

CONTRACT DATA

**A contract between
SENTECH, Sender Technology Park, Radiokop, Octave Road, Honeydew,
and**

**APPOINTMENT OF A SERVICE PROVIDER FOR THE REPLACEMENT OF THE BRIXTON
TOWER LIFT, INCLUDING MAINTENANCE AND SUPPORT FOR A PERIOD OF THREE
(03) YEARS WITH THE OPTION FOR FURTHER RENEWALS**

Bid Number: SENT/069/2023-24

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PART C1: AGREEMENTS AND CONTRACT DATA –

Form of Offer and Acceptance Offer

Sentech, identified in the acceptance signature block, has solicited offers to enter into a contract for the replacement of the current lift at Brixton Tower, as well as resolve the current problem where the lift communication and control systems are being affected by RF interference. The existing steel cage as well as the existing shaft will remain unchanged. The new lift will have to be retrofitted into the existing infrastructure.

The Bidder, identified in the offer signature block, has examined the documents listed in the Tender Data and addenda thereto as listed in the Bid schedules, and by submitting this offer has accepted the conditions of the Bid.

By the representative of the Bidder, deemed to be duly authorized, signing this part of this form of offer and acceptance, the Bidder offers to perform all of the obligations and liabilities of the Bidder under the Contract including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the conditions of contract identified in the Contract Data.

THE OFFERED TOTAL OF THE PRICES INCLUSIVE OF APPLICABLE TAXES; (in the Bids applicable currency).

_____ (amount in words);

_____ (amount in figures)

NB: The Prices quoted above is the total Bid offer inclusive of all applicable taxes for the Contract duration. The price must be carried over from the price breakdown / schedule of rates provided in the Bid document.

This offer may be accepted by Sentech by signing the acceptance part of this form of offer and acceptance and returning one copy of this document to the Bidder before the end of the period of validity stated in the Tender Data, whereupon the Bidder becomes the party named as the Bidder in the conditions of contract identified in the Contract Data.

Bidder's Signature(s) _____

Signed by the Bidder at _____ **on this the** _____ **day of** _____ **20** _____

Name(s) _____

Capacity _____

Address (Domicillium)

Acceptance

By signing this part of this form of offer and acceptance, Sentech accepts the Bidder's offer. In consideration thereof, Sentech shall pay the Bidder the amount due in accordance with the conditions of contract identified in the Contract Data. Acceptance of the Bidder's offer by the signature by Sentech shall form an agreement between Sentech and the Bidder upon the terms and conditions contained in this agreement and in the contract that is the subject of this agreement.

The terms of the contract, are contained in:

Part C1 Agreements and contract data, (which includes this agreement)

Part C2 Pricing data

Part C3 Scope of work.

and drawings and documents or parts thereof, which may be incorporated by reference into Parts C1 to C3 above.

Deviations from and amendments to the documents listed in the Tender Data and any addenda thereto as listed in the Bid schedules as well as any changes to the terms of the offer agreed by the Bidder and the employer during this process of offer and acceptance, are contained in the schedule of deviations attached to and forming part of this agreement. No amendments to or deviations from the said documents are valid unless contained in this schedule of deviations.

Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this agreement.

Sentech's Signature(s) _____

Signed by Sentech at _____ **on this the** _____ **day of** _____ **20** _____

Name(s) _____

Designation _____

SENTECH SOC LIMITED,
Sender Technology Park
Octave Road, Radiokop
Honeydew
Johannesburg

Date _____

Upon acceptance by Sentech of the Bidder's offer, a contract will come into existence.

SCHEDULE OF DEVIATIONS

Notes:

- 1 The extent of deviations from the Bid documents issued by the Sentech before the Bid closing date is limited to those permitted in terms of the conditions of Bid.
- 2 A Bidder's covering letter shall not be included in the final contract document. Should any matter in such letter, which constitutes a deviation as aforesaid, become the subject of agreements reached during the process of offer and acceptance, the outcome of such agreement shall be recorded here.
- 3 Any other matter arises from the process of offer and acceptance either as a confirmation, clarification or change to the Bid documents and which it is agreed by the Parties becomes an obligation of the contract shall also be recorded here.
- 4 Any change or addition to the Bid documents arising from the above agreements and recorded here shall also be incorporated into the Contract.

1. **Subject** _____

Details _____

2. **Subject** _____

Details _____

3. **Subject** _____

Details _____

4. **Subject** _____

Details _____

By the duly authorised representatives signing this schedule of deviations, Sentech and the Bidder agree to and accept the foregoing schedule of deviations as the only deviations from and amendments to the documents listed in the Tender Data and addenda thereto as listed in the Bid schedules, as well as any confirmation, clarification or changes to the terms of the offer agreed by the Bidder and Sentech during this process of offer and acceptance.

It is expressly agreed that no other matter whether in writing, oral communication or implied during the period between the issue of the Bid documents and the receipt by the Bidder of a completed signed copy of this Agreement shall have any meaning or effect in the contract between the parties arising from this agreement.

Contract Data

Part one - Data provided by Sentech given in all contracts

1. The Purchaser is

SENTECH SOC LIMITED,

Sender Technology Park

Octave Road

Radiokop

Honeydew

Johannesburg

2. General

The National Treasury General Conditions of Contract for goods and services (NT GCC, 2010) or General Conditions of Contract for Works (2015) as issued by National Treasury and the Construction Industry Development Board of the Republic of South Africa apply, respectively.

The goods are specified in the Scope of Work. The Special Conditions of Contract (SCC) are stipulated in the Tender Data.

3. Goods information:

The *Goods Information* is in the document called "Scope of Work" and in the documents and drawings referred to by it.

4. Terms of Delivery

The *Terms of Delivery* are contained in the General Conditions of Contract (GCC) and Special Conditions of Contract.

5. Language

The *language* of this contract is English.

6. Governing Laws and Jurisdiction

The Contract shall be governed by and interpreted according to the laws of the Republic of South Africa.

In the event of a conflict between or inconsistency in the laws applicable in the various provinces of the Republic of South Africa, the law as applied and interpreted in the Gauteng Province shall prevail.

The parties irrevocably submit to the exclusive jurisdiction of the South Gauteng High Court, Johannesburg in respect of any action or proceeding arising from this Bid.

This Bid and all contracts emanating there from will be subject to the General Conditions of Contract issued in accordance with Treasury Regulation 16A published in terms of the Public Finance Management Act, 1999 (Act 1 of 1999). The Special Conditions of Contract are supplementary to that of the General Conditions of Contract. Where, however, the SCC are in conflict with the GCC, the SCC shall prevail.

7. Sub-contracting post award

A Bidder awarded a Bid may only enter into a subcontracting arrangement with the approval of Sentech. The successful bidder may not subcontract more than 25% of the value of the contract to any other enterprise that does not have an equal or higher B-BBEE status level of contributor than the Bidder concerned, unless the contract is subcontracted to an EME that has the capability and ability to execute the subcontract.

8. Transformation Plan

A transformation plan is a record of activities an entity intends to undertake to improve its BBBEE Level through Ownership, Management and Control; Skills Development; Enterprise and Supplier Development and Socio-Economic Development.

Sentech reserves the right to request a BBBEE transformation plan with clearly defined timelines and milestones if the recommended bidder does not meet Sentech's transformation goals. These milestones must be achieved over the term of the contract. This transformation plan shall be submitted within 10 working

days from the written request, failing which Sentech reserves the right to withdraw its appointment of the preferred recommended Bidder.

9. Warranty

The warranty period is 12 months after Delivery.

10. Payment

The method and conditions of payment are contained in the Tender Data, GCC and SCC.

The interest on late payment is 0 % per complete week of delay.

11. Currency

South African registered businesses that purchase equipment overseas and quote in foreign currency will be required to provide Sentech a 6-month forward cover contract on appointment. The 6 months forward cover will be re-negotiated and renewed every 6 months should the contract term on this tender be longer than 6 months. In the case of failure to price for forward cover, the client will not accept any claims due to currency fluctuations.

