TECHNICAL SPECIFICATIONS

FOR

REPLACEMENT OF 4 NO. LIFTS, AVR & UPS

AT

WORLD TRADE CENTRE
MAIN TOWER

GENERAL PROVISION OF LIFTS INSTALLATIONS

1-1 GENERAL

1-1.1 Scope

This specification covers the supply, decommissioning, removal of 4 number existing lifts, supply, installation, testing and commissioning of 4 number new lifts (elevator equipment as described and scheduled hereafter. The lift equipment and all associated ancillary equipment shall be installed, tested and commissioned by the equipment supplier.

1-1.2 Codes

The completed installation shall comply in all respects with the requirements of the current
editions of:
B. S. 2655 and B. S . C . P. 407
European Standard EN 81 1SO/015 4344.

1-1.3 Submittals (to accompany each tender)
Each tenderer will be required to provide the following information.

1-1.4 Product data and technical literature relating to all lifts supplied.

1-1.5 Manufacturing, installation, operation and maintenance instructions bound in triplicate.

1-1.6 Detailed schedule of equipment provided listing all components.

1-1.7 Detailed loadings of all equipment.

1-1.8 Samples of car and door finishes for approval.

1-1.9 To be submitted after award of contract:
Shop drawings, builders work drawings etc.

1.2 Electrical Supply

Electricity supply shall be 240V single phase, 415 volt three phase, 50 Hertz.

1.3 Guarantee

The Lift Contractor shall guarantee that the material and workmanship of the equipment installed shall be first-class in every respect and that they will make good any defects not due to ordinary wear and tear or improper use, which may develop within one year from date of the installation being handed over to the purchasers.

1.4 Painting

All exposed metal parts supplied under this specification except as otherwise specified shall be properly painted by the Lift Contractor and shall be rust free.

1.5 Electrical Installation

Electricity supply shall be made available in the elevator motor rooms by others as follows:

1.5.1 Power supply for all lifts terminating in a triple pole isolation switch via a three-phase Distribution Board fused switch. A separately, controlled and fused single phase lighting supply shall be provided in the machine room, in each shaft via socket outlets for general purpose use and in each shaft for car lighting.

1.6 Performance and Leveling

1.6.1 Each elevator shall be so designed and constructed that it starts up smoothly, accelerates to full speed without discomfort to passengers and comes to rest without shock or jerk.

1.6.2 Car motion must at all times, be perfectly smooth and there must be no vibration or noise from the winding gears to the car.

1.6.3 The maximum error in leveling at landings shall not exceed 10mm above or below floor levels between the limits of full load and empty in either direction and this accuracy of leveling shall be maintained without frequent adjustments.

1.7 Noise

The contractor shall ensure the elimination of noise from the machines, controllers, doors etc., reaching the passengers as well as room occupants in the vicinity.

1.8 Radio and Television Interference

1.8.1 Lift supplier shall suppress the complete installation against radio and television interference in the building in accordance with the requirements of the International Committee on Radio Interference (CISPR).

1.9 Wiring

1.9.1 The contractor's responsibility for wiring shall commence at the outgoing terminals of the isolator.

1.9.2 The contractor shall provide for the supply, erection and connection of a suitable rated circuit breaker of approved manufacture to control the circuit to the elevator equipment.

1.9.3 All wiring associated with the operation and control of the lift shall be carried out by the supplier.

1.9.4 With the exception of flexible cables, wiring shall be carried out using PVC insulated cables or Mineral Insulated Copper Sheathed Cables. All cables shall have copper conductors and the minimum cross section to be used shall be $1.5mm^2$.

1.9.5 Cables shall be installed in galvanized steel or PVC conduit and / or galvanized steel or UPVC trunking in accordance with the General Electrical Specification for the Electrical contract.

1.10. Switch Gear & Control Gear

1.10.1 All switch gear and control gear shall be manufactured in accordance with British Standard Specification and shall be contained within rust proofed sheet steel enclosures, finished semi-gloss stove enamel with lockable doors.

