| Eskom | Specification | Generation Engineering |
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Title: **Specification for Industrial Gases for Various Eskom Sites**

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# 1. INTRODUCTION

This document entails general specifications in order for Eskom to establish long term national supply agreements for the supply, delivery and off-loading of industrial bottled and bulk gas to various sites.

Specific requirements are contained within SAP Material Master data.

# 2. SUPPORTING CLAUSES

## 2.1 SCOPE

### 2.1.1 Purpose

The purpose of this document is to consolidate and standardize bottled and bulk gas requirements across various Eskom sites.

### 2.1.2 Applicability

This document shall apply throughout Eskom Holdings SOC Limited and all relevant gas suppliers for various Eskom sites. These sites include Arnot, Camden, Duvha, Grootvlei, Hendrina, Kendal, Komati, Kriel, Kusile, Lethabo, Majuba, Matimba, Matla, Medupi, Tutuka and Peaking.

## 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] Occupational Health and Safety Act 85 of 1993.

[2] 240-83539994, Standard for Non-Destructive Testing (NDT) on Eskom Plant

[3] 240-106628253, Standard for Welding Requirements on Eskom Plant

[4] 240-150642762, Generation Plant Safety Regulations

[5] SANS 532, Standards and specifications for industrial, medical, propellant, food and beverage gases refrigerants and breathing gases.

[6] SANS 1774, Liquefied petroleum gases.

[7] SANS 10019, Transportable pressure receptacles for compressed, dissolved and liquefied gases-Basic design, manufacture, use and maintenance.

[8] SANS 10087, The handling, storage, distribution and maintenance of liquefied petroleum gas in domestic, commercial, and industrial installations

[9] IEC 60376, Specification of technical grade sulphur hexafluoride (SF6) and complementary gases to be used in its mixture for use in electrical equipment

[10] ISO 14175, Welding consumables — Gases and gas mixtures for fusion welding and allied processes

[11] ISO 17025, General requirements for the competence of testing and calibration laboratories.

### 2.3 DEFINITIONS

The terminology used in this specification is aligned for use with the NEC Term Services Contract conditions of contract.

#### 2.3.1 Classification

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

### 2.4 ABBREVIATIONS

| Abbreviation | Description |
|---|---|
| ISO | International Standard Organization |
| LPG | Liquefied Petroleum Gases |
| RT&D | Research, Testing and Development |
| SANAS | South African National Accreditation System |
| SANS | South African National Standard |

### 2.5 ROLES AND RESPONSIBILITIES

Personnel at the various Eskom sites and those involved in the supply, delivery and off-loading of gases, must ensure that the gases are compliant with the provisions of this specification and the SAP Material Master Data.

Each site (e.g., power station manager, site manager etc.) are responsible for the correctness of the SAP Material Master Data for the gases used at the site.

### 2.6 PROCESS FOR MONITORING

Eskom shall ensure regular analysis of gas qualities is conducted to verify compliance to the specification. Gas laboratory tests may be conducted by Eskom site chemical laboratories, Research, Testing and Development (RT&D) in Rosherville or and by SANAS accredited laboratories.

## 3. INDUSTRIAL AND LIQUEFIED PETROLEUM GAS SPECIFICATION

The *Employer* uses SAP as a procurement and inventory management tool. The details of each gas (Composition, purity, supply quantity, etc.) are specified in SAP Material Master data. Refer to Annexure 1 for examples.

It is accepted that slight deviations in packaging (weight, volume, pressurization, etc.) exist and therefore *Contractor* may provide options that slightly deviate from the requirements in the SAP Material Master database. The *Contractor* obtains acceptance of any deviations to the requirements in SAP Material master data before delivery.

### 3.1 GAS QUALITY

Industrial, medical, propellant, food and beverage gases, refrigerants and breathing gases comply with SANS 532 – Standards and Specifications for industrial, medical, propellant, food and beverage, refrigerants and breathing gases.

Liquid Petroleum Gas comply with SANS 1774, Liquefied petroleum gases.

Gasses used in electrical components comply with IEC 60376, Specification of technical grade sulphur hexafluoride (SF6) and complementary gases to be used in its mixture for use in electrical components.

Gasses used for fusion welding and allied process comply with ISO 14175, Welding consumables — Gases and gas mixtures for fusion welding and allied processes.

High purity gases, and specialised mixed gases comply to the requirements contained in the SAP Material Master database.

The gas composition must be verified through gas measuring instrumentation calibrated by a SANAS approved provider or equivalent international independent laboratory.

### 3.2 GAS CYLINDER

Cylinders are leased to the *Employer* for the period of use.

Cylinders comply with SANS 10019.

### 3.3 BULK GAS VESSEL AND SUPPLY REQUIREMENTS

The following Eskom sites require bulk quantities of LPG gas to be supplied; Duvha, Kendal, Lethabo, Majuba, Matimba, Matla, Tutuka, Medupi and Kusile Power Stations. Refer to Annexure 2 for the current vessel capacities unless specified in the Service Information.