12. General - Prices

Unless approval has been obtained from Sentech, no adjustment in contract prices will be made.

Applications for price adjustment must be accompanied by documentary evidence in support of any adjustment.

13. Price Negotiations

Sentech reserves the right to negotiate market related prices. If market-related prices are not agreed to, Sentech reserves the right to cancel the Bid.

14. Liabilities indemnities and insurance

Insurance is required from the Bidder in respect of delivery and transportation where applicable.

15. Disputes

Should any dispute, disagreement or claim arise between the parties ("the dispute") concerning this Agreement, the parties shall try to resolve the dispute by negotiation. This entails one party inviting the other party to meet and attempt to resolve the dispute within fourteen (14) days from the date of the written invitation.

If the dispute has not been resolved by such negotiation as referred to in this clause above, the Parties shall submit the dispute to the Arbitration Foundation of Southern Africa ("AFSA") for administered mediation, upon the terms set out by the AFSA secretariat.

Failing such resolution, the dispute shall be resolved by arbitration in accordance with the rules and procedures of AFSA by an arbitrator appointed by AFSA. Where the arbitration route is followed, the dispute must be adjudicated within Johannesburg in the English language and finally resolved in accordance with the rules of AFSA, by an arbitrator or arbitrators appointed by that Foundation.

The provisions of this clause shall not preclude any party from obtaining relief from a Court of competent jurisdiction. To this extent, the Parties hereby consent to the jurisdiction of the South Gauteng High Court, Johannesburg, South Africa. The provisions of this clause shall continue to be binding on the Parties, notwithstanding any termination or cancellation of this Agreement.

16. Termination

Sentech shall have the right, at its sole and exclusive discretion, upon written notice to the Bidder, to terminate this Agreement, in whole or in part should the Bidder fail to perform any of its obligations or deliver any deliverable timeously or should Sentech not be satisfied with the quality of any service/s in terms of this Agreement, to the satisfaction of Sentech.

Sentech shall furthermore have the right, as a result of such termination, to appoint a third party to perform the obligations of the Bidder in terms of the Agreement and the Bidder indemnifies Sentech against all costs incurred by Sentech in appointing such third party to fulfil the obligations of the Bidder.

Sentech shall have the right, at its sole and exclusive discretion, to terminate this Agreement, at any time, upon 30 (thirty) days' written notice to the Bidder.

17. Contract Term

This contract will run for a period not exceeding **10** months.

18. Supplier Due Diligence

Sentech reserves the right to conduct supplier due diligence at any time pre, during and post the contract period. This may include announced or unannounced site visits.

19. Cession

Sentech shall be entitled to cede, delegate, assign, charge, transfer or otherwise dispose of this Agreement or any rights or obligations therein in whole or in part, upon prior written notice to the Bidder.

20. Monitoring and Evaluation

The service delivery and performance of the Bidder will be monitored and evaluated by Sentech at all relevant times. In the event that the Bidder defaults in any manner or form, Sentech reserves the right to blacklist the Bidder on the National Treasury Database of Prohibited Suppliers and Tender Defaulters, and to take such further steps as may be warranted in the circumstances which steps shall be determined at Sentech's sole and exclusive discretion.

21. Protection of Personal Information Act No. 4 of 2013 ("POPI")

Sentech is POPI compliant and the Bidder will ensure that it conducts itself within the prescripts of the prescribed legislation.

Should Sentech need to collect Personal Information by law or in consideration of the Tender, and the Bidder fail to provide the Personal Information when requested, Sentech may refuse to accept the relevant services from the Bidder, and the Bidder will be notified in this event.

By agreeing to the terms of this Agreement, the Bidder voluntarily authorizes Sentech to process its' personal information (including its' name, credit card & banking details, physical address, telephone numbers, reference letters & any other information it has provided to Sentech) for purposes of Tendering and contracting.

The Bidder consents to the transfer of such personal information to third parties.

This consent is effective immediately and will endure until the relationship between the Bidder and Sentech has been terminated.

The Bidder indemnifies and holds Sentech harmless against any loss, whether direct or indirect, arising out of the failure to process any of its' personal data in accordance with applicable laws.

22. Delay damages

As stipulated in the Special Conditions of Contract.

Sentech's Representative is

Name: Mr. Zunaid Adams

Address: **SENTECH SOC LIMITED,**

Sender Technology Park
Octave Road,
Radiokop, Honeydew
Johannesburg

Tel No. 0114714400

Sentech's Representative is the Executive: Legal and Regulatory.

Contract Data

Part two - Data provided by the Bidder

Statements given in all contracts

The Bidder is:

Name _____ Address

a company / close corporation / partnership duly incorporated in accordance with the laws of the Republic of South Africa.

PART C2: PRICING DATA
Price List

ITEM NO	DESCRIPTION	UNIT	QTY	RATE	R
1	<u>PRELIMINARY & GENERAL</u>				
1.1	Fixed Cost Items (SANS 1500 SA 8.3)	sum	1		
1.2	Contract Requirements	sum	1		
1.3	Currency Forward Cover (Refer to Contract Data – Item 11: Currency)	sum	1		
	<u>Site Establishment</u>				
1.4	Stores	sum	1		
1.5	Allow for joint programming of all aspects of the work with the appointed professional team and the client	sum	1		
1.6	Occupational Health Compliance (Safety file to be approved before works commence on site)	sum	1		
1.7	Performance Guarantee covering the bidder's tendered price for their proposed project duration.	sum	1		
1.8	Public Liability Insurance Cover as per the R 10m limit	sum	1		
1.9	Protection of existing services / equipment. Costs include ensuring that no Sentech equipment, cabling and signage is damaged, but if so, then the cost shall include the immediate reinstatement thereof.	sum	1		
1.10	Other Obligations: (<i>Furnish Details</i>)	sum	1		
Sub-total for Bill No.1 (Carried Forward to Next Page)					
Scheduled of Quantities					

ITEM NO	DESCRIPTION	UNIT	QTY	RATE	R	C
2	<u>PROVISION SUMS</u> Include the following Provision Sums (Which may be utilized or omitted at the discretion of the Engineer), in the Tender Price					
2.1	Provisional Sum for Contingencies	sum	-	-		650 000
2.2	Upgrade to existing steel structure	sum	-	-		400 000
2.3	Provisional Sum for Escalation	sum	-	-		175 000
Sub-total for Bill No.2 (Carried Forward to Next Page)						1 225,000
Scheduled of Quantities						

ITEM NO	DESCRIPTION	UNIT	QTY	RATE	R C
3 3.1	<u>PASSENGER LIFT INSTALLATION</u> Supply and installation of a 14 Person 750 kg Passenger Lift/Goods as described in this specification, including all material, equipment, labour, and transport to the site as well as the 12 month guarantee period	sum	1		
3.2	Communication systems Installer to provide a comprehensive lift communication system that is free from EMI interference. Refer to the specification on the communication protocol required. A method statement will have to be issued by the installer and test results to be provided to prove the absence of interference. The costs must also include having a redundant communication protocol(wired) to be used in the event the main communication line is down.	sum	1		
3.3	Supply and install custom made RF Shielded Cabinets for lift control panels. This project intends to ensure that the Lift operation is not affected by EMI interference.	sum	1		
3.4	Supply and install the system earthing/grounding system. Proposed methodology to be approved before installation, test results and certificate to be issued on commissioning.	sum	1		
3.5	Hoisting and rigging. The installer must take into consideration the Silo height when costing this item. Also, take note that some equipment must be taken up before the existing lift is decommissioned. Proper planning is required when pricing this item as no further claims will be granted against this item	sum	1		
3.6	Decommissioning of the old lift	sum	1		
3.7	Compilation of Operation and Maintenance Manuals	sum	1		
3.8	Testing, commissioning, and handover	sum	1		
	Sub-total for Bill No.3 (Carried Forward to Next Page) Scheduled of Quantities				

ITEM NO	DESCRIPTION	R
1	Bill No 1 Preliminaries and General	
2	Bill No 2 Provisional Sum	1 225 000
3	Bill No 3 Passenger Lift Installation	
	ADD 15% VAT	
	TOTAL CARRIED TO FORM TO TENDER	

PART C3: SCOPE OF WORK

SENTECH'S GOODS INFORMATION

XXXXX

1. TECHNICAL REQUIREMENTS

1.1. Glossary of Terms

Abbreviations	Descriptions

2. INTRODUCTION

Sentech intends to replace the current lift at Brixton Tower. The lift is installed in 168 m high silo-type radio tower housing 15 FM transmitters. The intention is to replace the 45-year-old electro-mechanical, solenoid /contactor-controlled lift.