1.10.2 Circuit Breakers shall be of the Molded Case type or air-break type enclosed in sheet steel case.

1.10.3 Switches shall be of the rotary air break type complying with IEC Publication 408.

1.10.4 Contractors shall be of the quick make quick break type complying with IEC Publication 158-1.

1.10.5 Push-buttons and lamps shall be of oil and water-tight construction with protection class IP54 in accordance with IEC Publication 144.

1.10.6 Colours for push-buttons shall be as follows:

Red for "STOP" or "OFF"

Green for "START" or "ON"

1.10.7 Indicator lamps shall be as follows:

1.10.7.1 Red to warn of potential danger or a situation that requires immediate attention, e.g. motor tripped.

1.10.7.2 Green to indicate correct operation or that it is clear

to proceed, e.g. motor running.

1.10.7.3 Yellow to indicate a change or impending change in conditions, e.g. motor likely to start automatically.

1-10.7.4 Blue and white may be used as the project demands.

1.10.8 All switch gear and control gear have a certificate from a recognized international test organization to the effect that it complies with IEC439-1.

1.10.9 All switch gear and control gear shall be tested in accordance with IEC 439-1 both at the works and again on site prior to commissioning of the installation and records of all tests shall be submitted to the Engineer for approval prior to setting the system in operation.

1.11 Insulation and Earthing

1.11.1 The entire installation shall be well and satisfactorily insulated and actual insulation resistance of the installation measured between the terminals of the Main Switch, with motor and controller disconnected, and any point on the system shall not be less than one mega ohm.

1.11.2 The insulation resistance between the frame of the motor or of the controller shall be not less than half a mega ohm.

1.11.3 The electrical resistance of all conduits and/or MICS cable sheaths together with the resistance of the earthing leads, when measured from the connection with the earth electrode to any other points in the system, shall not exceed half ohm.

1.11.4 Insulation resistance shall be measured at 500 Volts.

1.12 Ventilation

1.12.1 The Contractor shall provide adequate natural or mechanical ventilation to the elevator motor rooms, car and shafts.

1.13 Lift Shaft

1.13.1 Unless otherwise indicated, shafts shall be constructed from reinforced concrete cast in situ.

1.13.2 Access to each pit shall be by means of a fixed ladder easily accessible from basement landing door. The access ladder shall not project into the clear running space of the equipment.
The lift Contractor shall include for the supply and installation of this ladder which shall run throughout the shaft and show on drawings all necessary associated builders work.

1.13.3 A stop/start switch shall be provided in the pit to allow servicing personnel to stop the elevator and hold it in the stopped position during servicing. It shall be enclosed in a sheet steel or all insulated enclosures with protection class IP55 in accordance with IEC 144.

1.13.4 Lighting to the shaft shall be provided by means of 100 Watt bulkhead fittings located at each landing level. They shall be switched from the appropriate motor room.

1.13.5 Prior to commencing manufacture, the Contractor shall determine exact shaft and door opening dimensions.

1.14 Machine Room Less Lift

1.14.1 Lift motor rooms are available. However, the lift motors shall be designed for machine room less installation at top of lift shafts.

1.14.2 The Contractor shall provide all steelwork and lifting beams required for supporting or lifting elevator machinery and associated equipment.

1.15 Landing Doors

Landing doors shall be manufactured from heavy duty brushed stainless steel, with a minimum fire resistance of two (2) hours.

The clearance between panels or between panel and upright lintel or sills shall not exceed 10mm.

Doors shall be automatic centre-opening type and shall be mechanically and electrically interlocked with car doors. No matter the position of the landing doors, the force necessary to prevent their closing shall not exceed 150N.
Each door shall be provided with the following protective devices to ensure reversal of the doors should they come in contact with any obstruction.

i. A rubber contact strip running the full height of the door.

ii. A photoelectric cell at a low level or a proximity switch.
It shall not be possible to open a landing door unless the car is within the unlocking zone and it shall not be possible to move the car or maintain the car in motion unless all doors are shut.

