



a world class African city



TITLE	STANDARD FOR INSPECTION AND MAINTENANCE OF ELEVATORS	REFERENCE	REV
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FOREWORD

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INTRODUCTION

City Power strives to become a world-class energy distributor. In line with this vision, the company continues to invest in innovative techniques and technologies that will improve the overall performance and management of City Power entire network infrastructure. In addition, City Power seeks to retain its ISO accreditations, in achieving this goal, a few passenger and goods lifts or elevators required maintenance in accordance to quality management and safety acceptable standards.

1. SCOPE

The purpose of this standard is to outline the specialised maintenance of passenger and goods lifts or elevators. It is not the intent of this standard to restrict any service provider from exceeding the minimum requirements, described and prescribed in this document. The scope entails maintenance, repair and refurbishment of goods and passenger lifts in all City Power's premises.

2. NORMATIVE REFERENCES

The following documents contain provisions that, through reference in the text, constitute requirements of this standard. 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 standard are encouraged to investigate the possibility of applying the most recent editions of the documents listed below.

SANS 1545-1: Electric Lifts – Safety rules for the construction and installation of Lifts Part 1

SANS 1545-2: Hydraulic Lifts -- Safety rules for the construction and installation of Lifts Part 2

SANS 4344: Lifts – Steel wire ropes for lifts – minimum requirements

SANS 8100-1: Lifts for the transport of persons and goods – Part 1: Safety rules for the construction and installation of passenger and goods passenger lifts

SANS 14798: Lifts -- (elevators), escalators and moving walks - Risk assessment and reduction methodology

SANS 25745-1: Lifts -- Energy performance of lifts, escalators and moving walks Part 1: Energy measurement and verification

SANS 50081-1: Lifts -- Safety rules for the construction and installation of lifts Part 1: Electric lifts

SANS 50081-3: Lifts -- Safety rules for the construction and installation of lifts Part 3: Electric and hydraulic service lifts

SANS 50081-20: Lifts -- Safety rules for the construction and installation of lifts - Lifts for the transport of persons and goods - Part 20: Passenger and goods passenger lifts

SANS 50081-21: Lifts -- Safety rules for the construction and installation of lifts - Lifts for the transport of persons and goods Part 21: New passenger and goods passenger lifts in existing building

SANS 50081-41: Lifts -- Safety rules for the construction and installation of lifts - Special lifts for the transport of persons and goods Part 41: Vertical lifting platforms intended for use by persons with impaired mobility

SANS 50081-50: Safety rules for the construction and installation of lifts - Examinations and tests -Part 50: Design rules, calculations, examinations and tests of lift components

SANS 50081-70: Lifts -- Safety rules for the construction and installation of lifts - Particular applications for passenger and goods lifts Part 70: Accessibility to lifts for persons including persons with disability

SANS 50081-72: Lifts -- Safety rules for the construction and installation of lifts - Particular applications for passenger and goods passenger lifts Part 72: Firefighters lifts

SANS 50081-80: Lifts -- Safety rules for the construction and installation of lifts - Existing lifts Part 80: Rules for the improvement of safety of existing passenger and goods lifts

SANS 53015: Lifts-- Maintenance for lifts and escalators - Rules for maintenance instructions

SANS 9001: *Quality management systems*

SANS 14001: Environmental management systems

ISO 45001: Occupational Health and Safety management systems.

3. DEFINITIONS

Definitions used in this document shall reference to those used at the normative reference documents.

4. REQUIREMENTS

4.1 Service provider

- 4.1.1 Inspection, testing and repairs, a competent person shall carry out examination of the lift parts (Lift mechanic).
- 4.1.2 After the competent person has identified defects, defects be rectified within a specified timescale, he/she shall submit a report promptly to allow City Power responsible person to take the necessary action within the required period.
- 4.1.3 Lift maintenance shall be in accordance with the manufacturer's recommended procedures. All tools and equipment required for performing repairs and maintenance be supplied by the Service provider, and shall remain his property.
- 4.1.4 The Service provider shall respond to emergency calls within an hour after a call is made or emergency service being requested.

