Specifications
For
Innovation Hub
Mechanical services

CONTENTS

PROJECT TECHNICAL SPECIFICATION

1.1. GENERAL

This specification covers the detail requirements for the Mechanical services for the Innovation Hub Phase 3.

The mechanical service that shall be detailed within this specification includes:

- Air Conditioning,
- Hot Water Installation,
- Fire services,
- Lift.

The prevailing site conditions are:

Outdoor design	(°C dry bulb/°C wet bulb):	34 °C db & 24 °C wb
Winter Outdoor	(°C dry bulb/°C wet bulb):	20 / 2
Indoor General	(°C dry bulb/% Rh) :	22.5/50 ± 1°C & 10 %
Altitude above sea level	:	1753m

NOISE LEVELS

General (NC): 30 to 54 dBA
Indoor Unit: 40dB (A) @ 2m
Condensing Unit: 58dB (A) @ 5m

Ventilation rate: 10 to 20 air changes/hour

1.2. DETAILED SCOPE OF WORKS

The following installations will form part of this mechanical specification and only these services are addressed in this specification;

1.2.1. HEATING VENTILATION AND AIR-CONDITIONING (HVAC)

- Air-Conditioning Installation: The provision for a VRV comfort cooling/heating installation for the offices, wet labs, manufacturing labs and other labs.
- Natural Ventilation: Toilets and kitchens will be naturally ventilated.
- Natural Ventilation: Natural Fresh air for the kitchens and toilets.

1.2.2. BUILDING WET SERVICES

- Hot Water Services Installation – The provision of a geyser for hot water services installation to all the showers, wash hand basins and sinks.

1.2.3. FIRE SERVICES

- Fire Fighting equipment.
- Statutory Signage
- Smoke/Heat Detection & Alarm
- Fire Lamp/ Strobe Light
- Fire Control Panel
- Fire Hydrant

1.2.4. LIFT INSTALLATION

- Provision of lift for paraplegic and light goods.

1.2.5. ELECTRICAL SERVICES

- The provision of electrical services to fire services, air conditioning systems hot water heating services and lift.

The scope shall be executed in accordance with this project specification and project drawings.

1.3. AIR-CONDITIONING DESIGN:

1.3.1. VRV system

The cooling and heating requirements for the majority of the building are to be satisfied by a Direct Expansion Variable Refrigerant Flow/Variable Refrigerant Volume system.

The form of evaporative unit will be under ceiling units. The type of evaporative unit for each space incorporating this type of system is detailed in the HVAC and refrigeration drawings

Junction/BC boxes associated with the VRV system shall be located on the roof within the corridor and will distribute the liquid and gas refrigeration pipework to/from the external condensers and the internal units. The external condensers shall be located on the external plant on the roof.

- Ground Floor:
    - **Offices/Boardroom:** shall also be supplied with conditioned air through a vrv system by an under-ceiling unit.
    - **Cleanrooms Labs:** shall also be supplied with conditioned air through a vrv system by an under-ceiling unit.
    - **Normal Labs:** shall also be supplied with conditioned air through a vrv system by an under-ceiling unit.
    - **Café:** shall also be supplied with conditioned air through a vrv system by an under-ceiling unit.
- First floor:
    - **Offices/Boardroom**: shall also be supplied with conditioned air through a vrv system by an under-ceiling unit.
    - **Cleanrooms Labs:** shall also be supplied with conditioned air through a vrv system by an under-ceiling unit.
    - **Normal Labs:** shall also be supplied with conditioned air through a vrv system by an under-ceiling unit.

- Second floor:
    - **Offices/Boardroom:** shall also be supplied with conditioned air through a vrv system by an under-ceiling unit.
    - **Cleanrooms Labs:** shall also be supplied with conditioned air through a vrv system by an under-ceiling unit.
    - **Normal Labs:** shall also be supplied with conditioned air through a vrv system by an under-ceiling unit.

Each internal evaporative unit shall be individually controlled by remote controllers that shall be fixed to the wall near the entrance to each space and which can be removed by the occupants to control the environments. The remote controller shall also come with a built-in thermostat.

The thermostat will incorporate on/off control as well as the temperature setting and temperature sensor to maintain the space at the required temperature.

1.4. MECHANICAL VENTILATION

1.4.1. Mechanical Ventilation General

The mechanical ventilation shall comply with SAN's 204 and SAN's 10400 Part O.

Outside air used in the mechanical ventilation system shall be introduced to the system from an inlet positioned to ensure that such air is, as far as possible, free from local contamination. Where it is not possible to position such inlet, the system shall incorporate suitable devices to;

Reduce contamination of outside air to an acceptable level, and

Prevent discharge of dust, fluff or hazardous substances or materials that might have accumulated in ducts from entering the building spaces.

