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## **Particular Specifications of Tender**

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## **Part 1**

### **1.0 Scope of Works**

This includes the dismantling for existing Lift & supply and installation of new Passenger Lift at the Offices for Occupational Health & Safety Authority, Tal Pieta.

- The dismantling, collection and disposal of all components of the current lift installation;
- Supply, delivery, installation, connecting up, testing and commissioning of the lifts as indicated on the bills of quantities and as described in this specification and within the main contract preliminaries.

The contractor shall note that the technical information contained in these specifications is to be used as minimum requirement for the lift.

### **1.1 Submittals**

Prior to the acceptance of the proposed system and equipment, the Contractor shall submit together with his offer all the technical literature of the materials and equipment in the bills of quantities; namely, the type of elevator proposed, functionality, materials specification and method statement of installation. The technical literature shall be in the English language and in compliance with the specifications below.

It shall be the responsibility of the contractor to verify and confirm all lift shaft sizes and openings accordingly prior to ordering of lift equipment, and to submit working drawings indicating the lift which is to be ordered. Any discrepancies found on site are to be immediately brought to the attention of the engineer/client. No claims for any alteration works shall be acceptable should any discrepancies arise which have not been brought to the attention of the engineer/client prior to ordering of lift.

### **1.2 Electrical Supply**

The electrical installation shall be carried out according to the latest IEE Regulations and according to Enemalta regulations. Installations shall be continuously supervised by a competent and qualified person or persons in possession of Enemalta Wireman's License A & B.

- 1) Installations shall be carried out according to drawings and specifications as stipulated in this tender document.
- 2) Electrical installations shall be carried out according to IEE regulations and Enemalta requirements.
- 3) Materials used shall all be CE marked, besides being in accordance with other specified standards.

### **1.3 Workmanship and Safety Regulations**

- a) All workmanship shall be of a high standard and shall fully comply with the relevant British Codes of Practice, Local Standards and Regulations or equally approved Standards. In addition, with

complying with the relevant Standards, The Enemalta Electricity Supply Regulations, and the IEE Regulations, the entire Electrical Services Installation covered under this Contract shall also satisfy the Engineer as regards finish and general appearance.

b) The Contractor shall fully comply with all safety rules and regulations and shall be solely held responsible for the safety of his employees, the client employees and the general public. The Contractor shall be responsible for any damage to the Client or Third Party that may be caused by him or his employees. All works shall be carried out by competent and licensed tradesman.

#### **1.4 Contractor's Responsibility**

The Contractor shall perform all functions necessary for the development, manufacture, procurement, installation and site testing of systems, sub-systems and components to provide complete and operable installations.

The contractor shall prepare such installation diagrams, wiring drawings and schematics as may be necessary for the completion of the works.

The contractor shall provide all required material, tools, instruments and equipment required to complete the installations. The contractor shall bind himself to co-ordinate his works with those of other contractors. The contractor shall also bind himself to schedule works in accordance with the program of works agreed to at the start of the project and monitored by the Engineer in charge.

The contractor shall comply with all health and safety regulations, as per the OHSA regulations – LN44 of 2007, and shall be solely responsible for the safety of his employees, client's representatives and the general public. The contractor shall be responsible for any damage to the property or third parties that may be caused by him or his employees. All works shall be carried out by competent and licensed tradesmen.

#### **1.5 Builder's Work**

The contractor is to include in his rates for chasing, holes in reinforced concrete or structural members etc. required for the proper execution of the works. Holes in reinforced concrete or structural members shall only be made after approval by the Engineer or Architect in charge. All holes shall be made good with appropriate material in order to ensure that the integrity of the fire barrier is maintained. Such making good shall be deemed to have been included in the tendered rates.

#### **1.6 Fixing to Building Structure**

The contractor shall ensure that all installations are properly fixed to the building structure such as bricks, concrete, dry wall or other masonry material, by means of correctly sized screws fitted into plastic or metal expanding plugs located in correctly sized holes drilled in the structure. Light fittings to cavity constructions shall be via gravity or spring toggles or expanding rubber sleeve fitted on to screws. All holes shall be drilled using slow speed rotary drills as recommended by the manufacturer.

of the system being installed. All penetrations required in structural beams or slabs or wherever re-bars or other reinforcing material need to be penetrated, these shall be carried out using diamond-tipped boring equipment. All penetrations shall be made only under approval of the Engineer in charge and by means of circular diamond tipped tools, and all structural openings shall be approved by the architect in charge. The use of percussion types boring devices and shot fired fixings shall not be allowed.

In all cases the particular type and size of fixing device used shall be in accordance with the manufacturer's recommendations having regard to the application and the load to be carried by the fixing device.