4.2 Facilities

City Power shall ensure that the facilities required by the Service provider in order to carry out the inspection are prepared. The Service provider shall cater for the following:

- 4.2.1 cordoned off area to prevent access by persons not directly involved in the examination;
- 4.2.2 provide their own lift testing tools ;
- 4.2.3 provide own resources (personnel) to remove covers or open up parts of the lift; and
- 4.2.4 Arranging, the preparation of parts or areas of the lift for non-destructive testing or examination (NDT).

4.3 Provisions for inspection

When inspection is undertaken, lifts shall be cleaned to remove all spilt matter and dirt that would otherwise conceal the structure or mechanisms and prevent an effective inspection. The inspection shall be carried out in a logical sequence, (for example, top to bottom), to ensure that nothing is overlooked.

The inspection scheme approach for thorough examinations, if used, shall be based on regular assessments of lifts in accordance with its usage. The Service provider shall take into account the age, loading, environmental and duty cycle history of the lift, and any examination intervals which have traditionally been accepted as appropriate for that or similar equipment. Equipment that does not have a complete record of the past usage shall be subjected to periodic thorough inspection.

The inspection plans shall include a written schedule of the steps required for periodically assessing the condition of items included in the inspection.

Note: The inspection plan intended to ensure that the lift remains safe to use and includes information on the required frequency of inspection.

4.4 Rated capacity indicator/limiter

- 4.4.1 Thorough examinations of elevators shall include confirmation that the Rated Capacity Indicator/Load (RCI/L) shall be calibrated to an accuracy within the tolerances given in SANS 50081
- 4.4.2 Calibration check shall be carried out at intervals not more than 6 months, and after the RCI/L has undergone repairs.
- 4.4.3 At each successive calibration, a different configuration of the lift shall be chosen so that eventually all configurations are systematically covered.
- 4.4.4 During the calibration check of the RCI/L, it is essential that the lift is not loaded beyond 100 % of its rated capacity. The radius/angle at which the test load corresponds to 100 % of the rated capacity shall be marked and the test load shall not be taken beyond that point.

4.5 Periodic inspection

Passenger and Goods lifts or elevators shall be examined by a Service provider at least once in every month, after carrying out the thorough inspection, the Service provider shall specify when the next inspection is to be carried out, which may be less than, but not more than, a month later.

4.6 Items to be checked at periodic inspections

- 4.6.1 Visual inspection on hoists for wear and damage;
- 4.6.2 Carry out a visual examination and functional check on the locking system for correct operation, for freedom from leaks, damage, corrosion and distortion, and for correct operation of all indicators.
- 4.6.3 Examine the tracks for wear and adjustment.
- 4.6.4 Examine the lift structure, for signs of damage, distortion, cracking and corrosion.
- 4.6.5 Inspect all bolts and fastenings to ensure that they are not coming loose.
- 4.6.6 Examine the full range of movements and with the lifts at maximum reach.
- 4.6.7 Examine all PLCs on the lift for corrosion, damage, leakage, security and fretting.
- 4.6.8 Examine all motors for leakage, and corrosion on the including and alignment. Visually check end fixings/stops for wear, security and lubrication.
- 4.6.9 Inspect lift car for corrosion, damage, cracks and distortion.
- 4.6.10 Examine all pivoting joints and attachments of the lift for wear, corrosion, security and evidence of lubrication.
- 4.6.11 Examine all wire ropes to determine whether they are of the size and type specified in the instructions and reeved in accordance with those instructions. Pay particular attention to the end terminations.
- 4.6.12 Check whether all pulleys/sheaves and drums are free from damage and wear, whether the rope fits correctly on them and if they are effectively lubricated. Check whether all idler pulleys/sheaves turn freely and ensure that all guards are undamaged and in place. Plastics sheaves need special attention, as surface cracks might be deeper than indicated on the surface and special solvents are required to establish the integrity of the sheaves.
- 4.6.13 Thoroughly examine the whole length of the wire ropes for signs of wear, damage, broken wires and corrosion. The requirements of the standard SANS 50081 shall be used;
- 4.6.14 Inspect the braking mechanism for wear, damage and adjustment, and check whether it conforms to the instructions for the lifts or elevators.

