

TABLE OF CONTENTS

	Page
FOREWORD	3
INTRODUCTION	4
1. SCOPE	4
2. NORMATIVE REFERENCES	4
3. REQUIREMENTS.....	4
3.1. General	4
3.2. Ratings.....	5
3.3. Installations	5
3.4. Inspections and Maintenance.....	6
4. PROTECTION	6
5. DOCUMENTATION	7
6. QUALITY MANAGEMENT	7
7. ENVIRONMENTAL MANAGEMENT.....	7
8. HEALTH AND SAFETY.....	7
ANNEXURE A - BIBLIOGRAPHY	8
ANNEXURE B - REVISION INFORMATION	9
ANNEXURE C - Item No. 1 - Installation, repair and maintenance of air conditioners.....	10
ANNEXURE D – Stock Items.....	13

FOREWORD

This document was prepared by the following Work Group member/s:

Sibongile Ntimane Innovation Hub

The work group was appointed by Innovation Hub (Technology Services), which at the time of approval comprised of the following members.

Nolubabalo Makana	Metering
Masape Mokgadi Kahumba	Metering
David Makoni	SDC
Gavin Jardine	Planning
Hilda Nonkonyana	Planning
Thabiso Letaoana	Logistics & Warehouse
Mpho Molope	Logistics & Warehouse
Patrick Radebe	Public lighting
Tiro Mokgosi	Quality Management

Recommendations for corrections, additions or deletions shall be addressed to the:

Senior Manager Innovation Hub
City Power Johannesburg (SOC) Ltd

P O Box 38766

Booyens
2016

INTRODUCTION

The air-conditioning system plays a crucial role in support of human comfort. It is therefore important to ensure that air-conditioning units installed in City Power buildings comply with the required specifications and are of acceptable quality. Fifty percent of the current air conditioning units installed in City Power properties are obsolete and defective. There are no spares to repair them since they have exceeded their life span.

1. SCOPE

This specification covers City Power's requirements for the supply, repair and installation of air-conditioning units.

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 and specifications 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.

SANS 10147:2014: *Refrigeration systems including plants associated with air-conditioning systems.*

SANS 10173:2003: *Installation, testing and balancing of air-conditioning duct work.*

SANS 1238:2005: *Air-conditioning ductwork.*

SANS 10142-1: 2020: *The wiring of premises part 1: low-voltage installations.*

SANS 10142-2: 2018: *The wiring of premises part 2: medium-voltage installations above 1 kV A.C. not exceeding 22 kV A.C. and up to and including 3 000 kW installed capacity.*

CP_TSSPEC_017: *Specification for miniature circuit breakers.*

CP_TSSPEC_002: *Specification for low voltage insulated wire power and multi-core control cable.*

SANS 10400:2016 *Code of practice for application of the national building regulations.*

3. REQUIREMENTS

3.1. General

- 3.1.1 Nothing in this specification shall lessen the obligation of the contractor. The contractor shall be fully responsible for the air-conditioning supply, repair, installation and satisfactory performance in service.
- 3.1.2 City Power Building & Works Manager shall approve replacement of each and every defective air-conditioning unit.
- 3.1.3 Repair and maintenance shall be done in accordance with the relevant manufacturer's standards.
- 3.1.4 Resources dispatched to perform work shall be competent to perform such tasks.
- 3.1.5 All air-condition units shall be of the inverter type.

3.2. Ratings

The following ratings shall be considered at all times when replacements of defective air conditioning units are carried out.

Designation	Room size	BTU
Office space	8 – 11m ²	12,000
	15 – 20m ²	12,000
Open plan up to	30m ²	21,400
	50m ²	35,700
	100m ²	2 x 35,000
Secretarial	10m ²	12,000
	20m ²	16,900
	30m ²	21,400

Table 1: Detailing designations, Room sizes and BTU's

Note 1: Sizes on open space areas can change depending on the number of occupants.

3.3. Installations

- 3.3.1 Evaporator shall be secured from ceiling with a minimum of 8mm threaded rod.
- 3.3.2 Condenser shall be mounted on cantilever bracket.
- 3.3.3 Copper piping shall be neatly used for interconnection between condenser and evaporator.
- 3.3.4 Copper piping shall be secured to avoid damage and armer-flex used to cover the pipes
- 3.3.5 Drainage pipe shall be installed on an adequate decline, to avoid water from running back into unit.

