Eskom	STANDARD	NUCLEAR ENGINEERING

Title: **Nuclear Specification Standard**

Document Identifier: **331-165**

Alternative Reference Number: **KSA-016**

Area of Applicability: **Nuclear Engineering**

Functional Area: **Engineering**

Revision: **2**

Total Pages: **13**

Next Review Date: **December 2023**

Disclosure Classification: **Controlled Disclosure**

Compiled by	Supported by	Functional Responsibility	Authorized by
			Signed by: Ravid Goldstein Signed at: 2020-12-07 08:32:41 +02:00 Reason: I approve this document
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Date: 2020-12-02	Date: 2020-12-02	Date: 2020-12-03	Date: 2020-12-07

.Nuclear Additional Classification Information

Business Level:	**3**
Working Document:	**3**
Importance Classification:	**CSR (S11306)**
NNR Approval:	**N/A**
Safety Committee Approval:	**N/A**
ALARA Review:	**N/A**
Functional Control Area:	**Design Engineering**

Content

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1. Introduction

This standard is to establish good practices and provide guidance for preparers preparing specifications to ensure that a uniform approach is used, that all the requirements are covered, and that the layout is uniform and standard.

2. Supporting Clauses

2.1 Scope

This document specifies the requirements, principles and responsibilities for establishing and managing the engineering specifications for the Koeberg Operating Unit, and applies to the following types of specifications:

- The procurement of equipment or services;
- The manufacture or repair of equipment.

2.1.1 Purpose

To establish the requirements for preparing specifications used at Koeberg Operating Unit. It is intended to:

- Establish good practices for the content of specifications used for nuclear power plants;
- Be applicable to a wide range of specifications used for the procurement of equipment or services, and for manufacture or repair of equipment;
- Provide guidance to specification preparers and reviewers.

2.1.2 Applicability

This document is applicable to all types of engineering specifications, excluding User Requirement Specifications (URS) for modifications, and Technical Requirement Specifications (TRS) for designs, and shall apply throughout Nuclear Engineering.

2.1.3 Effective date

Same as authorisation date.

2.2 Normative/Informative References

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

[1] ISO 9001 Quality Management Systems;

[2] IEEE Std 323: IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations;

[3] IEEE Std 344: IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations;

[4] ASME NQA-1: Quality Assurance Requirements for Nuclear Facility Applications;

[5] ASME III NB: ASME Boiler and Pressure Vessel Code Division 1 – Subsection NB Class 1 Components;

[6] ASME III NC: ASME Boiler and Pressure Vessel Code Division 1 – Subsection NC Class 2 Components;

[7] ASME III ND: ASME Boiler and Pressure Vessel Code Division 1 – Subsection ND Class 3 Components;

[8] RD-0034: Quality and Safety Management Requirements for Nuclear Installations;

[9] 238-101: Nuclear Division Nuclear Supplier Safety and Quality Management Requirements;

[10] 331-298: Procurement Specification template;

[11] 331-93: Guide for the Classification of Plant Components, Structures and Parts;

[12] 32-4: Document Template for Procedures, Standards, Work instructions, Guidelines, etc;

[13] 331-3: Nuclear Engineering Documentation and Records ManagementInstruction.

2.2.2 Informative

[14] EPRI NP-5638: Guidelines for Preparing Specifications for Nuclear Power Plants;

[15] IEEE 100: The Authoritative Dictionary of IEEE Standards Terms Seventh Edition;

[16] KSA-101: Software Requirement Specifications.

2.3 Definitions

2.3.1 Appropriate Experience: Experience in the field relevant to the subject of the Specification.

2.3.2 Approver: An authorised person of appropriate competence and seniority who ensures that controlled documents have been processed correctly.

2.3.3 Certificate of Conformance (C.O.C): A document certified by a competent authority that the supplied goods or service meets the required specifications. It is also called a certificate of compliance, or a certificate of conformity.

2.3.4 Certificate of Interchangeability (C.O.I.): A certificate supplied by the OEM and signed by the OEM QA manager, stating that the proposed item is equivalent to the original.