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- 4.6.15 Check any means of access for completeness, security handrails and handholds.
 - 4.6.16 Examine the control circuit for wear, security, freedom of movement and markings to show the correct size of the lift
 - 4.6.17 Check the oil and other fluids for the condition (for example by debris monitoring) and level of the fluid.
 - 4.6.18 Check whether the fixings for the lift control, where fitted, is all in place and secure.
 - 4.6.19 Check whether all control buttons are marked with their function and mode of operation.
 - 4.6.20 Inspect the upper and lower hoist limit switches and check if they are in place and free from damage and excessive wear.
 - 4.6.21 Examine the hooks, and their attachments and safety catches, for wear, fretting, distortion, corrosion and security.
 - 4.6.22 Examine the mounting attachment for corrosion, cracking, distortion and wear. Check whether the limit switches are in good working order.
 - 4.6.23 The functionally test all controls for smoothness of operation and to determine whether they are free from wear and other damage.
 - 4.6.24 Check whether warning signs and other important instructions are present and readable, for example the rating plate for load lifting.
 - 4.6.25 Operate the lift to check whether all motions operate smoothly and effectively without excessive play.
 - 4.6.26 Ensure that the load-lifting attachment does not drop excessively after the motion stopped, and all limiters and safety devices operate correctly.

4.7 Inspection before load testing

- 4.7.1 These inspections shall be determined, with the lift in motion and at rest whether it is
 - a) free from any defect that would preclude it from safely handling the test load,
 - b) in the correct configuration and condition according to the instructions, and
 - c) equipped with sufficient falls of wire rope for the load under consideration.
- 4.7.2 Check all safety switches, for example over the raising, lowering limit, and for correct operation.
- 4.7.3 Before the test, thoroughly examine the lifting accessories and determine whether the slinging arrangements are safe.

4.8 Load Test

- 4.8.1 New, reinstalled, altered, repaired, and modified lifts shall be load tested prior to initial use, as determined by a qualified person.
- 4.8.2 Load testing of altered, repaired, and modified lifts shall be limited to the functions affected by the alteration, repair, or modification, as determined by a qualified person.
- 4.8.3 The replacement of load chain and rope shall specifically excluded from this load test; however, an operational test shall be in accordance to relevant standard prior to putting the lift back in service.
- 4.8.4 If a load test is conducted, the load shall be not less than 100% of the rated load of the lift), whichever governs; or more than 110% of the rated load of the lift, whichever governs; unless otherwise recommended by the manufacturer or a qualified person.
- 4.8.5 If a load test is finished, the person conducting the load test shall prepare a written test report and the operations performed during the test. Reports shall be kept in a file,
- 4.8.6 Upon finishing the load test, operations be performed as outlined below or as modified by a qualified person.
 - a) Lower the test load, and stop and hold the test load with the brake(s).

4.9 Levelling

The lift shall be levelled to the appropriate level according to the recommendations of a Service Provider.

4.10 Inspection after load testing

After load testing, a thorough examination shall be undertaken by a competent person to determine whether the lift has withstood testing without signs of structural damage that could affect the safety of the lift, such as

- a) cracking,
- b) permanent deformation,
- c) paint flaking, and
- d) loosening of, or damage to, structural connections;

4.11 Inspection and certification

4.11.1 When the test has been completed, the Service provider shall issue the appropriate certificate, which shall be included to the report of the inspection and testing.

4.11.2 After all the inspection and testing, the Service provider shall provide a report detailing required information as per SANS 50081.

4.12 Non-destructive testing (NDT) of lifts

NDT of passenger and goods lifts or elevators might be necessary, particularly when there is a suspicion of cracks or other damage being present in structural parts of the lift or elevator.