The exhaust outlets for air which has been used for artificial ventilation purposes shall be so located and arranged to ensure that such air does not cause a nuisance or contaminate air which is likely to be drawn into an opening of the building. All exhaust outlets shall be constructed in a manner that ensures against any exhaust plume from the facility being entrained by natural forces, and re-entering the building via any building openings or ventilation openings.
Exhaust outlets and air inlets forming part of an artificial ventilating system shall be protected by a substantial grille, insect/bird mesh, louvre or weather cowl fitted with a screen through which a 12 mm diameter sphere cannot pass.

All air exhausted from internal spaces shall be discharged or exhausted directly to the outside of the building, and not into any ceiling void or space within the building envelope.

The mechanical ventilation system shall be under negative pressure within the building envelope and shall not be connected to any artificial lighting system for the purpose of on/off control;

Where an artificial ventilation system has been connected to a room;

Designed to be occupied by persons suffering from infectious or contagious diseases,

Containing a toilet pan or urinal, shower cubicle or bath, or used as a sauna, darkroom or refuse storage room,
Air from such room shall not be re-circulated to, or permitted to pass into, any other room, whether or not such room falls into the same room type.

The arrangement and sizes of air inlets and outlets in a room which is artificially ventilated shall be such as to ensure an even and uniform distribution and circulation of air throughout the occupied zone of the room without the creation of an air velocity of more than 0.5 m/s.

1.4.2. Mechanical Ventilation Design Criteria

All mechanical ventilation systems shall ensure they provide fresh air into for the occupants in the building and remove contaminates within the building. The quality of air provided shall conform to SANS 831-2:2009 Building construction – Expression of users' requirements, Part 2: Air purity requirements and ASHRAE Standard 62.1: Ventilation for Acceptable Indoor Air Quality.

The general design of all mechanical ventilations systems shall follow guidance stated in the ASHRAE Handbook: Heating, Ventilation and Air Conditioning.

Sound attenuators on the supply and exhaust side of each unit shall also be provided to maintain sound levels as indicated within the specification. The attenuators can be provided as part of the overall AHU or as separated duct line mounted items.

Duct work delivering the supply and return air shall be in accordance SAN's 10400 Part O.

The leakage of the ductwork shall comply with SANS 10173.

All spaces with mechanical ventilations shall have the general grade of filtration as stated in the specification. The filters shall conform to SANS 1424:2008 Filters for use in air-conditioning and general ventilation.

All fans within mechanical ventilation system shall conform to SANS 60335-2-80:2009 / IEC 60335-2-80:2008.

All air handling units systems shall incorporate a form of heat recovery with a minimum thermal efficiency of 50% or greater.

All conditioned air duct work and flexible ducting shall be insulated to limit heat gain and/or loss to not more than 5% from source to furthest point of delivery on a system.

Care should be taken to ensure that the roof ventilation openings do not allow rain penetration.

Gaps between roof tiles with sarking (or reflective insulation at rafter level) and metal sheet roofing are not acceptable methods of providing roof space ventilation.

Compliance with ventilation provisions may result in the ingress of wind driven rain or fine dust, or stimulate the growth of mould or fungus in the roof enclosure. Consideration should therefore be given to the surrounding environmental features.

1.4.3. MECHANICAL EXTRACT VENTILATION

1.4.3.1 Kitchens, stores and toilets Extract

- The kitchens, toilets and stores will be naturally ventilated as there will be openable windows for circulation of air.

1.4.4. MECHANICAL SUPPLY FRESH AIR VENTILATION

Mechanical supply ventilation shall be provided to spaces that require a source of fresh air that cannot be met by natural ventilation means. Should the HVAC system not be capable of providing a fresh air supply, separate mechanical supply ventilation shall be provided to the HVAC system installation to meet the fresh air requirements via fresh air fans, fresh air grilles/weather louvres.

For small air flow rates, celling mounted units shall be mounted within the corridor ceiling void (for acoustic reasons) and ducted to where required. Should here be a requirement for larger fresh air rates.

1.4.4.1 Kitchens, Toilets and Store Fresh Extract

- The above mentioned will be naturally ventilated because they have openable windows and will be able to supply fresh air in the rooms.

1.5. WET SERVICES:

The majority of the wet service plumbing shall form part of the main contract. However major or unusually items associated with the hot water services is described in details within this specification.
All hot water services will be designed and installed with the objective to economise the installation and maintenance costs, while still providing an appropriate level of comfort to the occupants.