2.3.5 Compiler: An authorised person who is competent and takes responsibility for compiling documents.

2.3.6 Controlled Disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.3.7 Environmental Qualification: A rigorous demonstration of the equipment to withstand harsh and mild environments subjected to extreme temperatures and pressures, humidity, chemical effects, radiation and aging.

2.3.8 Equipment: Any plant component or part.

2.3.9 Harsh Environment: An environment resulting from a design basis event, i.e., loss-of-coolant accident (LOCA), high-energy line break (HELB), and main steam line break (MSLB).

2.3.10 Item: Any piece of plant equipment.

2.3.11 Interchangeability/Equivalency: An item is considered interchangeable or equivalent if it can replace another item in an installation without a modification being required, and if it can perform the same function after installation as the replaced item.

2.3.12 Mild Environment: An environment that would at no time be significantly more severe than the environment that would occur during normal plant operation, including anticipated operational occurrences.

2.3.13 Nuclear Experience: Experience in the design, constructing, testing, commissioning, operation or maintenance of nuclear power plants or other nuclear facilities i.e., research and military reactors or power reactor simulators.

2.3.14 Procurement Specification: A specification referencing other specifications, codes, standards, and detailing the certification requirements. This is normally used for the procurement of items with Q3, Q2 or Q1 quality assurance requirements.

2.3.15 Reviewer: An authorised person who is technically competent and takes responsibility for reviewing the technical contents of documents.

2.3.16 Software: Any set of instructions, processed by a digital computing device.

2.3.17 Subject Matter Expert: An expert in a particular area or on a specific subject.

2.4 Abbreviations

Abbreviation	Explanation
ASME	American Society of Mechanical Engineers
COC	Certificate of Conformance
COI	Certificate of Interchangeability
EPRI	Electrical Power Research Institute
EQ	Environmental Qualification
IEEE	The Institute of Electrical and Electronics Engineers, Inc.
KOU	Koeberg Operating Unit
NE	Nuclear Engineering
OE	Operating Experience
OEM	Original Equipment Manufacturer
OES	Original Equipment Supplier
PEG	Procurement Engineering Group
SAP	System Application Products
SAR	Koeberg Safety Analysis Report
SEG	Specification Engineering Group
SME	Subject Matter Expert

2.5 Roles and Responsibilities

The Functional Responsible Person shall ensure that the latest version of this document is adhered to.

2.6 Process for Monitoring

This document shall undergo a full revision every 3 years or amendments as is necessary.

2.7 Related/Supporting Documents

[1] 331-32: Specification Template.

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3. Requirements

3.1 General requirements

3.1.1 The authorised Compiler of a specification shall decide on the content of the specification and verify its technical accuracy.

3.1.2 The authorised Reviewer shall verify the technical accuracy of the specification. He/she must not have participated in the compilation of the specification.

3.1.3 The Approver shall ensure that the specification has been processed correctly and is ready for implementation.

3.1.4 Eskom-wide specifications shall be used where applicable. Nuclear specifications are generated only if no suitable Eskom-wide specification is available.

3.1.5 Wherever possible, specifications shall be written to use South African standards and codes.

3.1.6 Applicable requirements and constraints (provisions, tests, prohibitions and records) of the Occupational Health and Safety Act (latest edition) shall be included or referenced in the specification.

3.1.7 Specifications shall include all design and test conditions established explicitly or implicitly by the SAR or by any other conditions of licence or other statutory regulations.

3.1.8 A copy of the specification shall be attached to the purchase documents.

3.1.9 A copy of the repair specification shall be attached to the purchase documents and a copy shall be forwarded to the Eskom person responsible for the control of the repair.

3.1.10 Specifications shall be given a unique number, and shall be controlled for issue.

3.2 Preparation of Specification

3.2.1 Introduction

The introduction shall briefly explain why the specification is necessary. The introduction should not contain requirements.

3.2.2 Scope

The scope clause shall define the extent and limitations of the subject matter addressed by the specification. The scope clause shall identify inclusions, exclusions, applications, limits, ranges and any other relevant restrictions so that the usefulness can be readily understood and misinterpretations prevented. The scope clause shall be concise and complete.

3.2.3 Purpose

Give a clear, concise statement explaining the specific aim of the specification and why this specification is necessary.

