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TITLE	SPECIFICATION FOR HIGH PURITY GASES	REFERENCE	CP_TSSPEC_266	REV	0
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FOREWORD

This specification was prepared by the following Work Group members:

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INTRODUCTION

The meticulous approach of producing high purity analytical and instrumentation gases provides City Power with the assurance with need to conduct our tasks with confidence. Any level of impurities, these gases may have a severe impact on the serviceability and maintenance of analytical instrumentation.

1. SCOPE

This specification includes the classification and labelling of gases to the new Globally Harmonised System (GHS) for classification and labelling of chemical gases criteria developed by United Nations. The aim of GHS is to ensure internationally comparable high standards for health, safety and environmental protection. City Power's requirements for the supply, of these high purity gases is aligned to a numbers of uses ranging from medical, laboratory, automotive, food and manufacturing.

2. NORMATIVE REFERENCES

The following documents contain provisions that, through reference in the text, constitute requirements of this specification. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this specification are encouraged to investigate the possibility of applying the most recent editions of the documents listed below.

Reference	Description
SANS 532	Standard and specifications for industrial, medical, propellant, food and beverage gases, refrigerants and breathing gases
SANS 199	Shut-off valves for transportable, refillable liquefied petroleum gas cylinders
SANS 220	Dissolved acetylene cylinders
SANS 399	Transportable refillable welded stainless steel cylinders for low pressure gases - Alternative design and construction
SANS 1518	Transport of dangerous goods - Design, construction, testing, approval and maintenance of road vehicles and portable tanks
SANS 1774	Liquefied petroleum gases
SANS 10019	Transportable pressure receptacles for compressed, dissolved and liquefied gases - Basic design, manufacture, use and maintenance
SANS 10234	Globally Harmonized System of classification and labelling of chemicals (GHS)
SANS 10263-2	The warehousing of dangerous goods Part 2: The storage and handling of gas cylinders
SANS 10087-1	The handling, storage, distribution and maintenance of liquefied petroleum gas in domestic, commercial, and industrial installations Part 1
SANS 10087-2	The handling, storage, distribution and maintenance of liquefied petroleum gas in domestic, commercial, and industrial installations Part 3
SANS 10229-1	Transport of dangerous goods - Packaging and large packaging for road and rail transport Part 1: Packaging
SANS ISO 9001:2015	Quality management systems — Requirements

SANS OHSAS 18001:2011	Occupational health and safety management systems — Requirements
SANS ISO 14001:2015	Environmental management systems — Requirements with guidance for use

3. REQUIREMENTS

3.1. General

The table 1 below indicates a number of gases that are cover by this specification: -

Item	Description	Symbol	UN	CAS (Chemical Abstract Service)
1.	Acetylene	C ₂ H ₂	1001	74-86-2
2.	Argon Baseline 5.0	Ar	1006 (512203-SE-C)	7440-37-1
3.	Argon shield universal	Ar/CO ₂ /O ₂	TBA	TBA
4.	Hydrogen Baseline 5.0	H ₂	1049 (510203-SH-C)	1333-74-0
5.	Nitrogen Baseline 5.0	N ₂	1066 (511203-SE-C)	7727-37-9
6.	Oxygen medical	O ₂	1072	7782-44-7
7.	Oxygen	O ₂	1073	
8.	Propane	C ₃ H ₈	1060	74-99-7
9.	Synthetic Air	N ₂ + O ₂	1002 (513207-SE-C)	132259-10-0
10.	Sulphur hexafluoride	SF ₆	1080	2551-62-4
11.	Stain shield	Ar/O ₂	TBA	TBA
12.	Stain shield heavy	Ar/CO ₂ /He	TBA	TBA
13.	Standard gas mixture	H ₂ /CH ₄ /CO/CO ₂ /C ₂ H ₂ /C ₂ H ₄ /C ₂ H ₆ /N ₂ +O ₂	TBA	TBA

3.2. Gas identification

The primary means of identification of the contents of any cylinder shall be the label affixed to the shoulder of the cylinder, and further identified by the colour of the cylinder.

3.3. Purity classification

As a quality code, e.g. 4.5 where the number before the dot represents the number on nines and the last number indicates the last decimal. (4.5 = 99.995% and 4.5 = 99.9997%). As purity in percent, this shall represent the minimum concentration of actual gas. In the case of liquefied gases, the purity shall represent the liquid phase.

