaces is recommended before the installations are put into service. The cleansing products used must comply with the specifications of category 1 (sheet 1).

SHEET 15

CATEGORY 15 – PAINTS AND COATING PRODUCTS

Definition:

Coating products with a permanent character used for the protection of metal surfaces.

Product range:

Paints, diluting agents, coatings, resins, bitumen, rust-inhibiting paint, strippable coatings.

Specifications:

The specifications for paints and coatings are contained in **331-170**.

It has been compiled according to the criteria listed in the table below:

Criteria	Not subject to specifications	Specification of 1000 ppm (halogens and sulphur)	Specification of 200 ppm (halogens and sulphur)
No risks of corrosion or pollution, e.g.: Building walls, office walls, concrete structures, plaster and wood.	X		
Risks of corrosion of the metal support or base, e.g.: External coating on the systems		X	
Risks of corrosion of the metal support or base and chemical pollution of the system coolants/fluids, e.g.: Internal coating on tanks.			X

The specification for permissible limits refers to the total or soluble content in halogens and sulphur.

The soluble content is obtained by means of a leaching (lixiviation) analysis which is performed by covering a metal plate test sample with the coating product while maintaining test conditions which are representative of the real conditions of use (test sample to be supplied by the manufacturer of the product). A complementary analysis about the behaviour of the coating

under different temperature conditions (thermal analysis) may be carried out in connection with the study of the soluble content.

The chemical specifications refer to the product in its ready-for-use state, i.e. if so required, after blending of its different components at the percentage ratios prescribed by the manufacturer, and to each colour tint with the same product reference.

If it is possible to use different percentages for the mixture, the specification will apply to the mixture which has the strongest ratio of halogens and sulphur.

COMPOUNDS FOR RESURFACING

This refers to products where the application procedure resembles that of certain paints, e.g. resurfacing products used to rework/recondition tools or parts etc. (e.g. resins containing metal).

These products do not appear in the National Paint Database but are subject to chemical specifications based on their destination code (table in annexe 1).

DRY-GALVANIZING PRODUCTS

These products are not subject to chemical specifications but must be used strictly in accordance with the manufacturer's instructions concerning their conditions of use. Their utilization and implementation is carried out according to written procedures which are integrated in a Quality Plan.

SHEET 16

CATEGORY 16 – GLUES

Definition:

Adhesive products used for temporary or permanent positioning of materials which are in contact with the metal systems.

Product range:

Basic or multi-compound glues.

Specifications:

Admissible maximum content:	Halogens (Cl + F + Br)	200 ppm
	Sulphur	200 ppm

The cleaning products, which are used to clean spillage or residues of these glues, must comply with the specifications in category 1 (sheet 1).

For multi-compound glues, the specification refers to the final product which was mixed according to the manufacturer's instructions.

SHEET 17

CATEGORY 17 – GASKETS AND PACKING SEALS

Definition:

Non-metal materials used to ensure static or dynamic leak tightness of the connections between metal components.

Product range:

Gaskets and seals made on the basis of polymers, graphite, natural fibres and which are available in the following forms:

- Solid: Packing or stuffing for packing seals, sheets, papers and fibrous material for flat gaskets which are ready for use, or which can be cut to size for O- ring gaskets or sealing lips.
- Pasty or liquid: Sealing paste, mastics and liquid sealing compounds.

Specifications:

Admissible maximum content:	Halogens (Cl + F + Br)	200 ppm
	Sulphur	200 ppm

Admissible soluble maximum content (*):	Halogens (Cl + F + Br)	200 ppm
	Sulphur	200 ppm

(*) always in connection with a maximum operating temperature.

The soluble content is obtained by means of a leaching (lixiviation) analysis on a sample specimen of the gasket or seal which is performed under conditions which are representative of the actual conditions of use (with an ambient temperature of up to 350°C). A complementary analysis about the behaviour of the material under different temperature conditions (thermal analysis) may be carried out in connection with the study of the soluble content.

SHEET 18

CATEGORY 18 – HYDRAULIC FLUIDS

Definition:

Industrial oils which are used in hydraulic systems.

Product range:

The classification of the products of this category is done in accordance with the ISO 6743/4 (or NFE 48-602) standard which defines their characteristics and application field.