Note 2: No interlinking of drainage pipes shall be allowed.

- 3.3.6 Testing shall be performed for periods of 24 hours after commissioning the air-conditioners.
- 3.3.7 Certificate of compliance (COC) for all installation shall be provided.
- 3.3.8 Re-instatement of any brick or prefabricated wall opening where through units were installed.
- 3.3.9 All controls shall be installed on the wall for air-conditioners.

3.4. Inspections and Maintenance

Inspections and maintenance shall be done once every four months. Tasks illustrated in the table below shall be executed during maintenance.

Item	Description of task	Response
General (Clean)		
1.	Check air filter and clean.	Action
2.	Check condition of evaporator and clean.	Action
3.	Clean equipment generally (Outside).	Action
Item	Description of task	Response
Inspection and Testing		
4	Check condensate drip trays and treat for corrosion if necessary.	Action
5.	Check condensates drain pipes and clear	Action
6	Check fan blades to ensure that they are secured to shafts.	Action
7	Check fan motors to ensure that they are running freely.	Action
8	Check compressor to ensure that is suspended freely.	Action
9	Check thermostat/s, switches, contactors.	Action
10	Check refrigeration system for leaks.	Action
11	Check condition of pressure condition of pressure coil.	Action
12	Check amperage readings on cooling/heating-fan.	Action
13.	Check operation of thermostat, heating element and exhaust/fresh air damper.	Action
14.	Check weather seal around cabinets.	Action
15.	Check and tighten all refrigerant pipe fittings.	Action
16.	Check head and suction pressures.	Action

Table 2: Inspection and Maintenance for minor or major service

Note 3: All the above recommendations might differ according to the OEM.

Note 4: A minor service shall cover items 1 till 3.

Note 5: A major service shall cover items 1 till 16.

4. PROTECTION

- 4.1 Circuit breaker and cable size shall be proportional to the output of unit.
- 4.2 All electrical materials shall be according to City Power specifications for low voltage (LV) miniature circuit breakers and cables.
- 4.3 Isolators shall be mounted at maximum distance of 1 metre from condenser.
- 4.4 Isolators shall be mounted in splash proof enclosure when outdoors.

5. DOCUMENTATION

Technical product catalogue and operating & installation manuals shall be provided.

6. QUALITY MANAGEMENT

A quality management system shall be set up in order to assure the quality during manufacture, installation, removal, transportation, and disposal. 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 an agreement between the purchaser and supplier.

7. ENVIRONMENTAL MANAGEMENT

An environmental management plan shall be set up in order to ensure the proper environmental management and compliance is adhered to during manufacture, installation, removal, transportation, and disposal. Guidance on the requirements for an environmental management system shall be found in ISO 14001:2015 standards. The details shall be subject to an agreement between City Power and the Supplier. This is to ensure that the asset created conforms to environmental standards and City Power SHERQ Policy.

8. HEALTH AND SAFETY

A health and safety plan shall be set up in order to ensure proper management and compliance during manufacture, installation, removal, transportation, and disposal. Guidance on the requirements of a health and safety plan shall be found in ISO 45001:2018 standards. The details shall be subject to an agreement between City Power and the Supplier.

ANNEXURE A - BIBLIOGRAPHY

None

ANNEXURE B - REVISION INFORMATION

DATE	REV. NO.	NOTES
January 2013	0	First issue
		Clause 6 Quality Management
		Clause 7 Health and Safety
April 2023	1	Clause 8 Environment Management
		Third issue
		General editing
		Added new study committee table
		Updated ISO on clause 6,7 & 8
October 2024	2	Removed ISO 18001 replaced with ISO 45001

ANNEXURE C - Item No. 1 - Installation, repair and maintenance of air conditioners