### **1.7 Labelling**

The contractor shall have the responsibility to label all equipment installed in the project being undertaken. Labels shall be installed on all items of equipment, distribution boards, switches, fuses etc., as may have formed part of his works and these labels shall bear such information as is considered necessary by the Engineer.

The Contractor shall provide a printed chart giving details of each circuit, in all distribution boards and consumer units and corresponding to the 'As Fitted' drawings supplied. These charts shall be enclosed in a transparent plastic envelope attached to the inside of the door of the consumer unit or distribution board. Consumer units and distribution boards are to be marked with appropriate labels made of white plastic, with clear engraved letters and figures coloured in black ink. Distribution boards are to have the DB identification indicated on their label as per the schematics or as requested by the Engineer/client. A plastic label with clear engraved letters and coloured red shall also be installed at each main earth terminal and shall read: "SAFETY ELECTRICAL CONNECTION – DO NOT REMOVE".

The Contractor shall also leave in position on all equipment the manufacturer's nameplate or marking normally attached thereto, and no equipment shall be installed without ready means of identifying the manufacturer and pattern or type number, together with the date of manufacture, the output and/or duty as applicable. The inscription on labels and engraving shall be in English characters.

### **1.8 Testing and Commissioning**

All the works provided as part of the contract shall be inspected and commissioned in accordance with the relevant MSA EN or BS, EN or IEC standards to the satisfaction of the Engineer. The Contractor shall be responsible for the testing of the electrical installation in the lift shaft as recommended in the IEE Wiring Regulations "Requirements for Electrical Installations" – 17th Edition including amendments. The contractor shall also be responsible for the testing and certification of the lift by a competent person/ACAB as per local legislation.

The Engineer has the right to inspect or test any equipment or parts of the work during installation and the Contractor shall provide test certificates to the Engineer, upon request. All tests shall be arranged in cooperation with the Engineer, and he shall be given prior notice of the time, location and

nature of the tests to be undertaken. All necessary test points, equipment and facilities, as well as skilled and unskilled labour necessary shall be provided for attendance duties before, during and after the test. The responsibility of the tested systems, partially or in full, shall remain the responsibility of the contractor until handing over. Tests shall be considered valid only if there is the presence of the Engineer or any of his representatives.

Defects occurring at any time during the test shall be made good and a complete retest shall be carried out at no extra cost to the client. Where failure during a test, inspection or commissioning process results in damage to the building fabric and/or services not provided as part of this contract or requires subsequent builders' work then these items shall be made good at no extra cost.

No section of the works shall be in any way concealed prior to testing and inspection and subsequent concealment where applicable shall only take place following written authority from the Engineer. All necessary facilities, measuring and recording instruments for inspection/testing and commissioning are to be calibrated as necessary before use. The Engineer reserves the right to call for a demonstration of the accuracy of any instrument used. All systems shall be commissioned only after inspection and testing procedures have demonstrated the integrity of the system.

#### **1.9     *Manuals and Records***

At the end of the installation, the Contractor shall provide the responsible engineer with three sets of complete operation and maintenance manuals for the lift installation. The manuals shall include the technical literature, testing and commissioning.

## **PARTICULAR SPECIFICATION**

### **PART 2 – Lift Installations**

#### **2.0 Schedule of Works**

The Lift contractor shall allow for the complete electrical works installation within the lift shafts and for all associated lift equipment.

Such installations shall include any ancillary power and telephone point requirements within the lift shaft and connecting up to the lift controllers.

#### **2.1 Schedule of Lift Equipment**

The lifts shall be provided for transportation between the different levels as indicated on the drawings. The lifts are to comply fully with the latest Lift standards including British and European Regulations, specifically BS EN81-1, A3 2004, MSA EN 81-70, European Parliament and Council Directive 95/16 EC, Design Guidelines Access for All, Energy Efficiency of Class A or better on VDI4707 using usage category 2, statutory regulations and bye-laws.

##### **2.1.1 Passenger Lift**

Type of Lift	Passenger lift and disabled access.
Fire Fighting Lift	No
Fireman's Recall Switch/Override Controls	No
Capacity	8 passenger – 640kgs
Lift Motor Electricity Supply	415V, TP&N, 50Hz
Lift Installation Ancillary Supply	230V, SP&N, 50Hz
Lift Type and Use	Electric traction 'machine room less' lift
Machine Type/Drive Units/Duty Cycle	Gearless variable speed AC electric traction V.V.V.F. – Min. 180 starts per hour
Lift Control System/Type	Single automatic push button, Full Collective
Lift Speed	1.6 m/s
Travel Distance	Approx. 23m Final measurement shall be taken on site by the contractor prior to ordering of lift.