3.2.4 Applicability

Describe to whom the specification applies. Unless identified to the contrary, the following statement is relevant:

This specification shall apply throughout Nuclear Engineering.

3.2.5 References

Normative references, which should include the applicable codes and standards, shall be stated as such and shall be referenced within the body of the specification.

Informative references shall be included to aid the user of the specification.

3.2.6 Definitions and Abbreviations

Include all definitions applicable to the specification, numbered and in alphabetical order. Explain all terms used, including documents, titles and departmental references that may cause confusion if not explained. Preferably use definitions listed in international standards.

3.3 Procurement Specification

The Procurement Specification Template 331-298 is to be used which shall include the following:

3.4 Design Requirements

3.4.1 Interface

- This section shall be used to specify instructions to ensure that equipment will interconnect with existing plant structures or equipment;
- The interface section shall be kept general and the specific information placed in an attachment or appendix.

3.4.2 Service Conditions

- Normal Environmental Conditions – This section shall include all operating conditions to be considered such as hazardous locations (Ex), ambient temperature, pressure, wind speed, humidity, dust and noise levels, nuclear and electromagnetic radiation, flow and fluid types, etc;
- Design Conditions – This section shall include design parameters such as maximum temperature and pressure;
- Operating Conditions – This section shall include the normal operating parameters such as temperature and pressure.

Accident Conditions – Conditions in these sections shall be reserved for specific events accident conditions.

3.4.3 Characteristics

This section shall list the requirements to ensure quality consistency for components and parts, to maintain the original standard of the plant.

3.4.4 Reliability

This section shall list the probability of a device performing its purpose adequately for the period of time intended under the operating conditions encountered.

3.4.5 Maintainability

- An item shall be considered maintainable if it can be serviced or repaired for considerably less cost than would be required for the manufacture of a new item;
- Ideally, all maintenance should be able to be performed with the item left installed. If the ideal situation is not attainable, the next choice shall be to minimise down time by having the item replaced with a new or rebuilt spare.

3.4.6 Construction Design

- General Design Principles – All local/international standards and Contractor/Eskom classifications applicable to the specification shall be mentioned;
- Overall Requirements – This section shall be used only if a total system or equipment specification is being considered. Safety and workmanship shall be dealt with here;
- Sub-Assembly Requirements – This section shall list the general and specific design and construction requirements for components or parts of a total piece of equipment. Included are such items as interchangeability, material specifications and human engineering or ergonomics.

3.4.7 Functional or Operating Requirements

This section shall detail desired operating parameters and limitations to be imposed.

3.5 Manufacturing Requirements

3.5.1 Physical requirements or restrictions shall be noted here.

3.5.2 Overall construction requirements shall be noted here. This section is used only if a total system or equipment is manufactured.

3.5.3 Sub-assembly construction requirements such as material specifications, manufacturing methods and restrictions shall be noted here. This section shall also detail how to mark and identify components and component parts.

3.5.4 The applicable codes and standards used for construction shall be noted here.

3.5.5 Verification and test

- Each verification or test shall be the subject of a separate paragraph;

- A test method, code or standard shall be referenced or will be explicitly contained in the specification. Acceptance criteria shall be contained in the method, code or standard or shall be stated in the specification.

3.5.6 Results of tests shall be submitted as part of the Quality Assurance Data Package (QADP).

3.6 Engineering Quality Requirements

3.6.1 Quality requirements shall match the equipment classification.

3.6.2 If specific process control is required, it shall be listed in this section.

3.6.3 EQ requirements to be listed for equipment classified as 1E and/or as environmental 2, 3 or 4.

3.6.4 The specific technical control documents to be reviewed, shall be listed and approved before the start of manufacturing.

3.6.5 A list of quality data to be submitted to Eskom shall be included.

3.6.6 The QA programme shall be contained in the purchase order and referenced in this section.

3.7 Training

The level of competence, education level and/or other training requirements of the users/operators, if applicable, shall be stated here.

3.8 Documentation

3.8.1 The documents which shall be supplied, such as drawings, manuals, and instructions, shall be listed. This shall not include documents that are covered by the QA requirements.