- There are four stories with landings on the Ground to 3rd floor and four landings at the top.
- The lift is housed inside a steel cage in the silo,
- The existing motor and control panel is situated on top of the lift shaft.
- There is constant maintenance ongoing, and downtime must be limited to a bare minimum.
- The lift communication systems are being affected by Electromagnetic Interference due to the presence of High-Density radio frequency waves.

This project intends to make sure that the lift communication and control systems are not affected by the EMI interference. It is also the intention of this project to have a reliable redundant communication system (wired system) that will be used should the duty communication systems fail for whatever reason.

- The lift specialist is to provide a communication system that is free from interference.
- All systems must have a grounding system.
- Guides and guide brackets will remain (structural steel support).
- It is the professional opinion of the engineer that the current installation be retrofitted with a new: Passenger/Goods lift, Lift car, ARD, (Elevator emergency automatic rescue device), Lift car control, Lift car belt drive, electrical equipment, RF-resistant communication cables.

As this is a retro-fit project, the contractor must pay particular attention to the following items when pricing this document.

- Repositioning of the lift motor and controller to ground floor to minimize interference.
- Check the integrity of the existing ropes and their lengths (make provision for additional lengths if needed)
- The contractor needs specialist services to have proper EMI screening methodology and implementation.
- The contractor also needs to plan properly in terms of having equipment that need to be taken up done before the old lift is decommissioned.
- The intention is to retrofit the new lift in the existing steel cage. A provisional amount will be set for works that will need to be done on the steel structure.
- The contractor is to submit a risk and safety protocol (Fire, ventilation, and emergency escapes)
- The contractor Programme should include decommissioning works, new lift installation as well as associates works necessary for the execution of the project.

The contractor needs to also prepare a Health and safety file.

3. SCOPE OF WORK

The project scope of work will include:

- Final measurements and procurement of components,
- Submit the final FM screening designs to the engineers for sign off, (Please refer to attached Ambient Radiated Emission Results)
- Managing of the programme to minimise downtime,
- Liaison with user client and schedule final shutdown,
- Drafting and introducing structural and other services that may be done whilst the existing lift is still in operation,
- Structural changes to the lift cage,
- Prepare a new lift motor and control room on the ground floor,
- Decommissioning of the existing lift while retrofitting the new cage,
- Installing the new lift,
- Testing and commissioning

It should be noted that this is a retrofit project, hence the onus will be on the Lift installer to make sure that all existing measurements are correctly captured.

4. DESIGN APPROACH AND METHODOLOGY LIFT REPLACEMENT - GENERIC APPROACH Detailed Lift Requirements

The design for the new lift will follow the below generic guidelines.

The following conditions will be taken into consideration on the final lift specification.

- (a) Electricity Supply
- (b) Ambient Air Conditions
- (c) Altitude of the site

Description of Lift System

Description	Lift Number	Stops	Floors	Speed	Load	Units
Passenger Lift	L 1	6	1F,2F,3F,4F,4F.5F.6F	3.5m/s	750kg	1

4.1 Technical Requirements for Lift

4.1.1 General

<u>Item</u>		<u>Description</u>	<u>Detail Requirements</u>
(a)		Number of Units	1
(b)		Type of Lift	Passenger and occupationally Goods
(c)		Load	750 kg
(d)		Speed	3.5 m/s(10% VARIENCE)
(e)		Lift Numbers	L1
(f)		Total Travel	168m
(g)		Number of Stops	Lift 6 stops
(h)		No of Openings	6 vertical in line
(i)		Car Entrances	One per Lift
(j)		Floor Designation	1F,2F,3F,4F,4F.5F.6F
(k)		Pit Depth	3660(as per information provided)
(l)		Machine Room Dimension	No machine Room-motor and controls in the shaft
(m)		Pit Service Platform	N/A
(n)		Extended Buffers	N/A
(o)		Access below Pit	N/A
(p)		Counterweight Safeties	N/A

4.1.2 Machine

<u>Item</u>	<u>Description</u>	<u>Detailed Requirements</u>
(a)	Drive	Variable Voltage Variable Frequently
(b)	Machine	DC Gearless, right hand
(c)	Traction diameter	TZ=1200Mm
(d)	Automatic Self- Levelling	Yes, As Specified
(e)	Rope size	10mm

4.1.3 Control Operation

Item	Description	Detailed Requirements
(a)	Operation	Full Collective
(b)	Up/Down Peaks	N/A
(c)	Fire Control	Level-1, As Specified
(d)	Evacuation Floor	Ground Level
(e)	Emergency Power Control	Level-1 & -2, As Specified
(f)	Evacuation Floor	Ground Level
(g)	Independent Control	N/A
(h)	Load Measuring	Overload, Landing Call By-pass, Anti- Nuisance

4.1.4 Landing Equipment

Item	Description	Detailed Requirements
(a)	Landing Doors Opening	Dependent on the lift manufacturer
(b)	Door Operation	Single Speed, Sliding
(c)	Door Control	Telescopic
(d)	Position Indicator	Digital Indicators on Main Landing (Ground Level) Only
(e)	Waiting Lanterns	Yes, As Specified
(f)	Gongs	Yes, As Specified
(g)	Call Buttons	Approved, Vandal Proof Mechanical Micro-Push Button
(h)	Direction Arrow	Yes, As Specified-Above all Landing Entrance

4.1.5 Car Equipment

Item	Description	Detailed Requirements
(a)	Number of COPs	One per Lift
(b)	Protection Drapes	Yes
(c)	Position Indicator	Yes, As Specified in COP
(d)	Direction Arrows	Yes, As Specified in COP
(e)	Intercom	Yes, As Specified- Master Station – Security Control
(f)	Call Buttons	Yes, Vandal Proof Mechanical Micro-Push Button
(g)	Door Detectors	Yes, As Specified- Ultrasonic Proximity Detectors
(h)	Signage	Yes, As Specified
(i)	Emergency Light	Yes, As Specified
(j)	Braille Call Buttons	Yes, As Specified

4.1.6 Shaft Dimensions and Equipment

Item	Description	Detailed Requirements
(a)	Shaft Dimensions	As measured on site
(b)	Head Room	6500
(c)	Pit Sump	Supplied by Others
(d)	Shaft Lighting	Yes, 50lux

4.1.7 Car Enclosure

Item	Description	Detailed Requirements
(a)	Car Dimensions	Suitable for the pit (14 persons)
(b)	Car Clear Internal Height	2300 mm(approx.)
(c)	Clear Door Opening	915mm wide x 2000 mm high(approx.)

4.1.8 Finishes

Item	Description	Detailed Requirements
(a)	Fixture Faceplate	Minimum 3mm thick Stainless Steel (SST) with bevelled edges and a brushed finish
(b)	Car COP Faceplate	Full height next to car door SST with brushed Finish
(c)	Car Side Walls	SST- Brushed Finish on one side and the other side Glass
(d)	Car Rear Wall	SST- Brushed Finish part rest Glass
(e)	Car Front	SST- Brushed Finish
(f)	Car Floor	Normament- Principal Agent to Specify Colour
(g)	Car Ceiling	High-Quality Suspended Ceiling with recessed fluorescent Luminaires
(h)	Handrails	At a height of 900mm above the car floor on the sides and rear of the car
(i)	Car Doors	SST- Brushed Finish
(j)	Landing Doors	SST- Brushed Finish
(k)	Landing Frames	SST- Brushed Finish
(l)	Landing Signals	Fitted above landing entrances

5. DESIGN DESCRIPTION, CALCULATIONS AND DESIGN DATA

TESTS CERTIFICATES AND INSPECTIONS

The Lift Contractor shall carry out all the tests and checks required in the document SABS1545-10 Annex A and/or B and issue the necessary Certificate of Compliance before final completion.