All materials, plant or equipment will be installed with appropriate access for ease of operation, maintenance and replacement. Local products with SABS approval will have preference.

1.5.1. RELEVANT NORMS AND STATUTORY REQUIREMENTS

The following norms and statutory requirements are utilised where applicable:

- SANS 10400 – The Application of the National Building Regulations.
- SANS 10252 – Water supply and drainage for buildings (Part 1 & 2).
- The Occupational Health and Safety Act.

1.5.2. INCOMING MAINS COLD WATER SUPPLY

The civil engineer will be responsible for providing a metered mains cold water supply within one meter of the building at the locations required/specified by the mechanical contractor. The new supply after the meter shall enter into the ground floor service duct where the new supply shall terminate via a stop cock. The contractor will connect the buildings water reticulations pipework to this new supply.

The contractor shall supply and install a new boosted cold water service to serve all required outlets, the hot water service.

1.5.3. HOT WATER GENERATION INSTALLATION

The hot water for the building shall be generated via hot water geyser that is going to serve the showers, wash hand basins and the sinks.

The building's hot water generation shall be met by the system as follows;

- 2 x 250 litres hot water geyser per floor, from ground floor to second floor.

The geyser is to be located is the service ducts of the building.

The geyser will be seized to provide the hot water requirements for the building for a 24 period and shall be sized based on the shower requirements of the building.

The water service design and requirements for water installations in buildings shall be in accordance with SAN 241, SANS 10252-1 and SANS 10254.

Hot water usage should be minimized and the system maintained in accordance with the requirements given in SANS 10252-1. The hot water storage shall be designed to satisfy the hot water demand and shall comply with the requirements of SANS 10252 –Part 1 water supply installations for buildings.

Hot water tank shall be insulated with a material achieving a minimum R-value of 2, 0.

1.6. INTERNAL DOMESTIC WATER DISTRIBUTION INSTALLATION

Hot water from the geyser shall reticulate, via the service duct, corridors and roof voids, to the various sanitary fittings.

The contractor shall provide isolation valves to each sanitary and catering outlet to allow maintenance to be carried out individually to that fitting, but retaining the distribution elsewhere.

Air release valves will be installed at high points to release any air in the system to prevent air locks.

The contractor shall supply and install pressure reducing valves at floor levels as necessary to ensure correct flow to outlets.

The contractor shall supply and install flow restriction valves where required to ensure excessive water consumption through fittings is prevented.

All control valves and safety valves associated with the cold and hot water distribution shall conform to SANS 198:2010.

All hot water piping shall be insulated to limit heat gain and/or loss to not more than 5 % from source to furthest point of delivery on a system.

Pipework layouts shall be installed by the contractor to allow for thermal expansion.

The routing of the cold water service pipes will be such so that separation from any adjacent hot water service is achieved to avoid heat gain to the cold water service causing its temperature to rise.

The distribution pipework shall be installed to minimise dead-legs, and thus the risk of stagnant water occurring within pipework.

The insulation shall be protected from mechanical damage using finishes suitable for the location in which it has been installed. All pipework within plant rooms and regularly accessed areas, such as but not limited to, risers, cleaners cupboards and regularly accessed areas.

Insulating materials shall meet Green Guide rating A, with a Global Warming Potential (GWP) of zero, and an Ozone Depletion Potential (ODP) of zero.

The use of flexible connections as the final connection between the distribution pipework and the sanitary outlet shall not be permitted due to the risks they present for growth of Legionella.

All exposed pipes to and from the hot water cylinders shall be insulated with pipe insulation material with an R-value in accordance with table below.

Minimum R-values of pipe insulation

Internal diameter of pipe (mm)	Minimum R-value - W/m2K
< 80	1.00
≥ 80	1.50
Determined with a hot surface temperature of 60 °C and an ambient temperature of 15 °C.	

The piping insulation requirements do not apply to water piping, encased within a concrete floor slab or in masonry.

These pipes shall comply with SANS 10252-1.

Pipework materials to be as follows:

All external pipework to be blue M.D.P.E protectaline buried in a sand filled trench no less than 900mm below the ground surface.

All internal domestic services pipework to be copper.

All exposed internal pipework to be provided with chrome finish

All plastic pipework water services shall be designed in accordance with SANS 10508:2008 / ISO 10508:2006.

All cold and hot service pipework and fittings within the building constructed from Crosslinked polyethylene (PE-X) shall conform to SANS 15875-2:2004 / ISO 15875-2:2003 (2009-07-31), SANS 15875-3:2004 / ISO 15875-3:2003 (2009-07-31). SANS 15875-5:2004 / ISO 15875-5:2003 (2009-07-31) and SANS 15875-1:2004 / ISO 15875-1:2003 (2009-07-31).