#### 3.3.1 Vessels owned by the *Employer*

##### 3.3.1.1 Inspections

The *Contractor* performs an inspection of the vessel and associated components before the first delivery to confirm compliance to SANS 10087 and the OHS act. The *Contractor* submits a report to the *Service Manager* for acceptance.

The *Contractor* performs regular inspections on the vessel and associated components and notifies the *Service Manager* of any non-compliances.

The *Contractor* performs a final inspection after the last filling operation.

The inspections include a review of the site maintenance records, where available.

The *Contractor* maintains a data book with all the inspection reports and filling records. The data book is submitted to the *Service Manager* on completion of the contract.

The *Contractor* submits an inspection plan to the *Service Manager* for acceptance.

The *Contractor* submits recommended maintenance plans to the *Service Manager*.

The *Contractor* complies with the Generation Plant Safety Regulations (240-150642762).

##### 3.3.1.2 Maintenance

The *Contractor* performs maintenance vessel and associated components when instructed by the *Service Manager*. The maintenance activities are based on the maintenance plan submitted by the *Contractor* and where available the risk based inspection assessment conducted by the *Employer*. The maintenance activities may include:

- Internal inspections.
- Non-Destructive Testing.
- Performance testing.
- Statutory inspections in accordance with the Pressure Equipment Regulations.
- Repairs to storage vessel.
- Certification of vessels and safety valve.
- Repair of components (including piping and instrumentation).
- Refurbishment of components (including piping and instrumentation).
- Replacement of components (including piping and instrumentation).
- Calibration and certification of instrumentation.
- Installation of plant codification labels.

The *Contractor* may be instructed to participate in the *Employer's* Risk Based Inspection Assessment.

The *Contractor* maintains a data book with all the maintenance records performed by the *Contractor*. The data book is submitted to the *Service Manager* on completion of the contract.

The *Contractor* complies with:

- 240-83539994, Standard for Non-Destructive Testing (NDT) on Eskom Plant
- 240-106628253, Standard for Welding Requirements on Eskom Plant
- 240-150642762, Generation Plant Safety Regulations.

### 3.3.2 Vessels provided by the *Contractor*

The *Contractor* provides the bulk storage vessels and associated components for the duration of the contract for all sites where the *Employer* does not own the permanently installed vessel. The *Contractor* is responsible for all costs associated with the manufacturing, installation compliance to local requirements and maintenance of the vessels. *Employer* will pay the rental costs only. Specific requirements of the vessel for each site are to be verified prior to the supply and installation on site.

The *Contractor* provided all components including instrumentation for a fully functional gas storage vessel system to each site that includes:

- Isolation valves.
- Safety valves.
- Pressure regulating/control valves that meet the specific requirements of each site.
- Single or dual fuel outlet manifolds as required by each individual site.
- Gas offloading valves for road tankers.
- Drain valves.
- Vessel changeover manifold with valves for temporary cylinder supply during vessel maintenance etc.
- Local and remote pressure indication.

- Local and remote level indication.
- Vaporizers.
- Vents.
- Vessel earthing and earthing strap for unloading trucks.
- Integrating pipework from vessel to existing Eskom battery limit in the area.

The vessel is located within existing demarcated areas for LPG vessels at each site.

Each vessel is supplied with a fence and gate for access control. Existing fences if available can be used if adequate.

Horizontal or vertical vessels can be supplied taking site area limitations into consideration.

Where applicable the vessel is installed within the existing framework of fire systems. If an existing fire system is not provided adequate fire extinguishers are provided with the installation.

The vessel installations comply to the Pressure Equipment Regulations and SANS 10087. This includes, issuing a Certificate of Compliance for the installation, pressure tests, maintenance, and any other statutory requirements. All costs associated with the compliance to any national requirement are for the account of the *Contractor* throughout the rental period.

The *Contractor* submits an inspection and maintenance plan for acceptance.

The *Contractor* submits a detailed installation, commission and testing program to the *Service Manager* for acceptance prior to the commencement of the activities.

The *Contractor* complies with the Generation Plant Safety Regulations (240-150642762).

Vessels are sized according to the current installations at each site. If the exact size is not available, the *Contractor* may include sizes close to it for consideration.

### 3.4 INFORMATION TO BE SUPPLIED WITH EACH DELIVERY

The *Contractor* provides the following information to the *Employer's* representative at delivery:

- SAP material number and short description.
- Name or classification of the gas.
- Standard to which the gas conforms.
- Composition of gas cylinder - (including a test certificate/certificate of compliance detailing the composition of the gas).
- Volumetric capacity, filling pressure and gas weight.
- Material safety data sheet.
- Statement that the cylinder conforms to the requirements of SANS 10019.
- Details of any accepted deviations to the requirements in SAP Material master data.
- Individual cylinder or multi cylinder pack identification, to be recorded during delivery and collection on/from site.