Landing doors shall be designed to avoid derailment, jamming or displacement at the extremities of their travel. Horizontal sliding doors shall be guided top and bottom.

Each landing door shall be capable of being opened from the outside in case of emergency. The key to open the doors shall take the form of a triangle. The contractor

shall include for providing written instructions on how this key should be used and all precautions to be taken before using it. Landing doors shall be provided with an electrical device for proving the closed position.

Landing entrance shall be provided with a sill of sufficient strength to withstand passage of loads into the car. It shall be anti-slip type and shall be supplied and fixed by the contractor. The contractor shall provide all frames, posts, lintels etc. necessary for fixing the doors and shall provide the following for each landing door:

i. 'UP' and 'DOWN' push button unit with call registered light.

ii. Position indicator over each door to indicate lift position and direction of travel.

iii. Audible sounder of the gong type to indicate lift arrival at a floor.

The above shall be flush-mounted with brushed stainless steel cover plates.

1.16 Lift Car

The capacity and rated load of each car shall be as detailed on the schedules.

Lift car shall be manufactured from heavy gauge steel panels mounted on heavy gauge steel framework. Panels shall be arranged to give a flush interior, the panels being interlocked for maximum, rigidity.

Floor of cars shall be provided with heavy duty granite.

Rear and side walls of cars shall be finished in brushed stainless steel and shall be provided with circular section, brushed stainless steel hand rails.
Ceiling shall be finished in lighted stainless steel. Ceiling shall be illuminated with random or slot perforations.

Car operating panel shall be flush mounted at the front of the car.

Car shall be ventilated at top and bottom and shall be provided with an emergency access hatch at least 500mm square at the top. Access hatch shall be the self locking type openable from the inside and outside without key; and shall be provided with an electrical switch to prevent lift operation with hatch open.

Lift car shall be provided with lighting controlled from the machine room. Lamps shall be 40W fluorescent or approved equal mounted behind perforated ceiling panels. Cars shall also be provided with emergency lighting unit complete with nickel cadium batteries (3-hour duration) to operate one of the lamps in the event of failure of normal power supply.

Telephones shall be provided in each car. These shall be wired back to a junction box in shaft. The telephone handset shall be mounted in a recess provided with a hinged door. The door shall have engraved on it the following "EMERGENCY TELEPHONE". Instructions regarding use of telephone shall be pasted on the inside of door.

The following indicators shall be provided inside the car.

i. Position indicator over the door to indicate lift location and direction of travel.

ii. Car control panel comprising push buttons with:

   a. 'Call registered' indicator for each floor served.

   b. Yellow alarm push buttons and floor select buttons.

All controls shall be flush-mounted.

1.17. COUNTERWEIGHTS

Each lift shall be provided with the necessary cash iron counterweights. The weight shall equal the weight of the car plus 40-50% of the specified load.

The contractor shall include for the balancing of the system after average traffic has been ascertained and again for six (6) months.

A counterweight screen consisting of heavy gauge galvanized wire mesh mounted on an angle iron frame built into the wall and floor to a height of 2.0m above the pit floor shall be provided.

1.18 GUIDE RAILS

Car and counterweight guide rails shall be manufactured from high quality, bright finish T-section mild steel mounted on I-Section steel backings.
Guides shall have good machined surfaces, accurately jointed at all breaks. Guide brackets shall be rigidly fixed to the wall using rag bolts or other approved method.

1.19 SUSPENSION ROPES

These shall be flexible steel wire securely anchored at the car sling and counterweight cross head in such a way as will provide equal tension in all ropes.

The minimum safety factor on all ropes shall be 12 wire strand with three or more lifting ropes and 16 wire strand in the case of two lifting ropes. The safety factor of rope attachments shall be at least 80% of that for the ropes.

Suitable telescopic oil damped buffers shall be fitted in the pit under the car and counterweight.