All cold and hot service pipework and fittings within the building constructed from Polybutylene (PB) shall conform to SANS 15876-2:2005 / ISO 15876-2:2003 (2010-11-26), SANS 15876-3:2005 / ISO 15876-3:2003 (2010-11-26), SANS 15876-1:2005 / ISO 15876-1:2003 (2010-11-26) and SANS 15876-5:2005 / ISO 15876-5:2003 (2010-12-09).

All cold and hot service pipework and fittings within the building constructed from Chlorinated poly(vinyl chloride)(PVC-C) shall conform to SANS 15877-2:2005 / ISO 15877-2:2003 (2010-11-26), SANS 15877-3:2005 / ISO 15877-3:2003 (2010-11-26), SANS 966-1:2010 and SANS 15877-1:2005 / ISO 15877-1:2003 (2010-11-26).
All cold and hot service pipework and fittings within the building constructed from Polyethylene of raised temperature resistance (PE-RT) shall conform to SANS 22391-2:2008 / ISO 22391-2:2007, SANS 22391-3:2008 / ISO 22391-3:2007, SANS 22391-1:2008 / ISO 22391-1:2007 and SANS 22391-5:2008 / ISO 22391-5:2007.

All cold and hot service pipework and fittings within the building constructed from Polyethylene (PE) shall conform to SANS 4427-2:2008 / ISO 4427-2:2007, SANS 4427-3:2008 / ISO 4427-3:2007, SANS 370:2009. SANS 4427-1:2008 / ISO 4427-1:2007, SANS 4427-5:2008 / ISO 4427-5:2007 and SANS 4427:1996 / ISO 4427:1996 (2009-07-31).

All cold and hot service pipework and fittings within the building constructed from copper shall conform to SANS 460:2011, SANS 460:2011, SANS 1067-1:2005, SANS 1067-2:2005, SANS 1808-10:2005 (2010-08-20) and SANS 1857:2005 (2010-08-20).

1.7. FIRE SERVICES

1.7.1. Fire extinguishers

Portable fire extinguishers for the purpose of firefighting shall be installed in the building at a rate of 1 fire extinguisher for every 200m² in floor area. For this building classification it will be a 4.5 litre water type fire extinguisher.

Features:

- Robust design.
- Controlled discharge.
- High quality epoxy resin finish (Weather resistant).
- Fully BS-EN3 approved.
- Quality lining.

Any approved portable firefighting extinguisher shall comply with the requirements contained in SABS 810, 889 or SABS 1151 and shall be installed, maintained and serviced in accordance with SANS 0105.

1.7.1.1. Fire extinguishers installation

- Fire extinguisher will be installed in all the cleanroom labs.
- Fire extinguisher will be installed in the all the normal labs.
- Fire extinguishers will be installed in the corridors.
- Fire extinguishers will be installed in the basement parking.
- Fire extinguishers will be installed in the escape stairs routes.

1.7.2. Fire hose reels

Any fire hose reel installed in any building shall comply with the requirements contained in SANS543.
The minimum diameter of any pipe providing water to the fire hose reel will not be less than 25mm in diameter.

The fire hose reel will be robustly constructed and with brackets that will fix the hose reel against a wall.

This hose reel rotates on a centre pin that allows the user to unwind the fire hose reel unobstructed in case of a fire.

The standard dimensions and characteristics of a fire hose reel are as follows:

- The fire hose reel drum is 850mm in diameter.
- A guide will prevent the fire hose reel from jamming.
- The maximum length of a fire hose reel is 30m.
- The diameter is 20mm.

1.7.2.1. Fire Hose Reel installation

- Fire hose reel will be installed in the corridors.
- Fire hose reel will be installed in the basement parking.
- Fire hose reel will be installed in the escape stair cases.

1.7.3. Fire hydrants

Any fire hydrant required shall comply with the requirements contained in SANS 1128 Part 1.

The minimum diameter of the supply pipe to any fire hydrant not to be less than 65mm internal diameter, and should this supply pipe to the hydrant be further than 50 meters this supply pipe should be increased to at least 100mm internal diameter.

All fire hydrants shall be 65mm pillar type fire hydrants and shall be the hand wheel openable type.

1.7.3.1. Fire Hydrant installation

- One fire hydrant will be installed within and around the building, it will be installed in such a way that it is able to cover the whole radius of the building.

1.7.4. Fire Signs

Any building that has emergency routes shall be clearly marked and signposted to indicate the direction of travel in the case of an emergency.

All exits will be marked by an approved sign readily visible from any direction of exit access.

