UCL Estates
Engineering Maintenance & Infrastructure

Design Guidance for Vertical Transportation Systems

Version 2.0

October 2021

Department Documentation Standards

Version Control

Version	Date	Nature of Revision	Author	Approved By	Signed
V1.0	Sep 2005	1st Issue of Document			
V1.1	Sep 2013	Revised document to provide separate guide			
V1.2	Oct 2014	Minor Revisions to numbering formatting			
V1.3	Nov 2018	Revised document to include new legislation.			
V2.0	Oct 2021	Design Guidance for Vertical Transportation Systems – Major Rev.	EM&I (Elec)	Michael Jorge	

Note: it is policy to convert all procedural documentation in PDF format once complete and signed off. This document is to remain Microsoft Office Work format to allow for copying and pasting where required.

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1.0 Introduction

This document covers the Employers Requirements for any new or modified/refurbished lift installation and any related M and E services installed at University College London (UCL).

This will include the supply, delivery, erection, fitting, testing and commissioning and consultant witness testing of all equipment and associated materials and plant.

The aim of this document is to ensure that all equipment is generic in design and is not special to any lift contractor. This shall ensure that all spares will be supplied by a third party supply chain and not a Lift Contractor and that lifts will be easy to maintain.

The work shall be completed and left in full working order to the satisfaction of the University.

THIS DOCUMENT SHALL BE READ IN CONJUNCTION WITH ALL OTHER EMPLOYERS REQUIREMENT DOCUMENTS FOR MECHANICAL, ELECTRICAL AND O&M REQUIREMENTS.

This document may also be referenced when completing modernisation and upgrade works to an existing lift installation. The requirements of this document should be applied to any lift upgrade where reasonably practical to do so.

1.1 Lift Aims

A passenger lift is the most suitable means of vertical access to get to a destination within a suitable timescale and in comfort. For all new builds and where possible on existing refurbishments, Multi-storey buildings should have at least one conventional passenger lift. All conventional passenger lifts should be of sufficient size to be accessible by wheelchair users and people with limited mobility. All floors, including any below ground level, should be served by a conventional passenger lift.

Provisions – Lifts

- Unless indicated specifically, these requirements are for passenger as well as Platform lifts.
- All new buildings must be provided with an evacuation passenger lift. The London Plan requires one evacuation lift per lift core unless a capacity assessment requires more).
- Lift design (including lobby and car size) will be governed by their location within the building.
- Any refurbishment of existing lifts in UCL premises must consider the provision or converting an existing lift to become an evacuation lift suitable for use by disabled people.
- Lifts to be located adjacent to other means of vertical circulation.
- The number of lifts provided and their capacity will need to accommodate the expected people flow.
- Existing buildings will require a bespoke solution, this to be discussed and agreed with EM&I.
- New buildings are to have passenger lifts serving all storeys (including roof Terraces and below ground).
- Platform lifts and wheelchair stair lifts are not to be used within new buildings. Non-enclosed platform lifts are usually used for shorter vertical travel distances, enclosed platform lifts are usually used for longer vertical travel distances.
- Platform lifts, where provided, should be designed to allow both assisted and unassisted use.
- Platform lifts may need to be provided with Card Access or free from control depending on locations within the UCL Security boundary.

- Lifts to have a clear level landing directly in front of the lift of at least 1500mm by 1500mm for manoeuvring and waiting. If the lifting appliance has a swing door, this space should be measured clear of the door swing.

- A covered shelter to be provided at all entrance locations of external lifts. Adequate weather protection, including a roof, should be provided to external lift wells, covering the entrances, the lift controls and any external waiting space.

- Additional consideration to be given to the material finish of external lifts and how this will be affected by the weather (including consideration of slip resistance, comfort and safety in use). Drainage facilities should be provided to remove any water that might accumulate in the lift pit and elsewhere, or as per BS EN 81-72 for Standard passenger lifts.

- Lifts to conform to the requirements contained within the BS EN 81 Series.