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_207	Description	Schedule A(Required)	Schedule B
1		Name of Manufacturer	XXXX	
2		Location	XXXX	
3	3.1	General	XXXX	XXXX
		Obligation to the supplier	Note	
		1.Managers approval Replacement Yes/No	Yes	
		2.Repair and maintenance accordance to OEM Yes/No	Yes	
		3.Competent resources Yes/No	Yes	
		4.Type air-conditioner	Inverter	
4	3.2	Ratings	XXXX	XXXX
		1.Compliance according to clues 3.2 table 1. Yes/No	Yes	
5	3.3	Installation	XXXX	XXXX
		1.Securing of evaporator by threaded rod mm	8	
		2.Condenser mounting	Cantilever	
		3.Piping secured Yes/No	Yes	
		4.Armer-flex for covering of pipes Yes/No	Yes	
		5.Drainage pipe in a decline Yes/No	Yes	
		6.Testing duration after commissioning Hours	24	
		7.COC after installation Yes/No	Yes	
		8.Re-instatement after installation Yes/No	Yes	
		9.Controllers	Wall mounted	
6	3.4	Inspection and maintenance	XXXX	XXXX
		1.Minor service (1-3 items) Yes/No	Yes	
		2.Major service (1-16 items) Yes/No	Yes	
7	4	Protection	XXXX	XXXX
		1.Minature circuit breaker according to CP_TSSPEC 017 Rev3 Yes/No	Yes	
		2.Minature circuit breaker according to CP_TSSPEC 017 Rev3 Yes/No	Yes	
		3.Isolator mounting m	1	
		4.Outdoor enclosure	Splash proof	
8	5	Documentation	XXXX	XXXX
		1.Technical product catalogue Yes/No	Yes	
		2.Operating manual Yes/No	Yes	
		3.Installation manuals Yes/No	Yes	
9	6	A Quality management system as to clause 6	Required	
	7	A health and safety plan as to clause 7	Required	
	8	An environmental management plan as to clause 8	Required	

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

**SPECIFICATION FOR SUPPLY,
INSTALLATION, REPAIR AND
MAINTENANCE OF AIR CONDITIONING**

REFERENCE

REV

CP_TSSPEC_207

2

PAGE

11

OF

13

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters

Signature

Full name of company: _____

Item No. 1 – ENERGISED OIL FILTRATION PLANT

Deviation 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_207	Proposed deviation

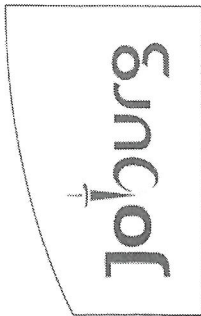
Tender Number: _____

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

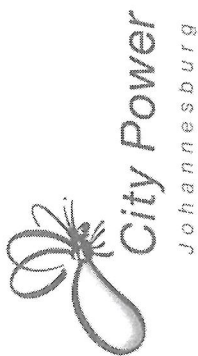
Full name of company: _____

ANNEXURE D – Stock Items

It is not intended that City Power should keep stock of these items.



a world class African city



**SUPPLY, INSTALL, REPAIRS AND MAINTENANCE OF AIR-CONDITIONERS
LABOUR CONTRACT**

AIR-CONDITIONERS SERVICES B.O.Q (Including labour rates)

Item	Description	Unit of measure	QTY	Rate	Total
1.	Minor Services per unit	EA	2		
2.	Major Services per unit	EA	1		
3	Travel above 60km	KM	100		

<u>Material plus mark – up for work not specified on the B.O.Q items</u>					
Item	Description	Unit of measure	QTY	Rate	Total
1.	Material plus mark – up) (less R30 000,00)	%	100		
2.	Material plus mark - up (R30 001,00 – R20 000,00)	%	100		
3.	Material plus mark – up (R200 001,00 and above)	%	100		

Labour Rates for work not specified on the B.O.Q line items						
Item	Description	Normal working hours per hour	After hours/ Saturday per hour	Sunday/ Public Holiday per hour	Rate per Hour	
1.	Semi-skilled labour per hour	R	R	R	R	
2.	Skilled labour per hour	R	R	R	R	
3.	Supervisor/ Team Leader	R	R	R	R	
4.	Safety Officer	R	R	R	R	
5.	Project Manager	R	R	R	R	