Sign placement will be such that no point in the exit access is more than 30 meters from the nearest visible sign.

All fire equipment shall be clearly marked and signposted to indicate the placement of the fire equipment.

Such signs are to be minimum size of 190 x 190mm and are to be SABS approved photo luminescent signs.

Every sign will be located and of such size, distinctive colour and design as to be readily visible. All signage must stand out from the surroundings and be visible.
Externally and internally illuminated signs will be visible in both the normal and emergency lighting mode.

Every sign required will provide evenly illuminated letters having a minimum luminance of 0.21cd/m².Exit signs will be illuminated by the emergency lighting facilities.

1.7.4.1. Fire Sings installation

- The whole Innovation hub building will be clearly marked with fire signs for emergency exit, to show where fire hose reels and fire extinguishers are.

1.7.5. Smoke detection.

General specifications of smoke detection systems

1.7.5.1. Control and indicating equipment

The Control Panel shall be of the Analogue Addressable type with built in power supply and complying with EN 54 part 2 and 4. The control and indicating equipment must have local support.

1.7.5.2. Printer

A printer shall be supplied with the control panel so that a permanent record of all events can be kept. The printer must be supplied by the manufacturer of the control and indicating equipment and be mounted in the control panel.

1.7.5.3. Batteries

The batteries that are supplied must be either National Panasonic, Yuasa or Sonnenchein and be of the sealed lead acid type. Battery calculation sheets shall be complemented and submitted to the engineer for approval prior to the commencement of the installation.

1.7.5.4. Loop wiring

All loops shall be Class "A" loops. Bridging of a loop in the Control Panel is forbidden as is running a spur from a loop. A spur is only allowed where detailed on the drawings.

1.7.5.5. Loop isolators

A loop isolator shall be located at the beginning and end of every zone in order to minimize disruption of the loop in the event of a cable fault.

1.7.5.6. Detectors

All detectors shall be of the addressable type and located a distance of 9m apart. Detectors of the I.S. type shall be conventional. The client will provide a suitable high integrity earth. Alternatively, a GALVANIC ISOLATOR may be used if recommended by the I.S. detector manufacturer. The zener barrier or galvanic isolator must be located in a safe area and be housed in a suitable polycarbonate box. The zener barrier must be mounted on din rail. The cabling to this unit must not be located on the same side of the housing.

1.7.5.7. Zoning

No zone shall exceed more than 2000m². Should there be any confusion, the engineer is to be consulted before work commences.

1.7.5.8. Remote power supplies

All remote power supplies shall be monitored for "mains fail" and "battery fail", by means of a contact monitoring device located on the loop. The circuit between the device and the contact in the power supply shall be a monitored circuit. Battery calculations sheets must be completed by a successful tenderer and submitted to ensure the correct size batteries are installed. The remote power supplies are there to provide power to operate sounder/strobes.

1.7.5.9. Sounder modules

These modules are an addressable device which shall be located adjacent to the remote power supplies. They shall have a 24vdc supply connected to them and provide power to a monitored sounder/strobe circuit in the event of an alarm.

1.7.5.10. Smoke and heat installation

- Fire and heat detectors will be installed in all rooms/areas within the building.

1.7.6. Audible alarms

The type of audible alarm shall be the electronic sounder, and electronic sounder strobe type when used in noisy areas. The sound shall be distinguishable from any other sound. Sounders located outside of a building shall be of the weatherproof type. As part the handover sound pressure testing will be carried out. The contractor must prove that a minimum of 65db or 5db above the ambient noise level exists. The contractor shall provide a db meter for the testing. The date of the test to beat the client's discretion.

- Visual alarms

The frequency setting shall be from 500 to 1000Hz. The flash rate shall be from 30 to 130 flashes per minute. The flash rate shall be distinguishable from any other visual device. The visual alarms must be located so as to provide maximum visibility when operated. If there is any confusion the engineer must be contacted. The engineer's decision will be final. They shall be red in colour. Should the contractor be using a sounder/strobe other than the AST model, the contractor shall be responsible for the correct sizing of the cable.

- Cabling

All cabling shall be installed in accordance with SANS 1042. Where cabling is to be installed underground, armoured cabling is to be installed. Should a loop go underground a 4core cable is not to be used. It must consist of 2 armoured cables each containing 2 cores. The size of a cable core must be a minimum of 1.5m².

Cable segregation must be observed, care must be taken not to locate fire detection cabling next to high voltage cables. It is compulsory for the contractor to confirm with the equipment manufacturer that the cable specified is suitable for the loop lengths and number of devices involved. Fire resistant cabling shall be used. FR 20 is unacceptable. Due to the differing loop lengths offered by different suppliers it may be necessary to supply two addressable panels which can communicate with each other.