3.4. Cylinders details

3.4.1 Cylinders

A seamless steel cylinder or a welded steel cylinder having a hydrostatic test pressure based on a developed pressure of at least 6 200 kPa (see SANS 10019) and respectively complying with the requirements of SANS 9809 and SANS 4706, or any steel cylinder of adequate design that has been accepted for use in the Republic of South Africa as detailed in SANS 10019, shall be used, except that a cylinder that has brazed joints shall not be acceptable.

3.4.2 Porous substance

Cylinders shall be filled as completely as possible with an effective porous substance of porosity not exceeding 92 %. The porous substance shall be uniform in quality, thoroughly dry, free from voids, and of a structure that prevents distortion or sagging of the porous substance when it is wet with solvent. The porous substance shall not react chemically with the metal of the cylinder, the solvent, or the acetylene gas.

3.4.3 Valve types

The valve shall be capable of withstanding operating pressures and test pressures, mechanical stresses, including dynamic loads such as pressure shocks or cyclic changes, and operating temperatures. The valve shall be deemed compliant with the above when successfully tested for compliance.

The valve may be of copper-zinc or copper-tin alloy provided that the copper content of alloy surfaces in contact with acetylene does not exceed 70 %.

3.4.4 Operating temperatures

Materials used shall be suitable for the temperatures for which the valve is designed. The minimum operating temperature to which the valve is expected to be exposed during normal use is -20 °C. In service, temperatures below this might be encountered during short periods, for example, during filling.

The maximum operating temperature to which the valve is expected to be exposed during normal operation is 65 °C. In service, this temperature might be exceeded for short periods. The valve shall be deemed compliant with the above when successfully tested for compliance.

3.4.5 Copper alloys

Valve bodies and components made from copper alloys shall be manufactured from materials in accordance with EN 12164 (CW 614 N), EN 12165 (CW 617 N), EN 12167, UNS C37710 and UNS C38500 or from alloys of equivalent properties and standards. This requirement can be satisfied by means of material test certificates provided by the manufacturer.

3.4.6 Non-metallic materials

Non-metallic materials in contact with LPG shall be compatible with LPG. They shall not distort, harden or adhere to the body or seat face to such an extent as to impair the function of the valve. The valve shall be deemed compliant with the above when successfully tested for compliance.

Note: The cylinder pressure shall be quoted at 21°C at 101.3 KPa.

4. HANDLING

- 4.1 All cylinders shall be restrained, to minimise risk posed to people and /or damage to vehicles due to the hazards outlined by each chemical composition.
- 4.2 Any supplier shall comply with government regulations and industry standards.
- 4.3 The vehicle shall be equipped with fire extinguishers and staff full protective clothing (PPE).
- 4.4 Where required, segregation of cylinder shall be applied.
- 4.5 The vehicle shall be fitted with the appropriate placards or signs as per the standards.

5. STORAGE

Storage facilities shall comply with the requirements of the following standards:

- a) Storage of gas cylinders, see SANS 10263-2.
- b) Storage of liquid petroleum gas, see SANS 10087-1 and SANS 10087-3.

6. TESTS AND EXAMINATIONS

The tests and examinations to be applied to cylinders shall be in accordance to SANS 399.

7. PACKAGING AND LABELLING

7.1 Packaging

The condition of cylinders and road tank vehicles shall be such as not to be detrimental to the purity of the gases during normal transportation and storage and shall have been approved by an accredited approving authority. Where applicable, transport by road shall comply with the requirements of the following standards:

- a) in the case of cylinders, see SANS 10229-1;
- b) in the case of road tank vehicles, see SANS 1518; and
- c) the information on each road vehicle, shall be in accordance with SANS 10232-1.

7.2 Labelling

With reference to the classification and labelling of dangerous substances and preparation for sale and handling, see SANS 10234.

8. MARKING

The cylinder shall be legibly and indelibly marked in accordance with the requirements for markings given in the relevant cylinder manufacturing specification based on SANS 10229-1 and painted in accordance with the colour code given in SANS 10019.

NOTE: In order to avoid damage to the cylinder, marking shall be carried out in accordance with the requirements of the manufacturing specification and the recommendations of the cylinder manufacturer. It is recommended that whenever feasible, the markings should be applied by the cylinder manufacturer.