Upon completion of the installation of all equipment and once in full operation, the Lift Contractor shall completely test the lift equipment to demonstrate that the equipment is provided in compliance with the specifications. The total costs for this test shall be included in the tendered amount.

The Lift Contractor shall decide on such tests and shall give at least 72 hours written notice to the Representative/Agent, before commencing the test.

In the event of the plant, equipment or installation not passing the test, the Representative/Agent shall be at liberty to deduct from the Contract amount all reasonable expenses incurred by the Employer and/or the Representative/Agent attending the test. All equipment remains at the contractor's liability until final handover. The contractor must bear the costs of replacing any portion of works that fails to pass tests without any claim to the employer.

Whenever any installation or equipment is operated for testing or adjusting as provided for above, the Contractor shall operate the entire system for as long a period as may be required to always prove satisfactory performance in the occupied space served by that system until the system is handed over.

The Contractor shall provide all labour and supervision required for such operation and the Department may assign operating personnel as observers, but such observation time shall not be counted as instruction time.

After completing the installation or system, all equipment shall be tested, adjusted and readjusted until they operate to the satisfaction and approval of the Representative/ Agent.

The Contractor shall submit certificates of tests carried out to prove the efficiency of all equipment, as well as certificates to be obtained from all relevant authorities, statutory bodies, etc.

6. EQUIPMENT REQUIREMENTS

6.1 HOISTING MACHINE

6.1.1 Traction Drive

(a) The brake shall be spring applied and electrically released by direct current. There shall be two shoes actuated by compression springs. The brake shall have sufficient power to hold the car at any landing with the normal amount of counterbalancing and with at least 150% of the rated load. The brake shall operate in the event of a power failure, or any other safety device designed to stop the lift.

(b) An effective sound-reducing material shall be installed between the bedplate of an overhead or basement driving machine and the beams, the structural concrete slab, the shaft structure or the upstands.

(c) The driving machine and motor shall have sufficient capacity to operate the lift continuously at 100% of the rated speed in both directions without overheating or hunting during levelling.

(d) The lift machinery shall operate silently and without vibration. The lifts shall constantly operate and shall be maintained at noise levels not exceeding 56 DB (A). The noise levels shall be considered acceptable if it does not exceed 56 DB (A) measured on the landing and in the car enclosure.

(e) Provision shall be made for a safe method of moving the car by hand in the event of a power failure and all the necessary equipment required to carry out this task shall be mounted neatly in the motor room and shall always remain on site.

(f) The Contractor shall supply and install suitable structural steel beams with bearing plates for the mounting of the lift machine on the motor room floor, as well as supporting beams or deflectors and secondary pulleys, as required. In the cases where machines are located below, the diverter sheaves shall be secured to the floor slabs and not to the overhead slabs, to prevent the transmission of vibration to the structure.

(g) Anti-vibration mountings shall be provided to minimise the transmission of vibrations to the structure and to ensure the silent and smooth operation of all the equipment. Tenderers shall describe the methods to be used to achieve the desired results.

6.2 HYDRAULIC DRIVE

(a) This drive shall not be accepted for this contract.

6.3 CONTROLLER

(a) Programmable solid-state operation and motion controller shall be provided to control the operation, the starting, the stopping and the speed of the lift motor and to apply the brake automatically if any of the safety devices operate or the power fails.

(b) All-solid-state controllers shall be enclosed in ventilated sheet metal cabinets with integral blowers. All power resistors and heat-generating transformers shall be mounted in separate enclosures if necessary to maintain the specified control panel internal temperature. The control cabinets shall be totally enclosed, vermin and insect-proof, drip-proof and dust-proof to at least class IP42 of IEC 144.

(c) Contacts breaking heavy currents shall be provided with magnetic blowouts and arc chutes. Contact surfaces shall be silver-to-silver except those for heavy currents, where carbon-to-silver or carbon-to-copper contact surfaces may be used.

(d) All terminals of the machinery and control gear shall be marked with distinctive letters or numbers, and corresponding markings shall appear on the contract drawings.

(e) All controllers shall be generic manufactured, assembled and supplied.\

(f) As a standard, PLC lift controllers shall not be accepted. However, if these controllers are considered a generic product by the Representative/Agent and can meet the requirements of the specification, PLC controllers may be offered as an alternative if the following requirements are met:

(g) Documentation stating that the control system has been subjected to extensive testing and is verified as safe, reliable, and fully complies with SABS 1545 and all national, and local regulations and by-laws.

(h) If requested by the Representative/Agent, the Contractor shall provide the Representative/Agent with a full set of backup software/software modules and all associated maintenance-related documentation including principal diagrams.

(i) Documentation from the PLC supplier is provided to verify the age of the model used, the date it is expected to be removed from the production line and the period the PLC supplier will guarantee parts and repairs.

(j) The Contractor shall verify that the PLC supplier is willing to maintain under a fully comprehensive agreement, the entire PLC unit(s) for at least 20 years.

(k) The control panel must attenuate EMC electromagnetic disturbances and be insulated at all times. This is mandatory failure to meet this specification will render your tender null and void

6.4 CONTROL SYSTEM

- (a) The control system shall be capable of constantly producing the performance criteria specified.
- (b) The associated control equipment for each control system shall provide smooth acceleration and deceleration. In conjunction with the controller and machine, the system shall consistently provide the performance times specified.
- (c) The drive control system shall be capable of decelerating the lift to stand still without a "Levelling in" or "creeping in" phase. Only lifts with direct floor approach capabilities shall be accepted.
- (d) The motor drive unit shall provide a smooth lift performance including acceleration, steady velocity and deceleration plus levelling to various floors within the time allowance and levelling tolerances specified. This performance shall be consistent under all conditions of loading and in either direction of travel.
- (e) The motor drive unit shall be equipped with all necessary monitoring circuits to maintain a safe and reliable operation. These shall include but are not limited to the monitoring of the load, direction of rotation, speed, supply voltage, and operating currents.
- (f) The hoist motor shall be provided with a thermostatically controlled blower, if necessary, to dissipate the heat to maintain the equipment within the specified operating temperature range.
- (g) The control system shall provide smooth acceleration and deceleration with levelling accuracy at all landings from no load to full rated load in the lift. This smooth operation shall be obtained for all lifts under stable conditions. A maximum of 0.8 seconds shall be allowed from the door close to the car start.
- (h) The equipment shall be designed to operate at plus or minus 15% of normal feeder voltage plus or minus 5% of feeder frequency without damage or interruption of lift service.
- (i) The control system shall be designed to operate the hoist motor continuously at 100% of the rated speed and 100% of the rated load in both directions without overheating or hunting.

6.5 MACHINE ROOM INDICATORS / ROPE MARKERS, MONITORS AND TESTING TOOLS

- (a) Monitor and keyboard or handheld testing instruments for commissioning, recommissioning and fault analysis of the lift control system shall be provided and shall always remain on-site.
- (b) As the lift travels through the lift shaft, a main hoisting rope marker shall indicate its floor-level position using a mechanical selector attached to the machine control indicator. This indicator shall operate independently of the lift control and shall not be dependent on the lift supply for its operation.
- (c) The lift control system shall be capable of generating error/fault reports. Error logs for the lift showing at least forty (40) of the most recent faults shall be accessible. The error log shall indicate the type of fault, date, and time the fault occurred.

6.6 SAFETY GEAR AND GOVERNOR

- (a) An over-speed governor, driven directly by an independent rope attached to the car, shall be provided in the motor room and shall be designed to operate the safety gear fitted to the car when the speed of the car, due to any cause, exceeds its normal maximum speed by more than a predetermined value. The tripping speed of the governor shall be selected with due regard to the rated speed. The

tripping speed shall be approximately inversely proportional to the rated speed and shall for rated speeds ranging from 0,25m/s to 5,0m/s does not exceed the rated speed by more than 40% and 20% respectively.