The stroke of the buffers and resistance to motion shall be designed to obtain an average rate of retardation from governor tripped speed to standstill not exceeding the of acceleration due to gravity. The buffers shall be fitted with means of ascertaining the oil level in the reservoir, and shall be mounted on continuous RSJ channels laid on the floor of the pit and securely located by the guide rails.

1.21 CLEARANCE

The following horizontal clearances shall not be exceeded:

i. Between Lift well and framework of car door: 150mm

ii. Sill of car and landing door: 35mm

iii. Car door and closed landing door: 120mm

1.22 LIFT MOTOR / DRIVE

The lift motor and drive shall be a self contained unit comprising motor, reduction gear, traction sheaves and electromechanical break, all mounted on a base plate which shall be supplied with anti-vibration mountings and shall be rigidly bolted to the floor.

The motor shall be suitable for the type of control scheduled and shall be designed for high starting torque with low starting current. The motor speed shall generally be less than 1000 R.P.M. and shall be gearless.

An electromechanical braking system shall operate automatically in the event of any one of the following:

i. Absence of power to lift circuit

ii. Absence of power to any of the control circuits.

The braking force shall be applied by guided compression springs or weights and braking shall be effected by application to the brake and drum or disc of at least two (2) shoe pads or jaws. Brake linings shall be incombustible.

The brake shall be capable of the following:

i. Decelerating the machine when it is at its rated speed and with the rated load augmented by 25%.

ii. Maintaining the machine stationary with the car load equal to the rated load plus 50%.

Provision shall be made for manual releases of the brake in the event of an emergency. The arrangement shall incorporate a safety switch which will ensure that the current supply to the machine is interrupted so that it cannot be operated while the brake remains so released.

Facility shall be provided to move the car manually in the upward direction to the nearest landing when the effort necessary to do so with the rated load does not exceed 400N. It shall be carried out using a spokeless wheel with removable handle which shall be located near the machine to be controlled and shall be clearly indicated on or near the wheel. Visible marks shall be provided on the lifting of governor ropes to indicate when the car is at a landing.

When the effort to lift car exceeds 400N a means of electrical winding shall be provided in the lift motor room. The supplier shall finish details of the system proposed at the time of tendering.

The stopping of the machine by means of an electric security device shall be initiated as follows:

a. In the case of motors supplied from the mains, the supply must be disconnected by two (2) independent contactors.

b. In the case of motors fed by static elements, one or other of following methods must be used:

b-i. Motor supply must be cut by two (2) independent contactors.
b-ii. A device must initiate the functioning of the normal switching device and the interruption, using at least one contactor, of all the poles feeding energy to the machines if the action of the normal switch has not been effective.

Protection against accidental contact with moving or rotating parts of the machine shall be provided.

1.23 CONTROL SYSTEM

The control system shall be solid state, programmable, computerized type, self monitoring for faults in the system. For ease of replacement, plug-in units will be used. Electronic selectors with bi-stable magnetic switches in the shaft will supply the shaft information to the control system. The control system proposed should be capable of self-adaptive control for the efficient use of the lifts under frequently changing traffic and load conditions.

Lifts shall have co-ordinated group control. This will include for full collective control on each car but when the system is at rest a number of cars will normally be stationed at the main level or other convenient level.

A flush mounted electronic mini-siren shall be provided at ground level in each lobby and shall be clearly labeled "Lift Alarm".

Remote alarm indication shall be provided with alarm indication at reception area. Operation of the alarm shall be by means of the alarm push button in the car and it shall be so wired that supply to the alarm is not disconnected in the event of the mains supply to the lift being disconnected or interrupted. The contractor shall provide all wiring to the siren.

A Fireman's switch shall be provided and located at high level on the ground floor in a glass fronted box with stainless steel frame. It shall be labelled "FIREMAN'S SWITCH" and the glass must be broken before switch can be operated. The fireman's switch when operated shall give complete control of the lift to the fireman and shall over-ride all other calls. The contractor shall be responsible for all wiring associated with the fireman's switch.