9. TRAINING REQUIREMENTS

The supplier shall provide the following details with regard to staff training offered:

- a) The available training courses and their duration;
- b) The cost per delegate and the first four shall be cost inclusive on provision of gases.
- c) The minimum number of delegates required;
- d) The certification of delegates;
- e) On-site and Off-site training, and
- f) Training course content.

10. DOCUMENTATION

The following documents shall be available:

- a) Set of detail drawings consisting of the general arrangements, a parts list, specifications for metallic and non-metallic materials;
- b) Description of the valve and method of operation;
- c) Information on the intended use of the valve (for example LPG mixtures, pressures, temperatures, connections, use with or without protection cap or shroud);
- d) Certificates relating to material suitability and compatibility; and
- e) Test report A written report shall be prepared detailing the tests carried out and the results from each test.

NOTE: All documentation supplied by manufacturers/representatives/agents shall be supplied in English.

11. QUALITY MANAGEMENT

A Quality Management Plan/System shall be set up in order to assure the quality of high purity gases during design, development, production and servicing. Guidance on the requirements for a quality management system may be found in the following standards: ISO 9001:2015. The details shall be subject to agreement between the City Power and Supplier/Contractor.

12. ENVIRONMENTAL MANAGEMENT

An Environmental Management Plan/System shall be set up in order to ensure the proper environmental management and compliance of high purity gases during their entire life cycle (i.e. during design, development, production, installation, operation and maintenance, decommissioning as well as Rehabilitation, Recycling or Disposal phase/s). Guidance on the requirements for an environmental management plan/system may be found in ISO 14001:2015 standards. The details shall be subject to agreement between City Power and the Supplier. This is to ensure that the asset created conforms to environmental standards and City Power SHERQ Policy.

13. OCCUPATIONAL HEALTH AND SAFETY (OHS) MANAGEMENT

A Health and Safety Plan/System shall be set up in order to ensure proper management and compliance of high purity gases during installation, operation, maintenance, and decommissioning phase/s. Guidance on the requirements of a Health and Safety Plan/System may be found in OHSAS 18001:2007 standards. This is to ensure that the asset/service conforms to standard operating procedures and City Power SHERQ Policy. The details shall be subject to agreement between City Power and the Supplier/Contractor.

ANNEXURE A - BIBLIOGRAPHY

None

ANNEXURE B - REVISION INFORMATION

DATE	REV. NO.	NOTES
February 2019	0	First issue

ANNEXURE C - Item No. 1 – Technical schedules for Acetylene (C₂H₂)**Schedule A: Purchaser's specific requirements****Schedule B: Guarantees and technical particulars of equipment offered**

Item	Sub clause of CP_TSSPEC_266	Description	Schedule A	Schedule B
1		Manufacturer	State	
2		Location	State	
3		Purity ppm/%	99.0	
4		Boiling point °C	- 84	
5		Relative density	0.906	
6		Molecular weight g/mol	26.04	
7		Critical temperature °C	State	
8		Specific volume m ³ /kg	0.90	
9		Flammability limits % volume	2.2 to 85	
10		Auto-ignition temperature °C	406 - 440	
11		Outlet connection	Vertical	
12		Valve type	State	
13		Vapour pressure kPa	4700	
14		Hazard classification	State	
15		Handling	State	
16		Storage	Required	
17		Types of test and evaluation	Required	
18		Packaging and labelling	Required	
19		Marking	Required	
20		Documentation	Required	
21		ISO 9001 certification	Required	
22		ISO 14001 certification	Required	
23		ISO/OSHAS 18001 certification	Required	

Note: Ticks, Cross [√, X], Astrick [*], Word [Noted, Yes], Yes or TBA ["To Be Advice"] will not be accepted.