**Lift Shaft**

Shaft Dimensions (min)	2199mm W x 1904mm D min overall clearance Final measurement shall be taken on site by the contractor prior to ordering of lift.
Shaft Headroom Dimensions (From last level served)	Approx. 3500mm min
Pit Depth	Approx. 1500mm (if other pit depth is required, this needs to be stated at tendering stage).
Accessible space below pit	No.

**Lift Cabin**

Car Type	90-degree entrance car.
No. of Floor stops	9 Stops.
Level Movement	From -4 to +4
Level Stops	-4, -3, -2, -1, 0, 1, 2, 3 & 4
Levelling Accuracy	± 5mm
Door operation	Power operated AC door operator, high speed, fully adjustable incorporating pressure sensing mechanism and curtain type infra-red beam across entrance.
Clear Door Opening	900 mm x 2000 mm (minimum)
Door Type	2-panel Centre-opening Doors designed for commercial duty of up to 400,000 cycles per year
No. of Door Opening	Single opening per floor (As shown in lift layout)
Access Control	No
Fire Rating of Doors	2 Hours
Internal Car Dimensions (min)	Minimum 1100 mm wide x 1400 mm deep x 2200 mm high car
Car/Landing Doors Finish	Brushed Stainless Steel
Car Interior Finishes	<b>Walls</b> Finished in Brushed Stainless Steel

	Half Length Mirror on the wall of the lift cabin opposite the lift door
	Fold down seat without back rest, narrow.
	<b>Floors</b> Standard rubber flooring
	<b>Ceiling</b> Suspended ceiling with LED lighting spots
	<b>Handrails</b> Curved stainless steel - Fitted to one side wall
Car Operating Panel	Flush-mounted operating panels Brushed stainless steel finish with DOT Matrix
Architrave Type	Stainless steel box type frame – to be finished and coordinated with marble/finishes works
Landing Entrance Façade	Stainless Steel Box Frame – to be finished and coordinated with marble/finishes works
Car and Landing Sills	Extruded Aluminium Section (Include Full Width Landing Sill Support) and sill angles
Car Interior Lighting	Flush fitting low energy fluorescent/LED with 3-hour non-maintained emergency lighting– DDA Compliant Lighting to be Indirect & non-glare lighting
Car Interior Ventilation	Mechanical Ventilation mounted on top of car to operate only when lift is in operation.
Car and Machine Acoustic Sound Isolation	To be Included
Interior Car Indicators	LED and audible voice communicator integrated into car control panel. Programmable Electro-luminescent floor level displays.
External Landing Controls	Single illuminated (Up/Down) tactile push buttons at each level.
External Landing Indicators	Digital Lift positions indicator with arrival 'gong' on each floor.
Door Vision Panels	None.



External Alarm Location	Ground Floor Level
Car Overload Detection System	Electronic, voice warning and illuminated indicator.
Interior Car Controls (additional)	Composite flush mounted control station, DOT Matrix indicator, Tactile push buttons, emergency intercom, preference key switch, light and fan, door hold/close. Digital position indicator within car control panel.
Machine Location	Top of shaft
Position of Counterweight	Side
Lift Controller	Located at top most level – Flush mounted Stainless-steel finish
Lift Controller Lighting (top floor landing):	Designed to 200 lux, c/w adequate emergency lighting.
Lift Shaft Lighting	By Lift Contractor. Designed to 150 lux, c/w 3 hour maintained emergency lighting.
Lift Guide Rails Earthing	By Lift Contractor. Rails to be earth bonded to the earth protection system at high and low level.
Conduit/Cable Trunking Types	Class 4 metallic conduit with LSF cables.
Safety Gear System	Wedge Type overspeed governor Up & Down Progressive Type safety gear
Pit Stop Switch	Include to BS7255
Telephone Line and Socket	External line fitted to the lift controller panel.
Lift Shaft Smoke Detector	By Third-party Contractor. Lift tenderer to allow for attendance for unit to be fixed at top of shaft by Third-party Contractor.
Stand Still Maintenance Requirements	Key preference within car
Operating and Maintenance Manuals	To be Included
As Fitted Drawings	To be Included
Third Party Inspections	Following completion of the Lift Installation allow for attendance for inspection by ACAB competent person.

Additional Requirements

Following handover of the system allow for attendance for inspection by the Insurance inspectorate.

Lift to comply with latest EN81-20:2014 and EN81-50:2014 standards and safety requirements.

Programmable Voice synthesiser announcing floor levels.