4.13 Items to be checked, repaired, maintained after periodic inspection

4.14.1 Inside car

- 4.14.1.1 Ensure the doors can open and close freely without obstruction ;
- 4.14.1.2 Look for the signs of damage on the ceiling , handrails and walls ;
- 4.14.1.3 Find and replace any burned out lights , including in the control panel; and
- 4.14.1.4 Confirm that the emergency phone connects quickly with local fire department.

4.14.2 Outside the car

- 4.14.2.1 Replace any lights that have burned out at each floor;
- 4.14.2.2 Inspect the door panels and clearances ;and
- 4.14.2.3 Test the smoke detector and fire alarm system.

4.14.3 In the machine room

- 4.14.3.1 Test the smoke detector and fire alarm system;
- 4.14.3.2 Check oil levels and ensure all systems are properly lubricated;
- 4.14.3.3 Examine electrical wiring for signs of fraying or defects;
- 4.14.3.4 Make sure there is adequate headroom for technicians; and
- 4.14.3.5 Remove anything that interferes with access to the equipment.

4.14.4 On top of the car (Compartment)

- 4.14.4.1 Ensure the emergency exit hatch is easily accessible;
- 4.14.4.2 Test the brakes and inspect the mechanism to make sure it is in good condition;

4.14.4.3 Check cables for signs of wear;

4.14.4.4 Look for signs of rodents for vandalism along the hoist way;

4.14.5 In the pit

4.14.5.1 Make certain the area has proper access;

4.14.5.2 Inspect the pit , to make sure it has the necessary clearance; and

4.14.5.3 Check the car frame for signs of damage.

5. PERSONAL PROTECTIVE CLOTHING

The Service provider shall conform to the Safety, Health, Environmental and Quality requirements. Any person working on equipment shall wear personal Protective Equipment (PPE) at all times. The Service provider shall ensure that the correct PPE is worn for specific activities during lift or elevator maintenance.

6. DOCUMENTATION

The Service provider shall prepare Inspection; Load testing and functional performance test report covering all information, data sheets, and a comprehensive summary describing any test. The test report shall be submitted to City Power Responsible person. City Power shall then accept responsibility for operating the elevator or any equipment being inspected or tested.

Information on, rated capacities, maintenance repairs, renewals and operators' instructions, full service history shall be generated by the Service provider, as City Power has no records at present for any Lift or Elevator maintenance. A Report of thorough examination after an inspection has been done, shall, be supplied and retained by City Power.

7. PERFORMANCE

City Power may inspect and test the various portions of the work at all times and shall have full power to reject all or any portion of the work that City Power may consider sub-standard or inferior as per the quality of workmanship with respect to the original design.

The service provider shall correct a portion of the work rejected, immediately. The Service provider shall at his own expense, be at liberty to repair the work to the satisfaction of City Power. The Service provider shall carry out such work/tests as necessary, in the opinion of City Power, to prove that the contract requirements are met.

It is also primarily important that the service provider shall be accredited with a valid SANAS Certification, for Inspection of Lifts, Escalators and Passenger conveyors.

8. TRAINING OF STAFF

The following training courses, for City Power's staff be provided; which is listed into three main areas:

- a) operation;
- b) maintenance; and
- c) associated disciplines/information, such as, examination and the safe use of Passenger and Goods Lifts or Elevators

It is advisable that each of the above be separately attended, since they are applicable in different ways to different equipment.

In addition to complying with all the mandatory requirements given in national legislation, training documents shall comply with the operational and maintenance requirements given in the standard. The training documentation supplied shall explain all the safety aspects of the electrical equipment installation.

9. QUALITY MANAGEMENT

A quality management system shall be set up in order to assure the quality during removal, transportation and disposal of scrap metals. 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 purchaser and supplier.

10. HEALTH AND SAFETY

A health and safety plan shall be set up in order to ensure proper management and compliance during removal, transportation and disposal of scrap metals. Guidance on the requirements of a health and safety plan shall be found in ISO45001:2019 standards. The details shall be subject to agreement between City Power and the Supplier.

11. ENVIRONMENTAL MANAGEMENT

An environmental management plan shall be set up in order to ensure the proper environmental management and compliance is adhered to during removal, transportation and disposal of scrap metals. Guidance on the requirements for an environmental management system shall 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 SHEQ Policy.