### 3.5 COMPLIANCE AND ACCREDITATION

- Compliance to the Occupational Health and Safety Act 85 of 1993.
- Testing laboratories complies with ISO 17025 and are accredited by SANAS.
- All road vehicles entering Eskom sites comply to the national road traffic act. Vehicles not complying will be refused entry.

Authorisation

## 4. THIS DOCUMENT HAS BEEN SEEN AND ACCEPTED BY:

| Name | Designation |
|---|---|
| Manie van Staden | Senior Consultant Engineering |
| Felix Bosch | Generation Engineering Documentation Manager |

## 5. REVISIONS

| Date | Rev. | Compiler | Remarks |
|---|---|---|---|
| July 2015 | 0.1 | L. Nkunjana | First draft for review process |
| January 2016 | 1 | L. Nkunjana | Final Rev 1 for Authorisation and Publication |
| February 2018 | 2 | W. Cilliers | Final Rev 1 for Authorisation and Publication |
| January 2024 | 2.1 | J. Strydom | General revision, reference to SAP Material Master data |
| July 2024 | 2.2 | J. Strydom | Final Draft after Comments Review Process |
| July 2024 | 3 | J. Strydom | Final Rev 3 Document for Authorisation and Publication |

## ANNEXURE 1: EXAMPLES OF SAP MATERIAL MASTER DATA

| SAP NUMBER | Short Format Description | Purchase Order Description | Base UOM |
|---|---|---|---|
| 213039 | GAS ACETLN:DISSOLVED;ACETYLENE 99 PCT | GAS, ACETYLENE: TYPE: DISSOLVED; CONCENTRATION: ACETYLENE 99 PCT; CONTAINER TYPE: CYL; CONTAINER CAPACITY: 8.6 KG; PROOF OF PURITY; MATERIAL SAFETY DATA SHEETS WITH ENVIRONMENTAL INFORMATION IN THE 16 POINT FORMAT TO BE PROVIDED WITH EVERY DELIVERY AS REQUIRED BY THE OCCUPATIONAL HEALTH AND SAFETY ACT | Each (EA) |
| 17669 | GAS MED:OXYGEN;1.84 KG;CYL;MIN 99.5 PCT | GAS, MEDICAL: TYPE: OXYGEN; CONTAINER CAPACITY: 1.84 KG; CONTAINER TYPE: CYL; CONCENTRATION: MIN 99.5 PCT; MOLECULAR FORMULA: O2; PHYSICAL FORM: GAS; CAS REGISTRATION NUMBER: 29/34/0037; STORAGE CODE OR COLOR: BLACK; MSDS NUMBER: 899-376; INDUSTRY STANDARD: CL 2.2; SUPPL P/N: 340283; APPLICATION: MEDICAL CENTRE; CONTAINS: 1.4M3; BULL NOSE VALVE; UN NUMBER: 1072; GAS UNDER PRESSURE 2.2 | Each (EA) |

## ANNEXURE 2: BULK STORAGE VESSELS CURRENTLY INSTALLED (JANUARY 2024)

| # | Eskom Site | Gas Type | Grade/Purity | Industry Standard | Vessel Volume ($m^3$) and Gas Capacity (kg) | Vessel owned by *Employer* |
|---|---|---|---|---|---|---|
| 1 | Duvha Power Station | Liquid Petroleum Gas (LPG) | Propane Butane Mixture | SANS 1774 | 1 x 9$m^3$<br>9000kg max<br>7200kg operational | No |
| 2 | Kendal Power Station | Liquid Petroleum Gas (LPG) | Propane Butane Mixture | SANS 1774 | 1 x 9$m^3$ | No |
| 3 | Lethabo Power Station | Liquid Petroleum Gas (LPG) | Propane Butane Mixture | SANS 1774 | 1 x 4.5$m^3$<br>1 x 9$m^3$ | No |
| 4 | Majuba Power Station | Liquid Petroleum Gas (LPG) | Propane Butane Mixture | SANS 1774 | 1 x 9 $m^3$ | Yes |
| 5 | Matimba Power Station | Liquid Petroleum Gas (LPG) | Propane Butane Mixture | SANS 1774 | 1 x 9 $m^3$ | No |
| 6 | Matla Power Station | Liquid Petroleum Gas (LPG) | Propane Butane Mixture | SANS 1774 | 1 x 9 $m^3$ | No |
| 7 | Tutuka Power Station | Liquid Petroleum Gas (LPG) | Propane Butane Mixture | SANS 1774 | 2 x 9 $m^3$ | No |
| 8 | Medupi Power Station | Liquid Petroleum Gas (LPG) | Propane Butane Mixture | SANS 1774 | 1 x 22 $m^3$<br>8500kg (85%) | No |
| 9 | Kusile Power Station | Liquid Petroleum Gas (LPG) | Propane Butane Mixture | SANS 1774 | 1 x 22.5 $m^3$<br>10 000Kg | Yes |