Emergency Evacuation Device such that lift returns to closest level in cases of electrical failure

All controls with tactile Braille markings.  
Induction loop

Emergency communication system including an induction coupler

Connection to dedicated telephone line.  
Communication wiring via Auto Dialler programmable to telephone line. Pre-programmed numbers to be provided by client during installation.

Audible Floor Level Indication Emergency Release Procedure.

Pit and machine area stop switches.

All relevant notices, including: -  
o Motor area notice.  
o Electric shock notice

All necessary guarding included and include for top of car safety barriers.

Top of car inspection panel with electrical socket outlet, top of car light and door open/close button in full compliance with BS EN 7255 1989.

Sheave brake or similar to comply with Lift regulations 1997.

Electrical Wiring Diagrams.

Testing and Commissioning to a test procedure approved by an industry recognized body.

A safety plan

36 Months Maintenance Contract Commencing from Commissioning

Approved ACAB examination certificate  
Accurate re-levelling ensures that there is no dangerous step between the car and landing sill in any situation

## **2.2 Information for Approval, Notices and Technical Specification**

The lift contractor must take all necessary dimensions on site prior to commencing and during the progress of the works.

Before putting any work in hand, the following working drawings shall be submitted for approval of the engineer -

- a) General arrangement and builders-work detail, shaft
- b) Car enclosure, car doors, landing entrance complete with frame fixing details (where applicable).
- c) Car layout, Perspective and Manufacturing Drawings.

After approval of items (a) and (b) three copies of each shall be submitted for use during the duration of the contract.

The contractor shall submit all electrical and reaction force loadings, no later than the date of the final submission of working drawings.

The information shall be complete in all respects and will include confirmation of the KW ratings, full load and starting amperages, fuse ratings, permitted volt drop and a line diagram of the switch gear arrangement in the machine room, for the 3 phase and single-phase supplies.

Any additional requirements for ancillary equipment such as communications or diagnostics shall be fully detailed with all information on cabling and terminations.

On completion of the work, the contractor shall provide and fix in the lift shaft a framed and mounted "straight line" and "as wired" set of wiring diagrams of all electrical apparatus of the lift as actually wired and fitted and showing the arrangement and markings of all connections. These diagrams shall be plastic encapsulated or equivalent finish to approval.

Nomenclature detailing all symbols and forms of identification used on the equipment drawings of circuit diagrams applicable to the equipment encapsulated in plastic or equivalent to approval and mounted alongside the circuit diagrams.

Full information in respect of the heat output and operating temperature range of the equipment is to be provided.

All danger, warning or advisory notices recommended by either BS 5655 or BS EN 81 or BS 7255 which are applicable to this contract shall be provided by the lift contractor. They shall comply in all respects with the requirements of British Standards and shall be manufactured from "ivorine" plastic laminates or equivalent approved material.

The lift contractor shall provide and fix an electric shock notice in the lift shaft.

The lift contractor shall provide an internally mounted distribution chart in the consumer unit identifying the use of all circuits and their fuse rating.

All switches within the lift shaft, including the main switch are to have permanently fixed labels identifying their use.

### **2.3 Traction Equipment**

#### **2.3.1 Lift Machine**

The lift machine shall comprise a variable frequency gearless drive with traction sheave directly coupled to an electric motor and incorporating an electro-mechanical disc brake. The whole assembly shall be carried on the lift car and various steel supports at the top of the lift shaft. Transmission of vibration to the fabric of the building shall be prevented by the use of proprietary anti-vibration mountings. The lift contractor is to ensure that his offer includes for all necessary steel work to accommodate the lift machine(s). The whole assembly is to be designed and tested to sustain contract load plus 25% overload – Lift beam/eyes to be installed and tested by the Contractor in the presence of the client.

#### **2.3.2 Motor**

The hoisting induction motor shall be suitable for the supply and shall have a speed not exceeding 1500 rpm. It shall run at all loads without appreciable noise, hum or heat buildup and the rotor shall be specially constructed for variable AC operation. The motor will bear the motor maker's nameplate. A plate showing the direction of movement of the lift shall be provided on the motor for indication during hand winding operations.

#### **2.3.3 Traction and Diverter Sheave**

All traction and diverter sheaves shall be painted yellow or guarded and rope restraints shall be fitted adjacent to them to prevent the suspension ropes from leaving their grooves.

The traction sheave shall have a diameter not less than 100mm. The suspension rope shall be 2:1 where necessary.

#### **2.3.4 Brake**

The disc brake shall be spring applied, electrically released, of heavy construction and have an adequate braking area for the load and speed specified. There shall be two self-aligning shoes actuated by two separate compression springs.

The brake shall be designed to be instantly and automatically applied in the event of an interruption of the power supply from any cause and shall be capable of sustaining a static overload of 25% in the lift car.