Specifications:

Only the hydraulic fluids which are used in immersed machines or which are in contact with the primary coolant (MSDG: multistud tensioning machine for example) are subject to content limits for halogens and sulphur listed in the table below, independent of their ISO classification:

Sub-category No.	Use	ISO codes	Specifications	Special remarks
8	Hydraulic systems with mineral oils	LHM-LHV	Halogens < 200 ppm Sulphur < 200 ppm	
8	Hydraulic systems with aqueous bases	LHFA LHFC	Halogens < 200 ppm Sulphur < 200 ppm	
8	Hydraulic systems with ester-phosphates	LHFDR	Specification HN20S41	GFR system
12	Heat transfer, mineral oils or synthetic oils	LQ	Halogens < 200 ppm Sulphur < 200 ppm	
16	Cooling fluids for motors	-	Special specifications	Emergency diesel generator set

These products are not subject to content limits for halogens and sulphur when they are being used in other application fields. An example is the product type "Cooling fluids for motors" for the emergency diesel generator sets which are covered by special specifications (file P.4.12 of the chemical specifications for PWR power stations, reference No. D.5001/NRN/R84442).

For each product it is necessary to establish whether it is compatible with the systems it will be in contact with (if necessary, by means of prior testing) and whether the procedures implemented for its use ensure the protection of the adjoining material in the case of an incident (leakage, accidental discharge etc.).

SHEET 19

CATEGORY 19 – OILS, GREASES AND LUBRICANTS

Definition - Specifications:

The classification of the products of this category is done in accordance with the ISO 6743/0 (or NFT 60-162) standard, which defines their characteristics and application fields as shown in the table below:

Sub-category No.	Use	ISO codes	Specifications	Special remarks
1	Disposable lubricants	LA and LAN	Halogens < 200 ppm Sulphur not specified	
2	Gears	LC	Halogens < 200 ppm Sulphur not specified	
3	Air compressors	LD	Not subject to spec.	
4	Refrigerating machine compressors	LD	Not subject to spec.	
5	Internal combustion engines	LE	Not subject to spec.	
6	Pin bearings, bearings and clutches	LF	Not subject to spec.	
7	Sliding rails, glide bearings	LG	Not subject to spec.	
9	Machining fluids	LM	Halogens < 200 ppm Sulphur < 200 ppm	For the ready-for-use product, pure or diluted
10	Electrical insulation	LN	Specification HN27 S02	
11	Pneumatic tools	LP	Not subject to spec.	
13	Turbines	LT	Specification HN20 S30	Lubrication of turbines and primary pumps
14	Lubricants	LX	Halogens < 200 ppm Sulphur not specified	
15	Other applications	LY	Halogens < 200 ppm Sulphur < 200 ppm	

Products which contain molybdenum disulphide (MoS_2) are prohibited, no matter which category they belong to. For the subcategories 1, 2 and 14, which are subject to chemical homologation controls, the sulphur content must be evaluated even if the category itself is not subject to specifications.

SHEET 20

CATEGORY 20 – FUELS

Definition:

Fuels are subdivided into two categories:

- Fuels which are used for production: Uranium, fuel oil, coal;
- Others: Fuel oils used for the emergency diesel generators, combustion turbines, FOD of the auxiliary boilers.

Specifications:

Fuels are governed by the "Délégation Aux Combustibles" department, which handles the fuel and oil supplies and controls and ensures that these products comply with the specifications. These products are therefore not part of the PMUPS control.

- The specifications for the FOD, which is used for the emergency diesel generators, are compiled on sheet P. 5.4 of the document "Chemical Specifications for PWR Power Stations", reference No. D.5001/NRN/R84.442. This product is not subject to PMUPS control, but it is controlled by a Maintenance Order issued by the Maintenance Department, reference No. D.4002-42-53/DC97-273.

SHEET 21

CATEGORY 21 – CONDITIONING PRODUCTS

Definition:

Conditioning products are subdivided into two categories:

21.1 – The reagents used to condition the systems/circuits and the chemical products used for the water treatment (for example CRF injection acid).

21.3 – Ion exchange resins of nuclear quality.

Specifications:

These products are subject to special specifications, which are directly linked to their use and application field. These specifications are listed in the following documents:

ION EXCHANGE RESINS SPECIFICATIONS	SPECIFICATION TITLE
DSG-317-003	NUCLEAR GRADE ION EXCHANGE RESINS
DSG-317-009	INDUSTRIAL GRADE ION EXCHANGE AND ABSORBENT RESINS
BULK CHEMICAL SPECIFICATIONS	**SPECIFICATIONS TITLE**
DSG-313-002	LITHIUM HYDROXIDE (Li 7 OH)
DSG-313-005	BORIC ACID NUCLEAR GRADE
DSG-317-001	TRISODIUM PHOPHATE (NUCLEAR GRADE)
DSG-317-011	AMMONIA SOLUTION, CHEMICALLY PURE
DSG-317-012	FYRQUEL EHC ELECTRO-HYDRAULIC CONTROL FLUID
DSG-317-031	AMMONIA SOLUTION 25%
DSG-317-047	SULPHURIC ACID – INDUSTRIAL GRADE
DSG-317-076	ANTIFREEZE RADIATOR COOLANT
DSG-317-090	MONOETHANOLAMINE
DSG-317-096	PLANT CHEMICALS
DSG-313-001	CATALYSED 100% HYDRAZINE HYDRATE / 64%HYDRAZINE

Chemical products, which are used in the laboratories for analytical purposes, laboratory samples, the developing reagents for photographic films for industrial radiography etc. are not subjected to the PMUPS control.