(b) The safety gear shall be arranged to stop the lift whenever excessive descending speed is attained. Means shall be provided to cut off power from the motor and apply the brake before application of the safety gear. The safety gear shall be released by moving the lift in the "UP" direction.

(c) The governor rope system, including the governor and tension sheave, shall be arranged so that the carrier shall not be released due to system dynamics when the lift is subjected to an emergency stop in the "UP" direction.

(d) Car and counterweight safety gear shall be provided with a switch to cut off the power from the motor and apply the brake if the safety gear applies without tripping the governor.

(e) Rope guards and an electrical contact to monitor the rope stretch shall be provided on the governor tension sheaves.

6.7 ROPE GUARDS

Rope guards shall be used to cover machine sheaves, secondary or deflector sheaves and governor sheaves to cover moving sheaves and ropes. Guards are also required on rope hole openings in the machine room and secondary level floors to prevent objects from falling into the lift shaft. Guards shall be provided in secondary level floors where ropes and tapes or selector drives pass through to prevent accidental contact.

6.8 MOTOR ROOM VENTILATION AND LIGHTING

(a) The Lift Contractor must ensure that the lighting levels and ventilation of the machine room provided are sufficient.

(b) If any alterations have to be made the Lift Contractor must inform the Representative/Agent in writing, to ensure that it will be corrected.

6.9 MACHINE DATA SUBMITTALS

The Contractor shall supply all the relevant machine data to ensure the correct power feeder design, including, but not limited to the following:

- Lift numbers
- Capacity / Rated load [kg]
- Traveling Speed [m/s]
- Supply Voltage [V]
- Supply Frequency [Hz]
- Number of wires
- Motor kW rating [kW]
- Roping
- Full load UP acceleration [A]
- Full load UP nominal speed [A]
- Machine heat release per car [BTU/hr/car]
- Power Factor [%]

6.10 LIFT SHAFT REQUIREMENTS

- (a) In terms of SABS 1545 (Parts 1 and 2) provide the necessary rope or selector tape guards in pit areas and landing door unlocking devices on all landings.
- (b) Provide safe Working Platforms in pits with depths more than two (2) metres and if necessary, at the top of the shaft to create sheave-room platforms. The working platforms shall comply with SABS 1545 (Parts 1 and 2) safety requirements pertaining to the depth/height and free space of these areas.
- (c) In terms of SABS 1545 (Parts 1 and 2), shaft lights are to be provided and installed by the Contractor.

6.11 CAR AND COUNTERWEIGHT GUIDE RAILS

- (a) The guide rails for the car and counterweight shall consist of planed steel tees with milled, tongued, and grooved joints. Metal splice plates shall be of a suitable length and fixing brackets for guide rails shall be provided at intervals not exceeding 2,4m. Guide rail fixings shall be in such positions that when the car is at any landing, the guide shoes on the car will be at a fixing bracket. The bottom end of each guide rail shall be provided with a sole plate fixed to the pit floor.
- (b) All brackets shall be secured using approved expandable concrete anchor bolts of adequate size and length.

6.12 HOIST AND GOVERNOR ROPES

- (a) The ends of the hoist ropes shall be properly secured to the car and counterweight crosshead or to the dead-end hitch plates on 2:1 roping, with adjustable rope shackles having approved sockets. Screw adjustment shall permit equalisation of the tension in all ropes.
- (b) The lift car hoisting rope attachment/hitch shall be suitably vibration-isolated to prevent rope noise from being transferred to the car enclosure.
- (c) Governor ropes shall be in accordance with SABS 1545 (Parts 1 and 2) and the steel rope shall be specially designed for lift service. The two ends shall be securely fastened together at the lift and shall be attached to the safety operating mechanism. The governor rope shall pass over the governor sheave and over an approved tensioner sheave in the pit. An electrical contact shall be fitted to the pit sheave and shall stop the lift if the governor rope becomes slack or breaks.

6.13 COUNTERWEIGHT

- (a) The lift shall be suitably counterbalanced for smooth and economical operation. Cast iron or steel sub-weights shall be contained in a guided structural steel frame. The counterweight shall be equal to the weight of the complete lift car plus at least 40% of the rated load. The weights in the counterweight frame shall be balanced with the weight equally distributed across the width of the frame to equalise guide pressures. The sub weights shall be welded or fastened together as necessary to prevent rattling.
- (b) Counterweight screen guards shall be provided at the bottom of the shaft to a height of 2150mm above the floor of the pit and approximately halfway up the shaft at the position where the car and counterweight pass each other.

6.14 CAR AND COUNTERWEIGHT GUIDE ROLLERS OR SHOES

The car and counterweight guide rollers/shoes shall constantly provide the ride quality as specified in Section 3 Clause 11 of this specification.

6.14.1 Guide Rollers

(a) The lift shall be provided with car and counterweight roller guides. Each roller guide shall consist of at least three wheels with durable resilient material, each rotating on ball bearings having sealed-in lubrication, assembled on a substantial metal base and so mounted as to provide continuous contact of all wheels with the corresponding rail surface under all conditions of loading and operation. The wheels shall run on three machined rail surfaces. The roller guides shall be properly secured at the top and bottom on each side of the car frame and counterweight frame.

(b) The roller guides shall run on dry guide rails. Sheet metal guards shall be provided to protect the wheels located on the top of the car and the counterweight. The roller wheels for the car shall not exceed 500 rpm and the roller wheels for the counterweight shall not exceed 1000 rpm at rated speed.

6.14.2 Guide Shoes

If the speed and load nominated for a specific lift allows the use of guide shoes:

(a) The lift shall be provided with car and counterweight spring-loaded guide shoes. The spring tension shall be adjusted to maintain the lift in the centre of the rails and provide continuous contact with the corresponding rail surface under all conditions of loading and operation. The guide shoes shall be lined with a durable resilient material, which shall ensure a quiet and smooth ride. When oil buffers are attached to the bottom of the counterweight, additional guide shoes shall be installed on each side of the buffer cylinder frame.

(b) The guide shoes shall run on lubricated rails. The guide rails shall be lubricated by a permanently mounted lubrication reservoir on top of the car and counterweight.

6.15 ELECTRICAL COMPENSATION

A sufficient extra hoisting kilowatt rating in the hoist motor, machine, and motor generator capacity and control equipment may be provided so that effective electrical compensation for the weight of the hoist ropes and travelling cables shall be accomplished as the lift travels through the lift shaft.

6.16 COMPENSATION CABLES

If Section 2 Clause 14 (Electrical Compensation), cannot be achieved the following shall apply:

(a) Compensating trailing cables or compensating chains encased in a synthetic sleeve (whisper flex) shall be used.

(b) Compensating cable restraining rings shall be provided in each pit and mounted on both the car and the counterweight buffer supports.

(c) Compensation shall be fixed to the bottom of the counterweight and car in a position that shall allow the counterweight to remain balanced in the guides and exert equal pressure on each face of the guide at the four guide locating positions.

(d) The fixing of the compensation to the car shall be accomplished by a vibration isolating compensation hitch.

(e) Where compensating steel ropes are used for compensation, they shall be accompanied by a statically balanced compensation pit sheave and shall be mounted centrally between the guides.

6.17 BUFFERS

- (a) Suitable oil, heavy spring or polyurethane buffers shall be provided for the car and counterweight and shall be so adjusted that in the case of over-travel, no parts of the car or counterweight will touch the shaft ceiling and that the retardation of the car does not exceed the limits as laid down in the SANS 1545.
- (b) Hydraulic buffers shall be constructed and shall be installed to allow the fluid level to be checked easily. Easy access to the buffer for testing and maintenance purposes shall be possible without having to remove the counterweight pit screen.
- (c) Energy dissipation type buffers shall have an electrical contact fitted to monitor the stroke (extended position).