### **2.3.5 Isolation Switches**

On the lift car roof an emergency stop switch of the mushroom headed lock down type is to be installed in a position and at a height where it is readily accessible to personnel in an emergency situation. A label is to be displayed on or adjacent to the switch engraved "emergency stop".

In the lift pit an identical switch is to be fitted adjacent to the landing entrance. It shall be fitted in a position, which is accessible from the landing and, by a person standing in the lift pit. Where the depth of the pit prevents this being achieved a second switch shall be provided.

### **2.3.6 Over Speed Governor**

A type tested over speed governor with governor rope and tension pulley frame shall be provided and designed to meet the respective electrical and mechanical tripping speeds specified in the current edition of BS EN 81 and a means shall be provided whereby for testing purposes the governor shall trip when the car is travelling at normal speed. Guards are to be fitted to fully enclose the governor; the data plate details shall be repeated on the top of the guard. The tension frame in the pit shall be electrically interlocked, by a positive acting switch.

### **2.3.7 Controller**

The control equipment shall be totally enclosed in a stainless-steel cabinet with louvered ventilation slots and a hinged door exposing all components for accessibility. This shall be placed on the top most lift landing and installed flush mounted to the wall. The contractor shall also be responsible to seal and make-good around such cabinet.

All main components, relay, contactors, fuses, overloads etc. shall be suitably identified and a nomenclature compatible with the circuit diagrams shall be provided.

The hoist motor windings shall be protected with encased thermistors that are fully adjustable to provide a level of protection commensurate with the motor manufacturer's recommendations.

Any solid-state circuitry must be adequately protected with proven stabilization devices such as Zenner diodes or self-compensating power packs. Where power packs are fitted each unit shall be adequately fused and have an overload reset feature fitted.

A device shall be incorporated within each panel to detect a loss of one phase or a phase reversal. Where the device detects one of the above conditions a switch relay or contactor shall become open circuit removing the supply to all contactors and control panel circuitry. All contacts controlled by relays or contactors shall be normally "open" when such devices are de-energized.

A position indicator with LED or seven segment digital display shall be provided within the controller.

Particular requirements of the Electricity Supply Authority shall be identified and complied with having particular regard to power factor correction.

A test facility incorporating direction buttons identical to those detailed for fitting on the car top control station shall be incorporated in the control panel. The lift shall remain in inspection mode until both sets of inspection switches are returned to the "normal" position. However, when the lift is in "inspection mode" initiated from the car top, it shall isolate the control panel inspection switches.

The contractor shall provide a rubber mat on lift car roof where access is required to electrical equipment.

If the preferred method for interrogating the lift control system when fault finding is by the use of a portable or hand-held device, then any such device shall be permanently located within the controller cabinet and shall become the purchaser's property and shall be connected to the controller via a door mounted socket.

### **2.3.8 Power System**

The lift power control system shall be single speed AC motor utilizing a variable speed drive.

Speed regulation between no-load and full-load shall be within 5% of the contract speed. The entire lift installation shall run normally when the supply voltage varies to a limit of plus or minus 6% of the declared voltage. The lift trade contractor shall also indicate the maximum voltage drop permitted to enable the lift to operate satisfactorily from a standing start to contract speed.

### **2.3.9 Control System**

The lift control system shall be provided with the following features.

- a. Shall be micro-processor based and have the facility for future installation of 'fail logging' and remote monitoring equipment complying with BSI document DD.176: 1988.
- b. Car and landing calls should be stored in the system after operation of the respective car to landing push.
- c. The car and landing calls shall be cancelled marginally before or during the door opening cycle at the appropriate landing.
- d. Car calls should be answered in the order in which destinations are reached, irrespective of the sequence in which they are registered.
- e. With no calls in the system, the landing call registered will be answered and immediately responded to.
- f. An adjustable timing device is to be incorporated to allow a predetermined time for passengers to enter or leave the lift car before the doors start to close in response to a further landing call. The registration of a car call shall override this timer and the doors shall immediately start to close. Operation of the landing push during the closing cycle of the doors at the floor the car is present at will cause the doors to stop immediately and re-open.
- g. The machine cannot start unless both the car and landing doors are in the close position and locked both electrically and mechanically.
- h. Full fire-fighting control system in accordance with BS 5588 for lifts as applicable.

### **2.3.10 Diagnostics**

The facilities for fault and event diagnostics shall be incorporated in the lift control system in the form of a micro-computer and shall be capable of being interrogated at the controller or at the emergency inspection panel. The information shall be presented as a digital display and if coded, the appropriate key shall be listed on a label fixed to the interior of the controller.