SCHEDULE OF TASKS TO BE CARRIED OUT ON INSPECTION/REPAIRS

Part	Description of task (Six) monthly inspection
1	MACHINE ROOM
	Access secured /locked
	Access light to machine room(what's the Lux Capacity)
	Warning Notice posted on the door
	Fire extinguisher expiry date:
	Verify validity date and relevant information is correct?
	Are the monthly records up to date?
	Has the six monthly rope inspection been done and recorded in the record book onsite
	Has the annual safety test been done conducted, recorded in the record book
	Has the annual buffer test been done, conducted, recorded in the record book
	Machine room lighting(300Lux) -checked
	Verify the earth leakage-is the car 220VAC supply connected to the earth leakage
	All equipment identified
	Emergency release equipment and procedure correct and operating
	Floor marking indication(door zone)
	Warning signs/labels in place
	All electrical conductors identified/guarded
	Drive sheaves and rotating equipment guarded
	Holes in floor covered/guarded/protected.
	Secondary emergency stop switch installed and functioning.
	Is the condition of the brake good and parts pertaining to the braking system?
	Is the condition of the machine good
	Is the condition of the drive motor good
	Lift speed as per requirements & verified
	Is the governor in a good working condition /Trip the governor on inspection speed and verify the protections are applied correctly
	Overruns for both directions, have they been checked
	Confirm traction in accordance to the industry standard
	Sign the equipment book

	CAR TOP
	Car top clean and free of materials
	Warning signs in place
	Guards/Protection: are the permanent car top guardrail in place
	Is the emergency stop switch operational
	Is the top of car inspection unit operating
	Are the protections clean and free of any rust
	Are all linkages intact and free
	INSIDE CAR
	Lights inside the car operating correctly-50 LUX
	Car interiors in good condition
	Door operation and pressure tests: maximum door closing force-150N or less
	Door operation and pressure tests: Kinetic energy-10j or less
	Re opening devices working
	Nudging pressure(if feature available) max 4 joules
	Is the intercom working
	Is the alarm button working
	HOISTWAY
	Access to the HOISTWAY foyer: safe and well lit
	Is there adequate lighting in the HOISTWAY-50 lux min
	All holes filled and projections guarded
	Is the HOISTWAY screening/projection installed- if in multiple elevators in common shaft
	Is the condition of the ropes to a standard
	Is the HOISTWAY adequately ventilated
	PIT
	Access to the pit foyer: safe and well lit
	Is the emergency pit stop switch operating correctly and compliant
	Is there adequate lighting in the pit
	Warning signs: check if designation in pit
	Pit; Clean and tidy

Counterweight Filler Lifting Tool protection guards installed
Is pit screening installed
Equipment properly identified
Safe access to reach bottom of car
Pit ladder installed
Electrical safety contacts/switches checked.
Buffer Gear- checked.
COUNTERWEIGHTS
Counterweights cleats installed
Counterweight safety devices checked and working
Counterweight suspension points and related equipment-checked?
LANDINGS
Access to foyer: safe and well lit?
Is the landing door operation good and all locking devices in order-both mechanical and electrical?
Has all associated landing door equipment been checked and in order?

Part	Description of task of yearly (12 month) inspection and Test
1	1.Load testing 2.Load limiters calibration 3.Non-destructive testing a) Main hoist hock 4.Load test of lifting tackle 5.Producing a load certificate

Travel and Costs as per the table below:

Item	Description
1.	From office to site (per radius)

Skills Costs as per the table below:

**STANDARD FOR INSPECTION AND
MAINTENANCE OF ELEVATORS**

Items	Description
1.	Competent person hourly rate
2.	Assistance hourly rate

Tender Number:

Tenderer's Authorised Signatory:

Name in block lettersSignature

Full name of company:

ANNEXURE A - BIBLIOGRAPHY

None

ANNEXURE B - REVISION INFORMATION

DATE	REV. NO.	NOTES
May 2021	0	First issue
September 2022	1	Amend ISO requirements