6.18 PIT SWITCHES

Each lift pit shall be provided with watertight pit safety switches accessible from the entrance to the pits without the necessity of entering the pit and shall also be accessible from the pit while standing on the pit floor. The pit switch shall interrupt the power supply and apply the brake to hold each car to permit safe access to the pit. The pit switch shall be clearly distinguished from other switches that may be mounted in the pit area and the on/off position shall be clearly marked.

6.19 STOPPING DEVICES

- (a) Normal terminal stopping devices shall be enclosed in dust-proof enclosures for the lift. These devices, once operated, shall bring the lift automatically to a smooth stop at the terminal landing.
- (b) Final terminal stopping devices shall be positioned at the top and the bottom of each lift shaft. A fixed cam securely attached to the lift shall operate these final limit switches. These limit switches shall be independent of any other stopping devices and shall positively open without the use of springs to cut off all power from the driving machine motor and brake. It shall prevent the operation of the lift in either direction. They shall be so located that they open at the time the lift or the counterweight engages the buffer.

6.20 TRAVELLING CABLES

- (a) Travelling cables between the lift and the fixed lift shaft wiring shall be flexible and suitably suspended to relieve the strains in the individual conductors. All cables shall contain an approximately equal number of conductors or shall have equal flexibility.
- (b) Travelling cables shall include two shielded pairs for each lift car to accommodate voice communication.
- (c) The travelling cables shall be positioned in such a manner to eliminate the possibility of interference with the shaft information, selector tape or governor rope and all the necessary travelling cable protection shall be fitted to the shaft wall and shaft trimmers to prevent damage to the outer cover during normal travel.
- (d) The travelling cables shall be neatly and adequately strapped to the side of the car enclosure and all the necessary protection shall be provided where the cables cross over metal extrusions.
- (e) Travelling cables for the counterweight shall comply with the requirements of this section.
- (f) Flat and round trailing cables shall be fixed and shall hang in accordance with the trailing cable manufacturer's requirements.

6.21 ELECTRICAL WIRING AND CONTROL COMMUNICATION

- (a) All low voltage and control communication cables shall be run in separate ducts, conduits and trailing cables.
- (b) Car top terminal boxes of ample size and car top inspection control units shall be provided.

6.22 AUTOMATIC SELF LEVELLING

The lifts shall be provided with both a self-levelling and a re-levelling feature that shall automatically bring the lift to the floor landings within a tolerance of 3.0 mm under no load to full-rated load conditions without hunting. Self-levelling shall, within its zone, be entirely automatic and independent of the operating device and shall correct over-travel and rope stretch. The lift shall be maintained level with the landing, irrespective of load and while loading and unloading.

6.23 LIFT CAR CONSTRUCTION AND ENCLOSURE

- (a) The lift car shall be an assembly consisting of the sling, the platform, and the cabin.
- (b) The sling shall be constructed of rolled steel angle or channel sections bolted or welded together to form a rigid framework, which shall be suitably braced and reinforced to withstand the operation of the safety gear without permanent distortion.
- (c) The car platform shall consist of a 3mm thick mild steel plate or 20mm thick hardwood floor laid on closely spaced steel channel sections welded to a steel frame which in turn shall be laid on rubber pads in a structural steel frame. Load-weighing devices shall be incorporated where specified.
- (d) The cabin shall be designed as a fully enclosed car with a flat roof and solid full-height panels on the sides and the back.
- (e) The cabin shall be securely fixed to its sling and platform in such a manner that the cabin is not subjected to strain in the event of an unequal distribution of load occurring over the floor area.
- (f) The entire car assembly, including the car frame and the car platform shall be constructed to operate free from objectionable squeaks or metallic sounds, comprising of a rigidly tuned resonance car frame and acoustically treated superstructure.
- (g) The following features shall also be embodied in the lift car:
 - A continuous lighting system shall be provided along each side of the car. The lighting of the system shall consist of concealed, surface mounted, standard led luminaires, providing an illumination level of not less than 200 lux at 1000mm above floor level. LED shall be 1200mm, 36 Watt switch start type and shall bear the SABS mark. The width of the lighting troughs shall be the same as the front return panels and shall be covered by easily removable low brightness diffusers, mounted in purpose made hinged frames.
 - One of the lamps in each trough shall be provided with an emergency battery/inverter unit by means of which the lamp will be operated for at least 60 minutes in the event of a power failure. This lamp shall operate at full output under normal conditions.
 - Luminous car position indicator and "Up/Down" travel indicators installed above the entrance doors.
 - Fixing clips for the attachment of canvas protective coverings which shall be supplied with the lift for the side and rear walls.
 - Silent running squirrel cage, centrifugal flow exhaust blowers for passenger and goods/passenger lifts shall be mounted to draw air into car enclosure when doors are open and through door side clearances when doors are closed. The blower shall be mounted on the car top, draw air from the car through the perimeter of the suspended ceiling and exhaust the air into the lift shaft. The fan shall without exception, be capable of delivering not less than 0.3 cubic meters of free air per minute per square meter of floor area. The fan shall be switched via a toggle switch mounted in the car operating panel.

6.24 LIFT CAR FINISHES

Lift car finish detail shall be as specified in section 4 of this document.23.1 Passenger & Goods/Passenger Lift

- (a) The entire car's internal finish including the area above the suspended ceiling shall be installed and finished off to the highest standard. All finished work shall be smooth and free from wraps, buckles, squeaks and rattles and all joints shall be lightproof.
- (b) All wall panelling shall be jointed with a pliable material /silicone to prevent squeaks generated by car panel movement/deflection.
- (c) A robust handrail, consisting of an "Intrad" poly-carbonate bumper rail, spaced 50mm off the panelling, must be provided across the rear and side walls of the lift car. The spacer blocks to which the hand and bumper rails are secured shall be fixed to the panels using 2 x M10 bolts with locknuts or other approved methods.
- (d) Goods/Passenger lift car panels shall be manufactured from at least 1.5mm mild or stainless steel with at least two horizontal intermediate stiffening ribs and panels with a width greater than 400mm shall have vertical stiffening ribs at intervals not exceeding 200mm or equivalent construction.

6.25 FIXTURE FACEPLATES AND MOUNTING

- (a) Unless otherwise specified, all landing fixture faceplates shall be surface mounted and shall be manufactured of at least 3.0 mm thickness stainless steel, with bevelled edges for all lifts if square rectangle stainless steel face plates are offered. However, Contractors may offer alternative landing fixture faceplates if these faceplates are generic products and aesthetically acceptable to the Representative/Agent.
- (b) The fixture faceplates in the lift car and at the landings shall be mounted with concealed security fastenings or fastenings requiring special tools to remove them, as approved by the Representative/Agent. Exposed fastenings shall match the material and finish of the faceplate.
- (c) The following fixture face plates shall be located and sized by dimensions approved by the Representative/Agent:
 - o Car operating panels.
 - o Car position indicators.
 - o Car direction indicators.
 - o Landing push button stations.
 - o Landing position indicators and signals.
 - o Blanking-off plates
- (d) Without exception the Representative/Agent shall approve the final design of the fixture faceplates before placing the order or manufacturing of this equipment.

6.26 CAR AND LANDING DOOR OPERATOR

- (a) Only door operators with the capabilities of coping with medium to heavy traffic shall be accepted and the type of door operator offered shall be clearly shown in the tender submitted. The door system shall be capable of controlling the position of the doors at any given moment and shall constantly produce a smooth, accurate and efficient operation.
- (b) The doors on the lift car and at each landing opening shall be opened and closed quietly and smoothly by an electric operator.
- (c) The motion of the door operator shall be accomplished with arms and appropriate linkages to the approximate centre of gravity of the driven door panel.
- (d) Each landing door shall be equipped with Electro-mechanical interlocks so that the lift can operate only when the interlock circuit is established. Landing door locks shall meet the SANS 1545-

1 safety requirements. All work and material related to this Sub-Section shall form part of the Contractor's scope of work.

- (e) An independent auxiliary self-closing device shall close each landing door panel whenever the door is not in the closed position and the equipment relating to the car and landing door system does not restrain it.
- (f) An electric contact for the lift car door shall be provided which shall prevent the lift moving away from a landing unless the door is in the closed position.
- (g) An electrical contact shall be fitted to the non-driving car door if its linkage is dependent on a wire rope or chain.
- (h) Emergency Triangle access key mechanisms shall be provided at each entrance.