Cable of 2cl.0mm may be used where it can be shown not to exceed its specification.

All cable inside buildings must be housed in conduit to provide a neat appearance.

- The Installation

The installation shall be installed, tested and commissioned in accordance with SANS 10139. The installing technician will sign off his portion of the work. Upon completion of the contract the installing company undertakes to service the system for 3 quarterly services and 1

complete service. The cost for this undertaking must be allowed for in the Tender Sum. The time of handover i.e. During the week or on a weekend to be discussed with the client.

SPECIFICATION FOR THE INSTALLATION OF
LIFTS AND ACCESS GOODS LIFTS ONLY

1. 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.

2. 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 / load kg
- Speed m/s
- Supply Voltage Volts
- Supply Frequency Hertz
- Number of wires
- Motor kW rating kW
- Roping
- Full load UP acceleration Amps
- Full load UP nominal speed Amps
- Machine heat release per car BTU/hr/car
- Power Factor %

3. Lift Shaft Requirements

(a) In terms of SANS 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 in excess of two (2) metres and if necessary at the top of the shaft to create sheave-room platforms. The working platforms shall comply with SANS 1545 (Parts 1 and 2) safety requirements pertaining to the depth/height and free space of these areas.

(c) In terms of SANS 1545 (Parts 1 and 2), shaft lights are to be provided and installed by the Contractor.

(d) 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.

1. General Requirement

Tenderers shall offer lifts designed to comply with the technical requirements.

The equipment offered shall be suitable for continuous operations under the following conditions:

(a) Electricity Supply

3-phase, 4-wire, 50HZ, AC with nominal voltage of 400/231V varying between 95% and 105% of the nominal voltage.

(b) Ambient Air Conditions

Max. Temperature : 32°C
Min. Temperature : -1°C
Max. Relative humidity : 60 %

(c) Altitude of site

1350 m above sea level

All equipment of the lift installation shall be Y2K compliant in all respects.

All lifts shall comply with the latest edition of SANS1545-1 and SANS-1545-2 specifications.

Copies of ISO9002 accreditation shall accompany the tenders submitted.

The lift installation shall comply in all respects with the requirements of the Occupational Health and Safety Act, Act 85 of 1993 as amended.

2. Description of Lift System

NOTE: The lift must be disabled compliant and the tenderer must provide the specifications to show disabled compliance of his offering

Description	Lift Number	Stops	Floors	Speed	Load	Units
LIFT 1	L1	5	B2 to 2nd Floor	1.6 m/s	630-1000-kg	1
LIFT 2	L2	5	B2 to 2nd Floor	1.6 m/s	>1000-kg	1

3. Technical Requirements for *LIFT 1*

3.1 General

SPECIFICATIONS:

TYPE OF LIFT		Passenger Lift
NUMBER OF ELEVATOR IN GROUP	:	Simplex.(One Lift)
LOAD / PASSENGERS	:	1000 kg, 13 Persons
RATED SPEED	:	1.00 m/s
TRAVEL	:	± 45 m
NUMBER OF STOPS / FLOOR SERVED	:	1 (G &1.)
NUMBER OF LANDING OPENINGS	:	5
NUMBER OF CAR ENTRANCES	:	One (1)
FLOOR DESIGNATIONS	:	0, 1.
POWER SUPPLY	:	400 V +/- 10% 50 Hz 3ph.
	:	4 wire 3PE / 5 WIRE 3PNE
	:	230 V 50 Hz 1 ph. (2 wire + earth)
INTERCOM / COMMINCATION	:	New Intercom System. 3 x way. (Lift, control station & Security area.)
CONTROL SYSTEM		Microprocessor Control and Variable Voltage Variable Frequency Drive systems.

MOTORROOM DETAILS:

MACHINE ROOM POSITION	:	MRL, In the Lift Shaft above the top Level Served.

3.2 Machine

Item	Description	Detail Requirements
(a)	Drive	*Traction*
(b)	Machine	*Geared*
(c)	Roping	*1:1*
(d)	Automatic Self-Levelling	*Yes*
(e)	Compensation	*Yes*

3.3 Control Operation

Item	Description	Detail Requirements
(a)	Operation	*Group Automatic Operation*
(b)	Up/Down Peaks	*Yes, As Specified*
(c)	Fire Control	*Level-1, As Specified*
(d)	Fireman's Floor	*Ground Level*
(e)	Emergency Power Control	
(f)	Evacuation Floor	*Ground Level*
(g)	Independent Control	*Yes*
(h)	Load Measuring	*Over Load, Landing Call By-pass, Anti-Nuisance*

3.4 Landing Equipment

LANDING DETAILS:

LANDING DOOR	:	Automatic two panel side opening. Stainless Steel. Retain existing and make good and re-spray / re-clad.
LANDING DOOR FRAMES	:	
LANDING BOARDS	:	Mechanical Buttons.Illuminated
LANDING INDICATORS	:	Indicator,Gong & Direction on all Floors.
LANDING SILLS	:	Aluminum
ENTRANCE PROTECTION	:	Electronic Edge.