The list of faults and events shall cover as a minimum requirement the following items as identified in BS EN627:1996.

<u>Code</u>	<u>Fault</u>
00	No faults
01	Safety circuits interrupted (excluding locks)
02	Lock circuit interrupted whilst running
03	Failure of normal door closing sequence
04	Lift stopped outside door unlocking zone
05	Stuck call button
06	Lift failed to start
07	Low voltage on logic power supplies
08	Alarm button pressed
09	Self-test procedure failed
10	Anti-stall timer operated
11	Position lost
12	Excessive temperature of drive system
14	Failure of normal door operating sequence

<u>Code</u>	<u>Event</u>
40	No events
41	Main lift supply switched off
42	Inspection control operated
43	Lift switched to fire service
44	Data logging off
45	Lift on car preference

The record shall be held in the memory of the micro-computer in real time, and it shall retain in rolling sequence up to 5 timed occurrences of each of the listed faults or events. There shall be a facility for recognizing and reporting that there have been more than 5 recurrences of any one fault or event and the first and last shall be retained in the memory. Upon clearance of a fault, the date and time shall also be recorded and the next occurrence of the fault shall be reported as the first.



Each lift may be interrogated so as to provide on a printer and on a VDU, the information available within the memory of the micro-computer.

The memory shall be maintained by a backup battery supply against a mains power failure for a minimum of 100 hours.

If the information at the controller is accessed by a portable reader, then one such reader shall be supplied to become Employer's property together with one copy of the standard manuals containing a key to the codes and all operational and servicing information relevant to the diagnostics system. The connection to the controller shall be via a door mounted socket.

### **2.3.11 Lift Cars**

Generally, lift car(s) shall be of all steel construction finished as stated in the tender document. Each car shall be carried in a steel frame, which shall be sufficiently rigid to withstand the operation of the safety gear with a fully loaded car without permanent distortion of the car. Each car shall be sufficiently strong to carry a live load of 25% above the contract load and a static load of 100% above the contract load. No part of the enclosure sheeting of each car shall transmit any tensile stress between the frame and the lifting ropes.

The car(s) shall be effectively isolated from all sources of vibration by suitable mountings.

The interior finishes and car construction shall be as per client indications and flooring of cart shall be prepared for Marble/Tiles. A heavy steel member shall be bolted to the car frame at the door opening to support the door gear throughout its entire length. Side and top frames shall be provided to carry the car doors, locks etc.

A tow guard, 750mm in depth, manufactured from galvanized sheet steel of not less than 16 swg shall be fitted to the sill beneath the car entrance and rigidly braced to ensure the running clearance to the landing fascias is maintained. Tow guard shall extend for a minimum of the width of the car and landing entrances.

Prior to handover a data plate engraved with the following details shall be mounted on the cross head of the car sling and this shall be readily discernable from the landing.

- a. Job number and date of installation
- b. Weight of car enclosure and sling in kilograms.
- c. Length, diameter and construction of hoisting ropes.
- d. Contract speed in m/s.

### **2.3.12 Safety Gear**

A type tested safety gear shall be fitted to the underside of the car and shall be of the progressive type operated by a centrifugal over speed governor designed such that the safety gear will release by driving the lift car in the upwards direction of travel and reset without the engineer needing to enter the lift shaft. Wired into the main safety circuit shall be a suitably rated and purpose designed switch having its contacts "normally closed". When the safety gear is actuated, the switch shall operate and interrupt the safety circuit removing the lift from service.

### **2.3.13 Suspension Ropes**

The requirements regarding suspension be ropes are as follows:

- a. Multiple suspension ropes shall be used. Their nominal size shall be 3 x 30mm with a minimum safety factor of 12 to 1.
- b. They shall be attached at their terminations by suitable means in accordance with BS EN 81 Part 1 used with eyebolts and fitted with an isolated car hitch by means of springs or other method to approval.
- c. During the service of the lift, it shall be possible by means of adjustment of nuts on the eyebolts to shorten the ropes by approximately 150mm.
- d. A data plate shall be fixed to the cross head giving the details of the suspension ropes type, construction, size, length and car weight; expressed in metric terms.

### **2.3.14 Load Weighting Devices**

The car sling or platform will incorporate an automatic load weighing feature which will detect a 10% overload and alarm. This shall prevent the lift doors closing and the lift moving in addition an indicator and buzzer shall be provided in the car to advise the passengers of the overload.

The 'overload' and 'load weighing' device may be fixed to the underside or top of the car sling but if mounted on the top shall have suitable protection against accidental damage. The device shall be of a strain gauge or deflection measuring type and mechanical switches will not be acceptable.