6.27 LIFT DOOR HANGERS

Hangers shall be equipped with ball-bearing adjustable rollers to take the up-thrust of the doors. The hangers and rollers shall be designed to accommodate the size and weight of the doors operated with a high-speed door operator.

6.28 CAR DOOR CONTROL

6.28.1 Car Door Motion Controllers

- (a) Car door motion controllers dependent on resistors, rheostats or switches to control the opening and closing motion shall not be accepted. The car door motion controller shall be capable of controlling the position of the doors at any given moment and shall constantly produce a smooth, accurate and efficient operation.
- (b) If doors are held open for an adjustable period by a passenger standing in the entrance or by constant pressure of the door open button, a buzzer shall sound and the doors shall start to close at a reduced speed and force level. When the doors touch an obstruction, they shall re-open.

6.28.2 Door protection devices

- (a) A non-retractable electronic infra-red/ultra-sonic protective leading edge shall be provided and shall extend at least 2100 mm above the platform and its active surface/area shall project beyond the front edges of each leading car door panel. Should this device come in close proximity, or touch a person or object whilst the car doors are closing, the car and shaft doors shall return to their open position. Manual reversal of the doors while the lift is on automatic operation shall be accomplished by pressing a door open button in a car-operating panel. Should this device be activated while the car doors are closing, then the car and shaft doors shall return to their open position.
- (b) Without exception the Contractor shall demonstrate on the day of Completion that the door closing pressures comply in full with the SABS 1545 Part 1 and Part 2 under normal and forced closing conditions.
- (c) The door protection device shall have the capability of detecting metal/plastic trolleys.

6.29 CAR PLATFORM

The car platform with the enclosure of the lift shall be balanced by arranging balancing weights to equalise the guide pressure (front to back and side to side) so that the pressure on any guide shoe roller does not exceed 18kg without a load in the car. (Statically balanced).

6.30 LANDING ENTRANCES

- (a) The lift shaft landing entrance assembly shall consist of a unit frame, door panels, fascia, sill, hanger, closer and interlock. The installation shall comply with the applicable code requirements.
- (b) As a standard all lift landing equipment including doors, and signal faceplates shall have a two (2) hour fire rating. The Contractor shall provide the relevant SANS test certificates for Class “C” type landing door equipment.

6.31 DOOR PANELS

- a) The door panels for all openings shall be constructed of at least 1.5 mm thick mild or stainless steel. Continuous stiffener channels must be provided to the top, bottom and edges of the faceplates. The bottom of each door panel shall be provided with immovable laminated phenolic guides, which run in the sill slots.
- b) Door panels shall be constructed to operate free from squeaks or metallic sounds and shall be adequately treated with a sound deadening material to produce a quiet door operation under all operating conditions.
- c) The leading edge of the car and landing doors shall have an interlocking profile with rubber stoppers (top and bottom) to prevent the door panels from closing metal to metal. Add-on rubber profiles shall not be accepted.
- d) All landing door site guards shall have a stainless-steel box type construction for added rigidity.
- e) Goods/Passenger Lift and Access, Goods Only Lift Car Doors
 - (i) Car and landing sills shall have additional angle iron supports (reinforced sills) to accommodate the applicable point loads.
 - (ii) Landing and car door panels shall have reinforced sliding shoe supporting sections.
 - (iii) Only reinforced sliding door panels shall be accepted. Door panels shall be at least 1.5 mm thick Mild Steel or Stainless Steel with at least two horizontal intermediates stiffening ribs.

6.32 SILLS AND SUPPORT ANGLES

The landing sills for all openings shall be of narrow extruded aluminium. Grooves in all sills for the door guides shall be machine planed with minimum clearances for the guides. The sills shall be supported on steel angles provided by the lift Contractor and securely fastened to the building floor construction.

6.33 TOE GUARDS

Toe guards shall be of at least 1.5 mm thick steel and shall be installed on all landings. They shall extend the full width of the door opening and be gradually bevelled to the wall. The straight vertical portion of the guards shall at least be 400 mm long or as in the case of the lowest landing shall equal the distance travelled by the car sill from the bottom terminal landing to when the car is on the fully compressed buffer.

6.34 CAR POSITION INDICATORS

- a) Electronic LED digital readout position indicators shall be incorporated in each lift car operating panel at a height of not less than 2100 mm above the floor. As each lift travels through the lift shaft, its position shall be indicated continuously by the illumination of the numeral or letter corresponding to the landing that the lift is stopped at or is passing.
- b) The digital readout shall be at least 50 mm in height.

6.35 CAR OPERATING PANEL (COP) FOR PASSENGER AND GOODS /PASSENGER LIFTS

- a) The operating device for the lift shall include a series of buttons, numbered to correspond to the active landings served and various additional buttons and key switches, including emergency alarm, intercom, door open and door close buttons, independent control, fire control and rear door control key switches.
- b) The car call buttons shall be numbered to correspond to the landings served or the numbers shall be engraved with a recessed background adjacent to the car buttons.
- c) Car, landing and emergency buttons shall be of the Micro push operation type and shall be approved in terms of the Occupational Health and Safety Act. Each button shall be clearly marked with its corresponding floor position. The demarcation shall either comprise a raised or recessed numeric or alphabetic character. Car call buttons shall have Braille incorporated into the button unit.
- d) The car operating station shall be paraplegic-friendly and shall be located so that all operating and emergency buttons are located between 1500 mm and 900 mm above the car platform. The emergency buttons and switches shall be mounted at the bottom and the call buttons in numerical order starting above the emergency button and numbering from left to right.
- e) Swing front return panels used in the passenger car enclosures shall be arranged so that the call buttons and the control and signal devices are substantially flush with the vertical surface and shall be mounted on the return panel. The wiring to the individual components shall permit the panel to swing open for maintenance purposes.
- f) A second rear door car-operating panel for lifts with two entrances shall operate independently of the front panel and shall comply in full with this section.
- g) As a standard the lift signage shall include No Smoking, Load, Passengers, Certificate Number and Lift Number / Designation, as required by the applicable standards and regulations. All signage shall be engraved into the Car Operating Panel.
- h) Without exception the Representative/Agent shall approve the final design of the car operating panel before placing the order or manufacture of this equipment.
- i) The button markings/engraving shall be such that it does not fade or wear with continuous operations. The markings, whether engraved or raised shall remain clearly visible and the coloured epoxy shall remain intact throughout the life of the button.
- j) All key switch cylinders in the fixture faceplates of landing stations, car stations and Supervisory control stations shall be master keyed with removable core cylinders (KABA type or equivalent).

6.36 CALL ACKNOWLEDGING LIGHTS

All car and landing buttons shall be of the call acknowledging type. The registering of a call button shall illuminate the button to acknowledge that a call has been registered. Incandescent indicator lamps shall not be accepted.

6.37 LANDING CALL BUTTONS

6.37.1 Passenger and Goods/Passenger Lifts

- a. A riser of landing micro push button stations shall be provided. Terminal floors shall contain a single button station and intermediate floors shall contain both up and down buttons. Pressure on the button in one fixture shall cause the electronic illumination of the corresponding button unit in the other fixture at the same landing. Incandescent button illumination shall not be accepted.

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- b. Landing push buttons shall be of the Micro push operation type and shall be approved in terms of the Occupational Health and Safety Act.
- c. The location of the centreline of each landing micro push button fixture shall be located at 1050 mm above the floor.
- d. Each button shall be clearly marked with its corresponding direction of travel. The demarcation shall either comprise a raised or recessed approved symbol.
- e. The button markings/engraving shall be such that it does not fade or wear with continuous operations. The markings, whether engraved or raised shall remain clearly visible and the coloured epoxy shall remain intact throughout the life of the button. Buttons shall have Braille incorporated into the button unit.