Item	Description	Detail Requirements
(a)	Landing Doors Opening	*1100 x 2100mm Clear Opening,*
(b)	Door Operation	*Single Speed, Centre Opening*

(c)	Door Control	*VVVF Motion Control*
(d)	Position Indicator	*Digital Indicators on Main Landing (Ground Level) Only*
(e)	Waiting Lanterns	*Yes*
(f)	Gongs	*Yes*
(g)	Call Buttons	*Approved, Vandal Proof Mechanical Micro-Push Button*
(h)	Direction Arrows	*Yes, As Specified – Above all Landing Entrances*

3.5 Car Equipment

Item	**Description**	**Detail Requirements**
(a)	Number of COP's	*One per Lift*
(b)	Protection Drapes	*No*
(c)	Position Indicators	*Yes, As Specified on COP*
(d)	Direction Arrows	*Yes, As Specified on COP*
(e)	Intercom	*Yes, As Specified – Master Station - Security Control*
(f)	Call Buttons	*Approved, 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*

3.6 Shaft Dimensions and Equipment

Item	**Description**	**Detail Requirements**
(a)	Shaft Dimensions	*2200 x 2000mm- Use existing blank shaft*
(b)	Head Room	*8539mm*
(c)	Pit depth	*2133*
(d)	Shaft Lighting	*Yes, As Specified*

3.7 Car Enclosure

Item	**Description**	**Detail Requirements**
(a)	Car Dimensions	*1650 mm wide x 2350 mm deep.*
(b)	Door size	*1100 mm wide x 2400 mm high.*
(c)	Car operating panel	*Mechanical Buttons Illuminated. With Braille*

3.8 Finishes

Complete new lift car with all associated equipment, Counterweight, Machine, Controller, Wiring, Doors Buttons and signals, Guide rails and all shaft and pit equipment. (Complete new lift)

CAR DOOR	:	Automatic two panels side opening - Hairline stainless steel
FRONT WALL	:	Hairline stainless steel.
SIDE WALLS	:	Stainless steel with handrails.
BACK WALL	:	Stainless Steel. Mirror above handtail.
SKIRTING	:	Stainless Steel.
FLOORING	:	Rubber.
CEILING/LIGHTING	:	Stainless Steel. Spot Lights.
VENTILATION	:	Fan
STRUCTURAL PROVISION. Use Existing as is.		
SPECIAL REQUIREMENTS	:	Shaft to be cleared of all objects

SPECIFICATION FOR THE INSTALLATION OF
LIFTS, ACCESS GOODS LIFTS ONLY AND ESCALATORS

SCHEDULE OF TECHNICAL INFORMATION

1. GENERAL

Tenderers are required to complete the following Schedule of Technical Information and shall in addition, under separate cover, give full particulars of the equipment and installations offered as well as detailed descriptions of the various methods of control and operation.

2. TECHNICAL INFORMATION SCHEDULE

Item	Description	Details
1.	Manufacturer's name	
2.	Country of origin	
3.	% South African manufacture	
4.	Performance	
a)	Car speed in m/s	
b)	Average round trip time	
c)	Maximum carrying capacity of each lift car	
d)	Average waiting time after registration of a landing call	
5.	Main Hoist Motor	
a)	Maker's name	
b)	Type	
c)	Rated output (kW)	
d)	Time rating (starts/hr)	
e)	Manufacturing standard and safety codes	
f)	Maximum speed (RPM)	
g)	Rated voltage (Volts)	
h)	Full load current (Amps)	
i)	Starting current (Amps)	
j)	Type of bearings	
k)	Maximum line current with lift starting with full contract load (Amps)	
6.	Type of Brake	