### **2.3.15 Guide Shoes**

The lift car and counterweight shall be fitted with self-adjusting shoes having renewable liners. Each shoe on top of the car and counterweight shall be provided with an oil reservoir having wick lubricators, which must incorporate provision for adjusting the flow or lubricant to the guide rails. Where sliding shoes with oil lubrication are being employed, a metal drip tray is to be provided under each guide.

### **2.3.16 Mechanic Control Station**

A mechanics control switch shall be mounted on the car top in a position which guarantees its safe and convenient usage. In design and operation, it shall comply fully in all respects with the requirements of BS 7255. In situations where the emergency stop switch cannot be operated safely

and easily from the landing prior to personnel boarding the top of the lift car, then an additional switch shall be conveniently sited where it can be operated.

Incorporated into the mechanics control station shall be a switched 13-amp BS EN 60309 (2 pin and earth) three pin socket. A 100-watt inspection light fitted with a protective guard shall also be mounted on the unit and controlled by a switch fitted adjacent to it.

### **2.3.17 Car, Signal and Operating Devices**

The operating devices shall be incorporated within the side wall of the lift car and integral with it. A key operated independent services switch, floor isolation switches, key operated fan switch, door open and alarm buttons shall be provided in addition to the call pushes. An indicator and buzzer shall signify 'car overloaded' alarm and door open pushes shall have permanently illuminated surrounds. The operating pushes shall be positioned at a height between 900mm and 1100mm to suit disabled person's usage.

The push buttons shall be of a double column arrangement of the 'micro' movement type. The key switches, door open and alarm button and the overload indicator shall all be of the same module.

An LED call registered illumination signal shall be incorporated within the halo of each car push.

An alphanumeric digital car position indicator will be provided within each operating panel at 1800mm from the car floor.

### **2.3.18 Emergency Signal (Communications)**

An audible and visible alarm signal shall be fixed in an approved position within 5 meters of the lift shaft and a secondary alarm signal provided on the roof of the lift car. They shall give a minimum of audible level of 90 dBs at 1 meter outside the shaft area.

The supply shall be obtained from an auto-recharge unit of approved make fitted with nickel cadmium batteries.

The lift contractor shall supply and fix the auto-recharge unit either in the lift machine room or on the car roof.

The signal will be actuated by the 'alarm' push in the lift car station.

### **2.3.19 Car and Landing Entrances**

Automatic power operation of car and landing doors (with nudging).

The automatic door operator shall provide quiet controlled motion of the car and landing doors. A solid guard shall be fitted to the operator driving mechanism. The whole of the operator and its associated devices shall be mounted on steel members forming part of the car sling and under no circumstances shall the operator be fitted directly to the car enclosure.

It shall be driven by a DC electric motor in both opening and closing directions and tested for compliance with BS EN 81 for kinetic energy by using an approved device.

Any reduction gearbox shall utilize steel/bronze gearwheels. Nylon/plastic gears will not be acceptable.

### ***2.3.20 Locking Devices and Switches for Car and Landing Entrances***

The car door contacts, landing door locks and 'pick up' mechanism shall be of the same manufacture as the door operator and properly aligned for correct operation.

The landing and car doors shall be provided with electro-mechanical interlocks which will prevent operation of the lift under any circumstances, unless all doors are in the closed position and locked both electrically and mechanically.

Provision shall be made for fully opening each landing door by an authorized person by the aid of a key to fit an unlocking device in one door panel. The release aperture on the visible face shall be fitted with a raised 3mm circular stainless-steel bezel secured in position from the rear of the door panel, or a fixed escutcheon plate with a profile aperture suitable for the manufacturer's specific type of release key.

The key shall be of steel section material and the access to each lock shall be restricted to this key. No fixing screws shall be accessible from the landing. The force necessary to operate and release the door will be such that unauthorized use of the release mechanism (by the use of screwdriver, pliers etc.) will not be possible.

### ***2.3.21 Commissioning, Acceptance Procedure and Service Manuals***

The lift contractor shall agree a full commissioning and testing programmed with the engineer. Prior to offering the installation for acceptance tests to the engineer, the lift contractor shall carry out full tests in compliance with BS 5655 Part 10, and the specific requirements of the specification. Any defects arising from his own inspection and testing shall be remedied prior to the installation being offered for acceptance tests. The contractor will further ensure that the whole installation satisfies the design criteria and functions fully in accordance with the specification.

The lift contractor shall make complete records of the tests utilizing test sheets, which shall fully comply with BS 5655 Part 10. The lift contractor is responsible for providing all instruments and tools for carrying out the testing and commissioning of the installation to the satisfaction of the engineer.