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ANNEXURE C - Item No. 2 – Technical schedules for Synthetic Air (N₂+O₂)**Schedule A: Purchaser's specific requirements****Schedule B: Guarantees and technical particulars of equipment offered**

Item	Sub clause of CP_TSSPEC_266	Description	Schedule A	Schedule B
1		Manufacturer	State	
2		Location	State	
3		Purity ppm/%	99.99	
4		Boiling point °C	- 194	
5		Relative density	1.21	
6		Molecular weight g/mol	28.96	
7		Critical temperature °C	State	
8		Specific volume m ³ /kg	0.83	
9		Flammability limits % volume	Non combustible	
10		Auto-ignition temperature °C	None	
11		Outlet connection	State	
12		Valve type	State	
13		Vapour pressure kPa	≥13700	
14		Hazard classification	State	
15		Handling	State	
16		Storage	Required	
17		Types of test and evaluation	Required	
18		Packaging and labelling	Required	
19		Marking	Required	
20		Documentation	Required	
21		ISO 9001 certification	Required	
22		ISO 14001 certification	Required	
23		ISO/OSHAS 18001 certification	Required	

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ANNEXURE C - Item No. 3 – Technical schedules for Argon (Ar)

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_266	Description	Schedule A	Schedule B
1		Manufacturer	State	
2		Location	State	
3		Purity ppm/%	99.999	
4		Boiling point °C	- 185.9	
5		Relative density	1.38	
6		Molecular weight g/mol	39.95	
7		Critical temperature °C	State	
8		Specific volume m ³ /kg	0.60	
9		Flammability limits % volume	State	
10		Auto-ignition temperature °C	State	
11		Outlet connection	State	
12		Valve type	State	
13		Vapour pressure kPa	≥13000	
14		Hazard classification	State	
15		Handling	State	
16		Storage	Required	
17		Types of test and evaluation	Required	
18		Packaging and labelling	Required	
19		Marking	Required	
20		Documentation	Required	
21		ISO 9001 certification	Required	
22		ISO 14001 certification	Required	
23		ISO/OSHAS 18001 certification	Required	

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ANNEXURE C - Item No. 4 – Technical schedules for Argon shield universal

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_266	Description	Schedule A	Schedule B
1		Manufacturer	State	
2		Location	State	
3		Purity ppm/%	State	
4		Boiling point °C	State	
5		Relative density	State	
6		Molecular weight g/mol	State	
7		Critical temperature °C	State	
8		Specific volume m ³ /kg	State	
9		Flammability limits % volume	State	
10		Auto-ignition temperature °C	State	
11		Outlet connection	State	
12		Valve type	State	
13		Vapour pressure kPa	State	
14		Hazard classification	State	
15		Handling	State	
16		Storage	Required	
17		Types of test and evaluation	Required	
18		Packaging and labelling	Required	
19		Marking	Required	
20		Documentation	Required	
21		ISO 9001 certification	Required	
22		ISO 14001 certification	Required	
23		ISO/OSHAS 18001 certification	Required	

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ANNEXURE C - Item No. 5 – Technical schedules for Stain shield (Ar/O₂)**Schedule A: Purchaser's specific requirements****Schedule B: Guarantees and technical particulars of equipment offered**

Item	Sub clause of CP_TSSPEC_266	Description	Schedule A	Schedule B
1		Manufacturer	State	
2		Location	State	
3		Purity ppm/%	State	
4		Boiling point °C	State	
5		Relative density	State	
6		Molecular weight g/mol	State	
7		Critical temperature °C	State	
8		Specific volume m ³ /kg	State	
9		Flammability limits % volume	State	
10		Auto-ignition temperature °C	State	
11		Outlet connection	State	
12		Valve type	State	
13		Vapour pressure kPa	State	
14		Hazard classification	State	
15		Handling	State	
16		Storage	Required	
17		Types of test and evaluation	Required	
18		Packaging and labelling	Required	
19		Marking	Required	
20		Documentation	Required	
21		ISO 9001 certification	Required	
22		ISO 14001 certification	Required	
23		ISO/OSHAS 18001 certification	Required	

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ANNEXURE C - Item No. 6 – Technical schedules for Stain shield heavy (Ar/O₂/He)

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_266	Description	Schedule A	Schedule B
1		Manufacturer	State	
2		Location	State	
3		Purity ppm/%	State	
4		Boiling point °C	State	
5		Relative density	State	
6		Molecular weight g/mol	State	
7		Critical temperature °C	State	
8		Specific volume m ³ /kg	State	
9		Flammability limits % volume	State	
10		Auto-ignition temperature °C	State	
11		Outlet connection	State	
12		Valve type	State	
13		Vapour pressure kPa	State	
14		Hazard classification	State	
15		Handling	State	
16		Storage	Required	
17		Types of test and evaluation	Required	
18		Packaging and labelling	Required	
19		Marking	Required	
20		Documentation	Required	
21		ISO 9001 certification	Required	
22		ISO 14001 certification	Required	
23		ISO/OSHAS 18001 certification	Required	