Item	Description	Details
7.	Gearing (If Applicable)	
a)	Material of worm	
b)	Material of worm-wheel	
c)	Type of thrust bearings	
d)	Ratio of gearing	
e)	Type of worm-shaft bearings	
f)	Worm above or below wheel	
8.	Drive	
a)	Diameter of traction sheave (rope centres)	
b)	Type of grooving used on traction sheave	
c)	Type of bearing for sheave shaft	
d)	Diameter of smallest deflector pulley used	
e)	Type of grooves provided on deflector pulleys	
f)	Type of bearings for deflector pulleys	
g)	Means provided for absorption of vibration	
9.	Switch gear and Control System	
a)	Make of main circuit breaker	
b)	Rupturing capacity of main circuit breaker (kA)	
c)	Type of control system	
d)	Control voltage	
e)	Make of contactors	
f)	Make of control relays	
g)	Contact materials used for auxiliary and main contacts of controller switch gear	
h)	Type of selector	
10.	Car and Doors	
a)	Mass of complete car with doors and operating gear (kg)	
b)	Net inside dimensions (width x depth x height) in mm	
c)	Thickness of material of car and landing doors	
d)	Finish of car and landing doors	
e)	Clear width and height of car and landing entrances	
f)	Type of door drive mechanism offered	

Item	Description	Details
g)	Type of suspension used for car and landing doors	
h)	Type of proximity detectors	
(I)	For passengers approaching from landing	
(II)	For passengers leaving lift car	
i)	Type of material used for inside finishes of car (i.e. panels, ceiling trim)	
j)	Thickness and type of floorboards and floor covering	
k)	How is car and platform isolated from supporting structure?	
l)	Are car panels treated externally for sound absorption?	
m)	Door speed:	
(I)	Normal (m/min)	
(II)	On force closing (m/min)	
11.	Ropes	
a)	Maker's name	
b)	Diameter of ropes (mm)	
c)	Number of main ropes	
d)	Breaking load of each rope (kN)	
e)	Maximum working load of each rope	
f)	Factor of safety	
g)	Tensile strength of steel used (MPa)	
h)	Number of strands in rope	
i)	Number of wires per strand	
j)	Construction and lay of rope	
k)	Type of rope fastening used	
l)	System of roping (i.e. 2:1 or 1:1, single or double wrap)	
12.	Counterweight	
a)	Total mass (kg)	
b)	Percentage of live load counter balanced (%)	
13.	Guide Rails	
a)	Type and section	

Item	Description	Details
b)	Mass per metre-length (kg) for:	
(I)	Car	
(II)	Counterweight	
14.	Roller Shoes	
a)	Type	
b)	Material of tyres for roller type guides	
15.	Buffers	
a)	Type	
b)	Length of stroke	
c)	Reactions on pit floor when buffers are hit at 115% of contract speed whilst car is carrying contract load	
(I)	Car buffers	
(II)	Counterweight buffers	
16.	Safety Gear	
a)	Type	
b)	Type of governor	
c)	Stopping distance at overspeed with:	
(I)	Car empty (mm)	
(II)	With contract load (mm)	
d)	Percentage over-contract speed when governor trips safety (%)	
e)	Percentage over-contract speed at which governor trips motor supply	
f)	Is safety still effective if governor rope breaks after application of safety device?	
17.	Steelwork at Top of Shaft	
a)	Number and type of sections used	
b)	Reactions on structure must be submitted with tender by indicating position, magnitude and direction of all reactions on a drawing	
18.	Levelling	
a)	Levelling speed (m/s)	
b)	Levelling tolerance guaranteed (Maximum) (mm)	
c)	Will car and landing doors be fully open when car reaches floor level?	

Item	Description	Details
d)	What is distance of levelling zone above and below floor level?	
19.	Selector Type	
20.	Deviations from Specification as an Alternative Offer: Does the equipment offered comply strictly with the specification (Yes/No)	

SPECIFICATION FOR THE INSTALLATION OF
GOODS LIFTS ONLY

TYPE OF LIFT : Goods Lift

WEIGHT : 2000kg capacity goods hoist,
CAR SIZE : 1800mm wide x 1800mm deep x 2000mm high,
NUMBER OF FLOORS : Servicing 5 floors with a maximum vertical travel of 15.5m and
CAR SPEED : 0,1m/s to 0,3m/s.
LIFT SHAFT SIZE : 2400mm wide x 2200mm deep x 4000mm high with 1200mm deep pit and 4000mm headroom.

Drive unit to be machine roomless and requires a
POWER SUPPLY : 3-phase 380V electrical supply (elsewhere specified) for the relay logic based drive system.

CAR FINISHES:

- Powder coated mild steel
- Manually operated opposite powder coated mild steel picket gate car door
- Powder coated mild steel collapse a` panel gate landing door

OPTIONAL FEATURES TO INCLUDE:

- 3VF control, in-use light and arrival bell,
- intercom between floors and load weighing switch

SAFETY FEATURES:

- Governor controlled over speed safety
- Rope tension safety

EMERGENCY FEATURE:

- Emergency stop on each landing