- Internal lift requirements to be discussed and agreed with EM & I however consideration of the following are important requirements to note:

- Where provided, mirrors are not to cause visual confusion and are to provide views at high and low levels for a wheelchair user to see behind them when reversing.

- Lift floor coverings shall be slip resistant and contrast visually with landing surfaces.

- Lift floors are not to be black in colour, as this may be mistaken as an opening, rather than a floor material.

- Door openings to visually contrast with the surroundings (minimum of 30 LRV difference). Consultation with the Estates team during the design phase and for existing buildings is necessary to ensure that the minimum of 30 LRV difference is considered for lift landing lobby areas and for the car door finishes with through car arrangements.

- The Design Team is responsible for deciding on RAL colours external to the lift. Appropriate RAL colours to be considered when determining lift car finishes.

- Lifts to have adequate visual contrast between key surfaces and features.

- Where manual doors and gates are provided for platform lifts, the maximum opening force requirements for standard doors will apply.

- Manifestations to be provided for glazed lifts in line with Approved Document K. Extensive use of glass walls in lifts can also cause discomfort, and at least one solid or opaque wall or area of glass is to be preferred.

- Lighting within the lift car is not to cause glare, reflection, confusing shadows or pools of light and dark. Light sources should not be located immediately adjacent to the control panel. Lighting minimum requirements of 50 lux at the landing and car sill, and 100 lux on the control devices and at 1 m above the floor at any point not less than 100 mm from any wall of the lift car must be achieved. For existing refurbishments Estates and the Building Management to be consulted during the initial design phase with an aim to achieve the lux level requirements for new lifts as above.

2.0 Preferred Approved Components and Suppliers

The following list of components and suppliers is offered to the Contractor as a guide to the preferred specialists who are known to the University. The list has been designed around the ease of maintenance and availability of spares.

At all times, the Lift Contractor will be responsible for the performance and design of equipment offered.

Hoisting Machines
- Sassi – (Geared Machines)
- Thyssen – (Geared and Gearless Machines)
- Ziehl Abegg – (Gearless Machines)

Hoisting Machine Motors
- Sassi
- Thyssen
- Zeihl Abegg

Pulleys & Diverters (Cast Iron Only)
- Montanari
- Sassi
- Wittur (Schartz) plastic pulleys acceptable on MRL applications

Door Operators and Door Operating Equipment
- GAL MOVFR
- Selcom VF Pegasus with midi motor.

Control Systems
- Lester Controls
- Thames Valley Controls

Shaft Detection Systems
- Schmersal USP
- Lester / Cedes APS
- Thames Valley V-COM

Limit Switches
- Kronenberg FES.
- Schmersal

Specialist Finishes Applied on site [Lift Cars, Entrances &c]
- P.H. Jacksons.
- Brampton
- Mulhouse

Propbrook

Push Buttons

- Dewhurst Plc US 91 EN.
- Schaefer
- Lester Controls

Indicators

- To be a minimum of 50mm character on car and landing 40mm
- Dewhurst Plc
- Stentorgate
- Lester Controls TFT
- Drucegrove

Communication Equipment

- Windcrest
- Safeline

Door Detectors

- Memco

Pump Units for Hydraulic Lifts

- Bucher with LRV Electronic Valve.

Rams for Hydraulic Lifts

- Bucher

Emergency Communication Systems for Evacuation Lifts and Fire fighting Lifts

- Windcrest
- Safeline
- Drucegrove

Platform Stair lifts

- HIRO
- Stannah

3.0 Standards & Regulations

The installation shall, as a minimum conform to the following where applicable together with any amendments or updates: and any other construction related British or European standard.