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ANNEXURE C - Item No. 7 – Technical schedules for Hydrogen (H₂)**Schedule A: Purchaser's specific requirements****Schedule B: Guarantees and technical particulars of equipment offered**

Item	Sub clause of CP_TSSPEC_266	Description	Schedule A	Schedule B
1		Manufacturer	State	
2		Location	State	
3		Purity ppm/%	99.995	
4		Boiling point °C	- 252.8	
5		Relative density	0.07	
6		Molecular weight g/mol	2.02	
7		Critical temperature °C	State	
8		Specific volume m ³ /kg	12.0	
9		Flammability limits % volume	4.0 - 75	
10		Auto-ignition temperature °C	State	
11		Outlet connection	State	
12		Valve type	State	
13		Vapour pressure kPa	≥20000	
14		Hazard classification	State	
15		Handling	State	
16		Storage	Required	
17		Types of test and evaluation	Required	
18		Packaging and labelling	Required	
19		Marking	Required	
20		Documentation	Required	
21		ISO 9001 certification	Required	
22		ISO 14001 certification	Required	
23		ISO/OSHAS 18001 certification	Required	

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ANNEXURE C - Item No. 8 – Technical schedules for Standard gas mixture

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_266	Description	Schedule A	Schedule B
1		Manufacturer	State	
2		Location	State	
3		Purity ppm/%	1000.00	
4		Boiling point °C	State	
5		Relative density	State	
6		Molecular weight g/mol	State	
7		Critical temperature °C	State	
8		Specific volume m ³ /kg	State	
9		Flammability limits % volume	State	
10		Auto-ignition temperature °C	State	
11		Outlet connection	State	
12		Valve type	State	
13		Vapour pressure kPa	State	
14		Hazard classification	State	
15		Handling	State	
16		Storage	Required	
17		Types of test and evaluation	Required	
18		Packaging and labelling	Required	
19		Marking	Required	
20		Documentation	Required	
21		ISO 9001 certification	Required	
22		ISO 14001 certification	Required	
23		ISO/OSHAS 18001 certification	Required	

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ANNEXURE C - Item No. 9 – Technical schedules for Nitrogen (N₂)**Schedule A: Purchaser's specific requirements****Schedule B: Guarantees and technical particulars of equipment offered**

Item	Sub clause of CP_TSSPEC_266	Description	Schedule A	Schedule B
1		Manufacturer	State	
2		Location	State	
3		Purity ppm/%	99.996	
4		Boiling point °C	- 195.8	
5		Relative density	0.967	
6		Molecular weight g/mol	28.01	
7		Critical temperature °C	State	
8		Specific volume m ³ /kg	0.861	
9		Flammability limits % volume	Non flammable	
10		Auto-ignition temperature °C	State	
11		Outlet connection	State	
12		Valve type	State	
13		Vapour pressure kPa	≥13000	
14		Hazard classification	State	
15		Handling	State	
16		Storage	Required	
17		Types of test and evaluation	Required	
18		Packaging and labelling	Required	
19		Marking	Required	
20		Documentation	Required	
21		ISO 9001 certification	Required	
22		ISO 14001 certification	Required	
23		ISO/OSHAS 18001 certification	Required	

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ANNEXURE C - Item No. 10 – Technical schedules for Oxygen Medical (O₂)

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_266	Description	Schedule A	Schedule B
1		Manufacturer	State	
2		Location	State	
3		Purity ppm/%	99.5	
4		Boiling point °C	- 183.0	
5		Relative density	1.105	
6		Molecular weight g/mol	32	
7		Critical temperature °C	-118	
8		Specific volume m ³ /kg	0.86	
9		Flammability limits % volume	Non combustible	
10		Auto-ignition temperature °C	State	
11		Outlet connection	State	
12		Valve type	State	
13		Vapour pressure kPa	15200	
14		Hazard classification	State	
15		Handling	State	
16		Storage	Required	
17		Types of test and evaluation	Required	
18		Packaging and labelling	Required	
19		Marking	Required	
20		Documentation	Required	
21		ISO 9001 certification	Required	
22		ISO 14001 certification	Required	
23		ISO/OSHAS 18001 certification	Required	

Note: Ticks, Cross [✓, X], Astrick [*], Word [Noted, Yes], Yes or TBA ["To Be Advice"] will not be accepted.