SHEET 22

CATEGORY 22 – WELDING PRODUCTS AND RELATED COATINGS

Definition:

Products used for welding operations (for example welding rods, coated electrodes), as additives (for example flux and etching pastes, passivation agents), enclosing products for protection at the back of the argon welding area (soluble paper, elastomer foam), coating products, buttering which requires an energy supply.

Specifications:

- Soluble papers are subject to the following specifications:

Admissible total maximum content:	Halogens (Cl + F + Br)	200 ppm
	Sulphur	200 ppm

- Non-soluble enclosing products (foams, plugs) are subject to the following specifications:

Admissible soluble maximum content:	Halogens (Cl + F + Br)	200 ppm
	Sulphur	200 ppm

- Additives like flux and passivation agents, which are based on acid, are not subject to chemical specifications but they must be controlled by strict implementation procedures which include final rinsing routines which ensure that they are completely eliminated before the installations are put back into operation. The pH and the conductivity of the rinsing water must be checked. Etching products or fluxes in the form of pastes or gels are not recommended as they are difficult to remove by rinsing. They are, however, allowed if the application of liquid solutions is technically difficult or impossible. In this case it is important to take particular care with the rinsing procedures.
- Coating and buttering products are not subject to specifications.
- Welding rods and electrodes are not subject to specifications. All croppings and remains must be picked up and removed completely.

SHEET 23

CATEGORY 23 – PESTICIDES

Definition:

Chemical products used to combat animal or plant parasites (insecticides, rat poison, herbicides, defoliants etc.)

Specifications:

Only the products used in the NAB and RB containment area are subject to specifications.

Depending on their texture, the specifications for the products are as follows:

Texture	Total content of halogens Cl + F + Br in ppm	Total content of sulphur S in ppm
Solid products Granules – Powders	< 1000	< 1000
Liquid products Aerosol sprays or distributed by atomization	< 200	< 200

SHEET 24

CATEGORY 24 – FIRE FIGHTING PRODUCTS

Definition:

Products used for the detection, non-propagation and extinction of fires.

Product range:

- Extinction products: In the form of liquids, powders, foams etc. contained in fire extinguishers.
- Detection products: Smoke-producing product
- Products for non-propagation of fires: Fire strips for cable ducts/cable penetration, piping penetration, fire breaks or fire-retardant material.

Specifications:

The only products, which are subject to PMUPS chemical specifications, are those used for fire-proofing mechanical penetrations made of metal.

This includes the following product categories in their different physical forms:

- Ceramic and mineral fibres.

Admissible maximum content for the total of halogens (chlorine + fluorine + bromine): 600 ppm.

Admissible maximum content for the total of sulphur: 2000 ppm.

- Elastomers, mastics, silicon foams, paints, coatings and related products.

Admissible maximum content for the total of halogens (chlorine + fluorine + bromine): 1000 ppm.

Admissible maximum content for the total of sulphur: 2000 ppm.

Soluble content: 200 ppm of halogens and sulphur (in connection with the maximum operating temperature)

- Fire-retardant mortar and plaster.

Admissible maximum content for the total of halogens (chlorine + fluorine + bromine): 200 ppm.

No limitation for sulphur in the form of sulphates.

Presence of sulphides in the composition prohibited.

Soluble content: 200 ppm of halogens and sulphur (in connection with the maximum operating temperature).

Use demineralised Grade A water for the preparation of these products (sheet 11).

- Extinction products: They may not contain halogenated and sulphurous components in their composition.

The other product categories that are not subject to chemical specifications:

- Products for composite mechanical penetrations;
- Fire doors and related equipment.
- Products for electrical penetrations;
- Products for fire detection.