Door `Hold Open' time adjustment shall be provided in the controls to help reduce excessive delays of ready to start cars due to the late entering passengers who enter when door is closing, whereby the door reopens but only for a short period of time. To suit individual needs, the control shall allow independent adjustment for both the shorter period and the normal door-hold open time.
The car operating panel shall have a `Final Time' to prevent blocking of the car by passengers who refuse to move away from the car entrance. If the closing of the car door is prevented after a certain period of time (adjustable between 3 to 30 secs), a warning buzzer shall sound and the door shall begin to close at a reduced speed. During this period, the door photo-cell, safety edge and door open switches shall not be operative.

Lift controls shall include:
a Minimum
b Full Load
c Overload Controls.
A minimum load contact shall be provided in the load measuring car floor. This shall prevent unnecessary travel by cars which are empty.
A full load contact shall be provided in the car floor to ensure that fully loaded cars respond only to commands from within the car. Floor calls shall be registered but answered by the next available not-fully loaded cars.

The wiring of each lift control panel shall be carried out so that it is possible to remotely monitor the status of the lift. The conditions to be monitored shall be as follows:

i. Lift operating correctly.
ii. Lift breakdown.
iii. Emergency condition; eg. Operation of safety devices.
iv. Lift out of operation for maintenance purposes.
v. Operating of 'Alarm' Push button.

All external wiring between each of the lift control panels and the supervisory control room will be carried out by the Electrical Sub-Contractor to details supplied by the Lift Installer.

The Contractor shall provide a Control Panel in the machine room with indicators and signals for controlling the operation of the Lifts. The panels will be used for maintenance and supervisory purposes. Manual selection of the various functions and operations shall be by push buttons.

1.24 OPERATING AND MAINTENANCE INSTRUCTIONS

The lift installer shall provide operating and maintenance manuals for the various components of the installation as follows:

CAR PANEL

In each car panel the following shall be displayed:

a The names of manufacturers and installer, the serial number and the year of manufacture.

b The rated load in kilograms and the maximum number of persons that the lift can carry.

c Clear instructions on how to use the emergency telephone.

d Clear instructions on what action to be taken in the event of a fire.

Car Ropes

On the car crosshead near the rope hitch, a label shall be provided clearly indicating the maximum static load carried by the ropes, the number of ropes, the breaking load of the ropes and the details necessary for their replacement without the risk of error.

Headroom

The following shall be displayed in the lift headroom:

a. A label on each main switch indicating how the lift is being controlled.

b. A notice detailing the measures to be taken in the event of a breakdown; particularly the means of manually or electrically moving the car.

The Over-speed Governor shall be provided with a label indicating the following:

a. The manufacturer's name.

b The type of reference

c The Rated Speed

d. The breaking load of the rope and the details necessary for replacement without risk or error.

Buffers

The following shall be provided on the buffers:

a. Manufacturer's name

b. Type of reference

c. Maximum impact speed

d. Maximum permitted load

e. Minimum permitted load

f. Type of hydraulic fluid if applicable

g. Type approval sign and reference

Language

All labels shall be in the English Language.

Maintenance

The lift installer shall be required to enter into a comprehensive maintenance contract with the owner for the proper maintenance and repair of equipment installed.

The maintenance shall include all costs involved with the following:

a. Routine inspection and maintenance visits to site, at least six (6) times per annum.

b. Emergency visits to site due to breakdown of lifts or associated components.

c Replacement of components of the system which are damaged or have to be replaced due to the fair wear and tear.

d. Any further maintenance proposals suggested by the manufacturer. These shall be priced separately.

1.25. WORK PRIOR TO HANDING OVER

a. Painting

The contractor shall include for painting all the materials fixed and supplied with the exception of such items as lights, cables, bright metal work, and landing doors and the inside of the car.

All paint work shall be three (3) coats of oil paints of a colour to be selected by the consultant/client; after the surface to be painted has been cleaned down, primed and rust proofed.

Lift wells and motor rooms shall be painted with a dust inhibiting white paint.

b. Lubrication

All bearing points shall be arranged that they can be lubricated efficiently and easily. Where grease is used a lubricant `Stanffer Lubricators' of the screw-down pattern shall be used.