The engineer shall be given a minimum of 1 week notice by the lift contractor of his intention to offer the installation for acceptance tests, and this shall be confirmed in writing. The lift contractor shall also arrange for the client's insurance representative to witness the tests should this be required.

The lift contractor shall be responsible for all the tests to ensure the proper functions and operations of the lifts under this contract. Before the lift is accepted and put into service the lift shall, under the

supervision of the engineer pass all the tests, detailed within this clause or as required by the engineer during commission.

- a. 25% overload test.
- b. 60 minutes full load test
- c. Motor current and speed tests
- d. Door inspection and tests
- e. Electrical insulation resistance to earth test
- f. Earth continuity resistance test
- g. Full operational safety gear tests
- h. Buffer test carried out with contract load and at correct speed
- i. Overload test (electrical)
- j. Electrical protective device tests
- k. Levelling device tests
- l. Car balance tests

The lift contractor shall also carry out any other tests required by the engineer in order to prove that the equipment complies with the contract documents, codes and regulations covering equipment supplied under this contract.

Generally, the lift shall be made to run under various loading conditions from no load to 25% overload in order to check its operation and floor levelling accuracy.

The 25% overload test is to ensure that the equipment installed has ample safety margin above the rated load incorporated in the design.

The lift shall also be subject to 60 minutes test which shall prove the adequacy of all components to achieve the rated starts per hour of the equipment. With the car fully loaded during which it shall stop at each floor in the up and down direction opening and closing its doors at each stop. The test shall be continuous, the stops being 10 seconds maximum duration, with the door open. During the test, the equipment should not overheat, spark excessively, become noisy or operate in a faulty manner.

All the tests shall be carried out in the presence of the engineer and the results shall be signed and recorded in a tabulated form for easy checking and reference.

### **2.3.22 Service Manuals**

The contractor shall provide 3No. Copies of the service manuals and this shall include the following:

#### Documents:

- Full written general description of the equipment as installed identifying its main operation procedures.
- Sequence of operations applicable to the functioning of all control apparatus.

- Nomenclature detailing all symbols and forms of identification used on the equipment, drawings or circuit diagrams applicable to the installation.
- Fully descriptive list of components which it is anticipated may require regular or routine replacement due to "fair wear and tear". The minimum information provided shall ensure that ordering of replacement components can be achieved.
- Where a handheld or portable interrogating device is provided for fault finding, instructions for its use and data sheets for interpreting the information are to be included. The interrogating device is as described in the "controller" clause of this specification.

#### Test Certificates

Three copies of the site test certificates in respect of the tests carried out at the time of commissioning of the equipment shall be provided. These are to be fully completed and signed by a competent person authorized by the company. These shall include tests for:

- a. Hoisting ropes
- b. Governor ropes lift number
- c. Over speed governor
- d. Hoisting motor
- e. Door gear motor
- f. Car and counterweight buffers
- g. Safety gear
- h. Fire certificate for landing and car doors
- i. Lifting beam (where applicable)
- j. Electrical test certificates

#### Drawings and Circuit Wiring Diagrams

Full set of circuit diagrams which shall incorporate any and all amendments which have been carried out prior to the equipment being accepted by the engineers.

Complete set of wiring and "as fitted" drawings in respect of the completed installation.

Complete set of builders work and general arrangement drawings including landing entrances and lift car interior perspective.

#### Maintenance Contract and Inspection Reports

This section shall be provided for the future retention of maintenance reports and the maintenance contract document.

### **2.3.23 Handover Procedure**

Before offering the equipment for acceptance, the lift contractor shall ensure that works identified during the witness tests as remedial items have been completed to his satisfaction.

At handover the lift trade contractor shall provide for the client's use the following: -

- 3 sets of keys for each key switch in the installation.
- 3 landing door release keys.
- A typed document encapsulated in plastic giving full details of the contractor's local and national emergency breakdown and call out procedure inclusive of phone numbers.

### **2.3.24 Maintenance Contract**

The lift contractor shall provide comprehensive maintenance proposals including after sales service of the plant installed as part of the contract works covering the 36-month warranty period and including all expenses (parts and labour).

The object of the proposals shall be as follows:

- To ensure health and safety requirements are adequately covered.
- To ensure equipment efficiency is maintained
- To maximize the working life of the equipment

The maintenance agreement shall not invalidate the lift contractor's twenty-four-month warranty period.

The proposals shall clearly identify the following:

- All regulations and related documents to which all work carried out under agreement will comply e.g. MCCA Regulations, HSE Guideline Notes, Codes of Practice, British Standards, Safety Policies, CDM Regulations, COSH Regulations etc.
- The lift contractors shall identify the services included in a major and minor service visit during the 36-month period as part of the tender package.