SUMMARY TABLE OF THE CHEMICAL SPECIFICATIONS PER CATEGORY

Group	Heading	Types of products	Admissible maximum content	
			Halogens in ppm	Sulphur in ppm
1.	Cleaning Products	Aqueous solutions Volatile Solvents Absorbing – dispersing agents Passivation products Wipes or cloths used on Stainless Steel	10* 200 200 (soluble) No spec**** 50 ppm	10* 200 200 (soluble) No spec**** 50 ppm.
2.	Products and materials used for decontamination	Chemical products Aqueous solutions Volatile solutions Laundry products Stripping – Passivation – descaling agents Materials for mechanical processes	10* 200 30 (after dilution) No spec**** No spec**** 200	10* 200 30 (after dilution) No spec**** No spec**** 200
3.	Products and materials for temporary protection	Varnish Oils – waxes – paints	200 200	200 MoS_2 prohibited
4.	Bolting and assembling products	Unjamming agents – lubricants Gliding varnish	200	200 MoS_2 prohibited
5.	Plastic and compound materials and composites	Plastics – resin compounds	1000 100 (soluble)	1000 100 (soluble)
6.	Adhesive products	Tapes – Adhesives	1000	1000
7.	Products for leak detection and sealing	Leak detection Sealing products	200 1000	200 1000
8.	Products for non-destructive tests and controls	For penetration tests, magnetic particle testing, Ultrasound coupling Moulds, varnishes for duplication	200 200 1000	200 200 1000
9.	Non-metal thermal insulation	Glass fibre, rock fibre Power products, glass tissue Ceramic wool	600	2000
10.	Abrasives (Non metalic)	Solids – pastes – powders – liquids Related Products	200	200
11.	Water	Demineralised Water	150 ppb	150 ppb
12.	Compressed Air	Control air, drying air	No spec****	No spec****
13.	Desiccation products	Silica gels – aluminium silicates	No spec****	No spec****

Group	Heading	Types of products	Admissible maximum content	
			Halogens in ppm	Sulphur in ppm
14.	Marking Products	Paints – markers – pens – chalks Solids products	200 200 (soluble)	200 200 (soluble)
15.	Paints and Coating Products	Paints Coatings Anti-rust Bitumen Resins	331-170 331-170 ***	331-170 331-170 ***
16.	Glues	Basic – compound glues – related products	200	200
17.	Gaskets and packing seals	Solid– pre-shaped - liquid -pastes	200 200 (soluble)	200 200 (soluble)
18.	Hydraulic fluids (Codification ISO 6743/4)	Hydraulic systems Heat transfer Cooling liquids/coolants Control – ester phosphates	200 if used in the primary system No. Spec****	200 if used in the primary system No. Spec****
19.	Oils and Greases Codification ISO 6743/0 **Limits for Polychlorinated Biphenyls (PCBs) in oil ≤ 50 ppm**	Disposable lubricant Gears Compressors Refrigerating machine compressors Internal combustion engines Pen bearings, bearings, clutches Gliding rails, bearings Machining work on metals Electrical insulation Pneumatic tools Turbines and primary pumps Greases Other applications	200 200 No. Spec**** No. Spec**** No. Spec**** No. Spec**** No. Spec**** 200 No. Spec**** No. Spec**** See DSG-317-093 Rev1 200 200	No. Spec**** No. Spec**** No. Spec **** No. Spec **** No. Spec**** No. Spec**** No. Spec**** 200 No. Spec**** No. Spec**** See DSG-317-093 Rev 1 No. Spec**** 200
20.	Fuels	Motor – boiler	No. Spec****	No. Spec****
21.	Chemical Conditioning Products	Chemical conditioning agents Ion exchange resins	Special Spec. List on the spec sheet	Special Spec. List on the spec sheet
22.	Welding and related coating products	Flux and passivation agents Welding – rework/recoating Soluble paper Enclosing products. (Foams, plugs)	No. Spec**** No. Spec**** 200 200 (soluble)	No. Spec**** No. Spec**** 200 200 (soluble)
23.	Pesticides	Liquid Products Solid Products	* 200 if used in RB * 1000 if used in RB	* 200 if used in RB * 1000 if used in RB
24.	Fire-fighting products	Extinction, detection Mechanical penetrations depending on products	No. Spec**** 200 to 1000	No. Spec**** 200 to 1000
25.	Electronic Products	Cleaners, Varnishes, Lubricants, Fault finders	No. Spec****	No. Spec****
26.	Civil Works	Cements, epoxies, grouts, joint sealants	**No Spec****	**No Spec****

*** RB – Reactor Building, NAB – Nuclear Auxiliary Building**

**** This group of products applies to construction materials that are not directly in contact with a system or process.**

***** According to applications as defined in KSA-106, and maximum Halogen and Sulphur content as specified in Eskom purchase order.**

******No specific requirements for KNPS. Normal Industrial Standards are satisfactory.**