6.38 WAITING PASSENGER LANTERNS AND GONGS

- a) Provide an up and down, LED digital readout electric indication waiting for passenger lantern at each intermediate landing and an up or down single indication lantern at a terminal landing of all lifts. The lanterns shall be mounted above the head jamb or beside the side jamb of each typical entrance. Incandescent indicator lamps shall not be accepted.
- b) Supply and fit adjustable electronic arrival gong to each entrance. The fixture face plate shall contain an approved pattern of slots to enable the transmission of sound from within the shaft to the lift foyer. In terms of the paraplegic/blind person's requirements, the gongs shall have a different tone when announcing cars travelling in the up and down directions - two "gongs" for down and one "gong" for up.
- c) As soon as the lift has reached a predetermined distance from a landing and is going to stop at that landing, the corresponding waiting passenger lantern shall be illuminated and the gong shall sound whether a landing call has been registered. The waiting passenger lantern shall remain illuminated until the lift leaves the landing or if the car becomes filled, whichever occurs first.
- d) The type and design of the landing signals shall take into account long lift lobbies associated with groups of lifts installed adjacent to each other. After installation, the landing direction and/or announcing arrows shall be clearly visible from any position within the lift lobby. It shall be the Contractor's responsibility to inform the Representative/Agent if the selection of landing signal design is not going to achieve the visual requirements detailed in this section.
- e) As an exception and if specifically requested by the Contractor and accepted in writing by the Representative/Agent, adjustable gongs may be fitted to the car. Gongs fitted to the car shall be positioned in the header section of the car and the sound shall be contained and directed towards the entrance so as not to be transmitted to the floors above and below the lift. The gongs shall further only sound when the lift is within 200 mm from the landing level.
- f) As an exception and if specifically requested by the Contractor and accepted in writing by the Representative/Agent, announcing arrows may be fitted in the side jambs or incorporated in the push button unit. However, this option shall be restricted to Simplex and Duplex units with a single riser of buttons.

6.39 LANDING POSITION INDICATORS

- a) Electronic LED digital readout position indicators shall be provided over the architrave of each lift in the main lift lobby. As the lift travels through the lift shaft, its position shall be indicated continuously by the illumination of the numeral or letter corresponding to the landing that the lift stopped at or is passing.

- b) The final number of landing indicators required for each lift and their locations shall be as approved by the Representative/Agent.
- c) The digital readout shall be at least 50 mm in height.
- d) Landing position indicators shall not illuminate if the lift can no longer respond to calls as a result of a fault condition or when undergoing routine maintenance.

6.40 LANDING DOORS AND ARCHITRAVE FINISHES

- a) All stainless steel landing doors and architraves shall be cleaned before final acceptance and receive a coat of approved stainless steel polish.
- b) When spray painting the landing doors and frames, the Contractor shall ensure that the landing door panels are satisfactorily prepared before the final coat of Duco is applied.
- c) Floor designation shall be permanently marked on the inside of the landing doors (shaft side)

6.41 LIFT INTERCOM SYSTEM

- a) Provide an intercommunication system complete with talk-back speakers with all required auxiliary equipment, wiring and a six (6) hour minimum backup power supply.
- b) Lift travelling cables shall contain two (2) shielded pairs of conductors for each car for the intercommunication system.
- c) Terminal strip boxes for all wiring shall be provided.
- d) All wires in the wiring system shall be shielded without exception.
- e) Wiring between all master stations in the building shall comply with the manufacturer's recommended standards.
- f) Provide one sub-station in each lift car, one master station for each motor room and one master station for the security control room.
- g) The voice link shall constantly produce a sound/speech quality comparable to that of the normal Telkom telephone network. All provisions to adequately address interference in the lines shall be included. The intercom master stations shall include an indicator system/panel to indicate the lift car initiating the emergency call and an "All Call" feature to allow for communication to all lifts at the same time.
- h) The lift intercoms for all the lifts shall be wired back to a common security/control room centrally located.
- i) The Master Stations shall be capable of accommodating all the lifts covered under this Specification. The individual lift's designation and its call code shall be clearly and neatly displayed on the Master Station.

6.42 LOAD SWITCHES

All load switches and sensors which influence the control, and the drive shall be adjusted in order to achieve an optimum operation, and their operating loads documented for future reference on the datasheet or certificate of compliance SABS1545 - Annex "A". These load contacts may include but are not limited to the over-load, minimum load and landing call bypass functions.

6.43 CAR TOP REQUIREMENTS

6.43.1 Car Top Working Platform

Securely fitted working platforms of adequate strength shall be provided on the top of the car roof to create a level and safe working area. The platform shall be free of any electrical cabling and lift equipment. The car roof shall not be regarded as a working platform.

6.43.2 Car Top Guard Rails

In terms of SABS 1545 the car top shall be provided with a balustrade (guard-rail) where the free distance in the horizontal plane beyond and perpendicular to its outer edge exceeds 300 mm

6.44 ARD (AUTOMATIC RE-LEVELLING DEVICE)

6.44.1 The lift must have an automatic re-levelling device that will power the lift during a power failure or interruption of power.

6.44.2 The ARD shall be capable of bringing the down to the next available floor and parking with the doors open.

6.44.3 The lift shall switch automatically from normal mode to ARD mode with need for human intervention.

6.44.4 The ARD system shall power the following

- i) machine
- ii) position indicator
- iii) Lift controller
- iv) inverter if possible
- v) Brake coil
- vi) Other parts of the lift as determined

SAFETY FACTORS ADOPTED

The detailed design took into consideration the various safety requirements as stipulated in the building regulations as well as the Department of Labour regulations.

NORMS AND STANDARDS USED

- SANS 10400 - Building code
- SANS 204 - Green Design Code
- SANS 10139 - Fire detection & Alarm systems for buildings
- National Building Regulations and Building Standards Act 103 of 1977
- SANS 7240-16: Fire detection and alarm systems Part 16: Sound system control and indicating equipment
- SANS 7240-19: Fire detection and alarm systems Part 19: Design, installation, commissioning, and service of sound systems for emergency purposes
- Local municipal by-laws and regulations
- Local Fire & Ventilation Regulation
- NDPWI Specifications and standards
- SANS 1545-1 2009 Safety rules for the construction and installation of Lifts - Electrical Lifts
- SANS 1545-2 2009 Safety rules for the construction and installation of Lifts - Hydraulic Lifts
- SANS 1545-3 2009 Safety rules for the construction and installation of Lifts – Lifts for persons with physical disabilities – Stair lifting Platforms

- SANS 1545-4 2009 Safety rules for the construction and installation of Lifts – Lifts for persons with physical disabilities – Vertical lifting Platforms
- SANS 1545-5 2009 Safety rules for the construction and installation of Lifts – Electrical and hydraulic – Access Goods lift.

QUALITY ASSURANCE REQUIREMENTS

- a. The *Contractor* shall have, maintain and demonstrate its use of the *Project Manager* (and/or the *Supervisor*) to satisfy the requirements of the documented Quality Management System to be used in the performance of the *works*.
- b. The *Contractor* submits his Quality Management System documents to the Project Engineer as part of his programme which includes details of:
 - a. Quality Plan for the contract;
 - b. Quality Policy
 - c. Index of Procedures to be used; and
 - d. A schedule of internal and external audits during the contract
- c. The *Contractor* develops and maintains a comprehensive register of documents that will be generated throughout the contract including all quality related documents as part of its Quality Plan.
- d. The Quality Plan means the *Contractor's* statement, which outlines the strategy, methodology, resources allocation, QA and Quality Control co-ordination activities to ensure that the *works* meet the standards stated in the *Works*

RISK ASSESSMENT, SAFETY FILE AND METHOD STATEMENTS

The contractor shall create a **Risk Assessment** and develop a **Method Statement** prior to the project commencing. A draft **Risk assessment** and **Method Statement** shall be submitted with this document. The contractor shall also create a **Safety File** and a draft file shall be submitted with this document

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PERSONNEL

The contractor shall provide the qualifications of the following key personnel, together with their CVs and testimonials. Each skill shall require 5 customer testimonials for a job of a similar nature.