Tender Number: _____

Tenderer's Authorised Signatory: _____
 Name in block letters Signature

Full name of company: _____

ANNEXURE C - Item No. 11 – Technical schedules for Oxygen Welding (O₂)

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_266	Description	Schedule A	Schedule B
1		Manufacturer	State	
2		Location	State	
3		Purity ppm/%	State	
4		Boiling point °C	- 183.0	
5		Relative density	1.105	
6		Molecular weight g/mol	32	
7		Critical temperature °C	-118	
8		Specific volume m ³ /kg	1309	
9		Flammability limits % volume	Non combustible	
10		Auto-ignition temperature °C	State	
11		Outlet connection	State	
12		Valve type	State	
13		Vapour pressure kPa	State	
14		Hazard classification	State	
15		Handling	State	
16		Storage	Required	
17		Types of test and evaluation	Required	
18		Packaging and labelling	Required	
19		Marking	Required	
20		Documentation	Required	
21		ISO 9001 certification	Required	
22		ISO 14001 certification	Required	
23		ISO/OSHAS 18001 certification	Required	

Note: Ticks, Cross [✓, X], Astrick [*], Word [Noted, Yes], Yes or TBA ["To Be Advice"] will not be accepted.

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

ANNEXURE C - Item No. 12 – Technical schedules for Propane (C₃H₄)**Schedule A: Purchaser's specific requirements****Schedule B: Guarantees and technical particulars of equipment offered**

Item	Sub clause of CP_TSSPEC_266	Description	Schedule A	Schedule B
1		Manufacturer	State	
2		Location	State	
3		Purity ppm/%	99.5	
4		Boiling point °C	- 42.1	
5		Relative density	1.55	
6		Molecular weight g/mol	44.097	
7		Critical temperature °C	-104.0	
8		Specific volume m ³ /kg	0.53	
9		Flammability limits % volume	2.1 – 9.5	
10		Auto-ignition temperature °C	468	
11		Outlet connection	State	
12		Valve type	State	
13		Vapour pressure kPa	1050	
14		Hazard classification	State	
15		Handling	State	
16		Storage	Required	
17		Types of test and evaluation	Required	
18		Packaging and labelling	Required	
19		Marking	Required	
20		Documentation	Required	
21		ISO 9001 certification	Required	
22		ISO 14001 certification	Required	
23		ISO/OSHAS 18001 certification	Required	

Note: Ticks, Cross [✓, X], Astrick [*], Word [Noted, Yes], Yes or TBA ["To Be Advice"] will not be accepted.

Tender Number: _____

Tenderer's Authorised Signatory: _____
 Name in block letters Signature

Full name of company: _____

ANNEXURE C - Item No. 13 – Technical schedules for Sulphur hexafluoride (SF₆)

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_266	Description	Schedule A	Schedule B
1		Manufacturer	State	
2		Location	State	
3		Purity ppm/%	99.99	
4		Boiling point °C	63.8	
5		Relative density	5.11	
6		Molecular weight g/mol	146.1	
7		Critical temperature °C	State	
8		Specific volume m ³ /kg	0.156	
9		Flammability limits % volume	State	
10		Auto-ignition temperature °C	State	
11		Outlet connection	State	
12		Valve type	State	
13		Vapour pressure kPa	2450	
14		Hazard classification	State	
15		Handling	State	
16		Storage	Required	
17		Types of test and evaluation	Required	
18		Packaging and labelling	Required	
19		Marking	Required	
20		Documentation	Required	
21		ISO 9001 certification	Required	
22		ISO 14001 certification	Required	
23		ISO/OSHAS 18001 certification	Required	

Note: Ticks, Cross [✓, X], Astrick [*], Word [Noted, Yes], Yes or TBA ["To Be Advice"] will not be accepted.

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

Item No. – Deviation technical schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.

Item	Sub clause of CP_TSSPEC_266	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters

Signature

Full name of company: _____

ANNEXURE D – Stock Items

Not intended for stores