Tools

Any special tools that may be required for adjustment of the controllers, for general maintenance work or for emergency use shall be provided and fixed on a rack in the motor rooms.

All equipment so provided shall be clearly labelled as to its use and any safety precautions which have to be followed prior to use.

The contractor shall provide one set of tools for each lift; a list of which tools shall be provided with the tender.

1.26 PASSENGER LIFTS

The lift car, doors, indicators etc. shall be as the following:

Car ceiling and panels shall consist of textured plastic sheet on galvanized sheet base. Colour of the ceiling shall be white while side panels shall be grey.

FLOORING

It shall be fabricated from extra durable material, and have hardwearing, anti-bacterial and bio-degradable features. Colour of flooring shall be petrol green.

CAR DOOR and operating panels as well as facade shall have brushed stainless steel finish.

Handrails shall be round sectioned with bright chrome plating and shall be fixed on three sides.

DRIVE

The lift drive shall be variable speed geared machine with variable frequency control that shall be microprocessor based;

Car call and answering system shall be simplex full collective.

LANDING DOORS

These shall be two speed centre/lateral opening types and the entrance surrounds shall occupy the full width of the elevator well. The doors shall have a fire resistance rating of minimum 2-hours.

Door panels and entrance surrounds shall be finished in brushed stainless steel. Landing fixtures shall be in chrome and shall include the following:

i.) Signal Hall Lantern including gong signal made with LED components. Gong shall have different tone signals for 'up' and 'down' directions.

ii.) Hall buttons in bright chrome with ring illumination and shall show the actual direction of the car.

Telescopic elements shall be provided to permit height and lateral adjustment of the landing facade to the elevator well openings.

DISABILITY FRIENDLY: The push button knobs in the lift and its associated items shall be disability friendly

SPECIFICATION SCHEDULE FOR PASSENGER LIFT

PARAMETER	MINIMUM REQUIREMENT	MAXIMUM
TYPE	MACHINE ROOM-LESS (MRL) PASSENGER ELEVATOR	
QUANTITY	4	
TOTAL LOAD	1000 kg	
NUMBER OF PASSENGERS	13	
TRAVEL SPEED	1.6 m/s	
MINIMUM TRAVEL HEIGHT	68.675 metres	
NUMBER OF STOPS	17	
FLOORS SERVED	Basement, Ground, 1st to 15th floors	
CAR DIMENSIONS (W x D x H)	1370mm x 1570mm x 2200mm (Verify with shaft size on site)	
LIFT SHAFT DIMENSIONS (W x D)	2020mm x 1750mm (Verify with shaft size on site)	
LIFT CAR CONSTRUCTION	Robust, leakage proof as well as rust proof and finished in stainless steel	
PIT DEPTH	1560mm	
OVERHEAD HEIGHT	4200mm (Verify on site)	
FAN FOR CABIN VENTILATION	50 litres /second	
TYPE OF PANELS	Brushed Stainless Steel	
CAR DOOR OPENING	Automatic Central Opening Type	
MACHINE TYPE	Gearless	
OPERATION SYSTEM	Fully automatic Triplex (Two sets of 3-Car Group) Full Collective (FCL)	
FINISHING OF LIFT	Stainless Steel and Skin Plate with Prime Coating	
ELECTRIC POWER SUPPLY	380/210V, 50Hz	415/240V, 50Hz
SAFETY STANDARD	European Standard or Approved Equal	
ACCESSORIES	1. Alarm Bell 2. Lift Position & Travel Direction Indicator on all Floors 3. Independent Service Control with Key Switch 4. Overload Device 5. Automatic Door Operator, 6. 2-Way Intercom 7. Fire Control System 8. Hand Rails for Physically Challenged Persons and 9. Automatic Rescue Device. 10. Mirror (Full at rear) 11. Disability friendly braille push buttons	
ROUTINE MAINTENANCE DURING DEFECT LIABILITY PERIOD	Monthly	
WARRANTY	12 months.	