3.8.2 All relevant EQ test reports shall be supplied.

NOTE: An Eskom title block shall appear on all drawings.

3.9 Packaging and Shipping

This section shall detail the type of packaging, handling and shipment requirements.

3.10 Appendices

Appendices shall be used for lists, data tables, methods, drawings, procedures, etc. that are referred to in the specification.

3.11 Revision Information Page

Latest revised paragraphs shall be indicated by a bar line in the margin.

4. Acceptance

This document has been seen and accepted by:

Name	Designation
L Thomas	SE Manager (Acting)

5. Revisions

Date	Rev.	Compiler	Remarks
December 2020	2	N Gcesengana	Updated document importance classification as a result of audit finding. Transferred document to the latest template.
September 2019	1	SL Swartz	Review date change. Transferred document to latest template.
September 2016	0	PN Clark	Original Document

6. Development Team

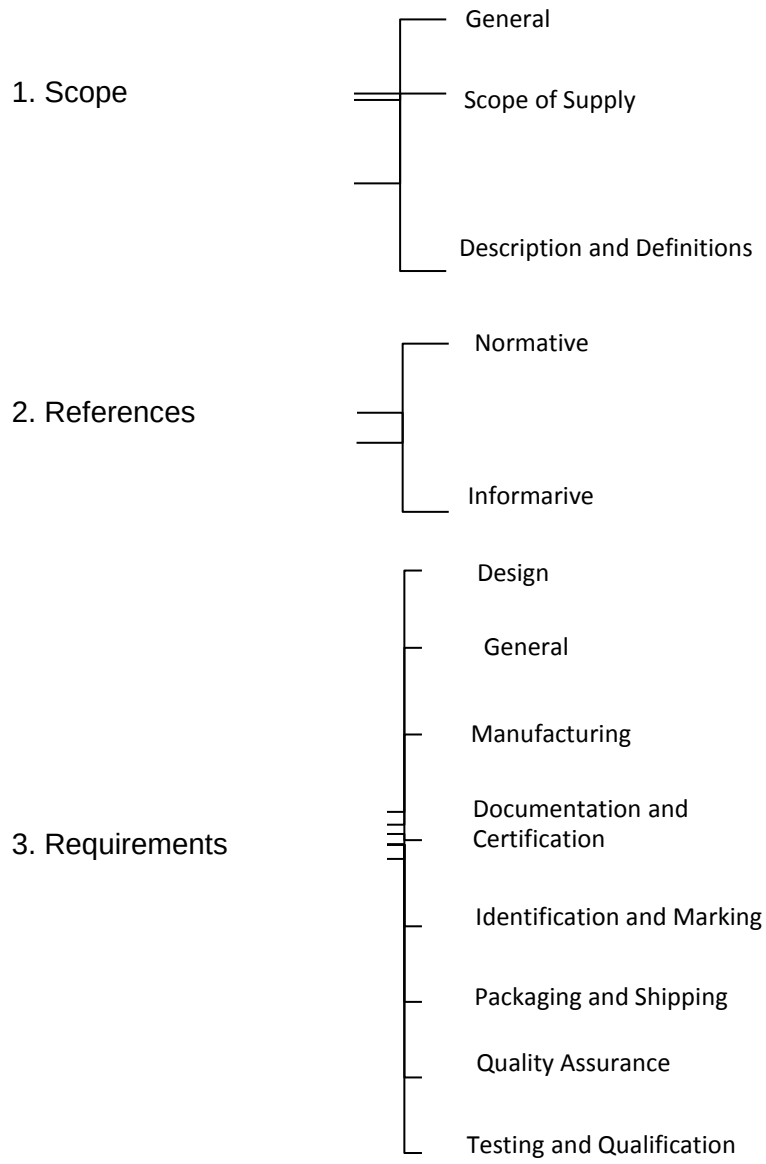
The following people were involved in the development of this document:

- N Gcesengana
- S Swartz

7. Acknowledgements

None.

Appendix A – Layout format for technical specifications (Contents)



4. Acceptance
5. Revisions
6. Development Team
7. Acknowledgements

Appendices

Note: *This is a typical general layout of topics to be covered in a Technical Specification but the subheadings may vary according to specific requirements.*