AIR-CONDITIONERS B.O.Q

Repairs & maintenance of Air-conditioners including labour

Item	Description	Unit of measure	Estimated quantities	Type	Brand	BTU's	Rate	BTU's	Rate	BTU's	Rate	BTU's	Rate
	Outdoor unit												
1.	Compressor	EA	50	Wall split	LG/ Daikin/ Midea Sumsung/Toshiba	9000 – 12 000	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000			
2.	Fan Motor	EA	50	Wall split	LG/ Daikin/ Midea Sumsung/Toshiba	9000 – 12 000	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000			
3.	Condenser coils	EA	50	Wall split	LG/ Daikin/ Midea Sumsung/Toshiba	9000 – 12 000	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000			
4.	Capacitor	EA	50	Wall split	LG/ Daikin/ Midea Sumsung/Toshiba	9000 – 12 000	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000			
5.	Relay	EA	50	Wall split	LG/ Daikin/ Midea Sumsung/Toshiba	9000 – 12 000	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000			
6.	Thermostat	EA	50	Wall split	LG/ Daikin/ Midea Sumsung/Toshiba	9000 – 12 000	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000			
	Indoor unit												
1.	Evaporator	EA	50	Wall split	LG/ Daikin/ Midea Sumsung/Toshiba	9000 – 12 000	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000			

[illegible]

1.	Evaporator coils	EA	50	Cassette	LG/ Daikin/ Midea Sumsung/ Toshiba	9000 – 12 000	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000
2.	Blower motor	EA	50	Cassette	LG/ Daikin/ Midea Sumsung/ Toshiba	9000 – 12 000	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000
3.	Drain pump	EA	50	Cassette	LG/ Daikin/ Midea Sumsung/ Toshiba	9000 – 12 000	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000
4.	Air-filter	EA	50	Cassette	LG/ Daikin/ Midea Sumsung/ Toshiba	9000 – 12 000	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000
5.	Thermostat	EA	50	Cassette	LG/ Daikin/ Midea Sumsung/ Toshiba	9000 – 12 000	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000
6.	Control board	EA	50	Cassette	LG/ Daikin/ Midea Sumsung/ Toshiba	9000 – 12 000	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000
7	Sensors	EA	50	Cassette	LG/ Daikin/ Midea Sumsung/ Toshiba	9000 – 12 000	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000
	Refrigeration System									
1.	Refrigerant leaks	EA	50	Cassette	LG/ Daikin/ Midea Sumsung/ Toshiba	9000 – 12 000	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000
2.	Expansion valve	EA	50	Cassette	LG/ Daikin/ Midea Sumsung/ Toshiba	9000 – 12 000	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000
3.	Capillary tubes	EA	50	Cassette	LG/ Daikin/ Midea Sumsung/ Toshiba	9000 – 12 000	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000
4.	Refrigerant charging	EA	50	Cassette	LG/ Daikin/ Midea Sumsung/ Toshiba	9000 – 12 000	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000
	Electrical									
1.	Wiring & connections	EA	50	Cassette	LG/ Daikin/ Midea Sumsung/ Toshiba	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000	96 000 – 120 000
2.	Circuit breakers	EA	50	Cassette	LG/ Daikin/ Midea Sumsung/ Toshiba	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000	96 000 – 120 000
3.	Fuses	EA	50	Cassette	LG/ Daikin/ Midea Sumsung/ Toshiba	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000	96 000 – 120 000
4.	Transformers	EA	50	Cassette	LG/ Daikin/ Midea Sumsung/ Toshiba	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000	96 000 – 120 000
5.	Electrical	EA	50	Cassette	LG/ Daikin/ Midea Sumsung/ Toshiba	18 000– 24 000	36 000 – 48 000	60 000 – 72 000	96 000 – 120 000	96 000 – 120 000

Labour Rates for work not specified on the B.O.Q line items					
Item	Description	Normal working hours per hour	After hours/ Saturday per hour	Sunday/ Public Holiday per hour	Rate per Hour
1.	Semi-skilled labour per hour	R	R	R	R
2.	Technician/ Skilled labour per hour	R	R	R	R
3.	Supervisor/ Team Leader	R	R	R	R
4.	Safety Officer	R	R	R	R
5.	Project Manager	R	R	R	R

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letter _____ Signature _____

Full name of company: _____