1. Lifts Regulations 2016.
2. The Building Regulations 2015, Approved Document M - Access to and use of buildings.
3. BS 5655 Part 6:2011 – Selection and Installation of Lifts.
4. BS EN81-3 2000 + A1:2008 Safety Rules for the construction and installation of electric and hydraulic service lifts. (When service Lifts are fitted)
5. BS EN81-20:2020 – Safety Rules for the construction and installation of lifts. Lifts for the transport of Passengers and Goods. - Passenger and goods passenger lifts.
6. BSEN81–21: 2018 – New Passenger and goods passenger lifts in existing buildings.
7. BS EN81-28: 2018 - Safety Rules for the construction and installation of lifts – Lifts for the transport of persons and goods – Remote alarm on passenger and goods passenger lifts.
8. BSEN81-31: 2010 – Accessible Goods only lifts.
9. BSEN81-50:2020 - Safety Rules for the construction and installation of lifts. Examinations and Tests. Design rules, calculations, examinations and tests of lift components.
10. BS EN81-58: 2018 – Safety Rules for the construction and installation of lifts. Examination and tests. Landing doors fire resistance test.
11. BS EN81-70: 2018 - Safety Rules for the construction and installation of lifts – Particular applications for passenger and goods passenger – Accessibility to lifts for persons including persons with disability.
12. BS EN81-71: 2018 - Safety Rules for the construction and installation of lifts. A particular application for passenger and goods passenger lifts. Part 71. Vandal Resistant lifts.
13. BS ISO 4190 Part 1: 2010 - Lift installations Class I, II, III, and VI lifts.
14. BS ISO 4190 Part 5: 2006 – Control devices, signals and other fittings.
15. BS7255:2012 – Safe Working on Lifts.
16. BS 9012:2014 – Safe Working on Lifting Platforms
17. BS EN81-72: 2020 – Safety Rules for the construction and installation of lifts – Particular applications for passenger and goods passenger lifts – Part 72 Fire Fighter Lifts. (Where Fire Fighting Lifts are required)
18. BS EN81-73:2020 - Behavior of lifts in the event of a fire.
19. BS 9999:2017 - Code of practice for fire safety in the design, management and the use of buildings.
20. BSEN81- 40/41: 2008 - Stair lifts and inclined lifting platforms intended for persons with impaired mobility.BS 8899:2016 - Improvement of fire-fighting and evacuation provisions in existing lifts. Code of practice.
21. BSEN81- 41: 2010 – Vertical lifting platforms intended for persons with impaired mobility.
22. BS EN 81-82:2013 - Safety rules for the construction and installation of lifts. Existing lifts. Rules for the improvement of the accessibility of existing lifts for persons including persons with disability

23. BS 6440: 2011 – Powered Lifting Platforms for use by disabled persons.
24. Examination and Test of new lifts before putting into service specification for means of determining compliance with EN81-20: Passenger and goods passenger lifts. *(Draft produced by working group and intended for submission to BSI as a British Standard).*
25. EN13015:2001 +A1:2008 – Maintenance for Lifts and Escalators – Rules for maintenance instructions.
26. BS 7671 : 2018/A1:2020 – Requirements for Electrical Installations. IET Wiring Regulations.
27. This document should be read in conjunction with the UCL technical notes.
28. CIBSE Guide for Transportation of Lifts in Buildings.
29. BREEAM guidelines with respect to Energy Efficient Transportation Systems
30. BS8486 – Testing and Commissioning of Lifts

Suitably qualified and competent personnel shall carry out the extent and scope of the works detailed within this document, proof of competence shall be provided to the Employer upon request.

4.0 General Requirements

4.1 Hoisting Machine

4.1.1 General

Motor and drive inverter

The motor shall be AC type incorporating forced ventilation.

The control of the motor shall be achieved, through power transistors, by finite adjustment to the frequency and voltage of an AC power supply through a Pulse Width Modulator incorporating four-quadrant regeneration.

The inverter drive shall meet the harmonic limits laid down in the current Electricity Council Recommendation and must fulfil all radio interference requirements.

The motor and its control shall be compatible to the power supply to the machine room and is to incorporate a sound filter to dampen the Pulse Width Modulator enabling the Lift to run at all loads/speed without appreciable noise or hum.

The motor control shall be by means of either an Open loop up to a contract speed of 0.63 m/s or a Closed Loop System incorporating a speed regulator that must be fully adjustable to give optimum performance throughout the intended travel of the Lift. The regulator will respond to feedback signals derived from the motor speed, motor voltage, distance to travel and load within the Lift car.

The system is to have an accurately controlled method of controlling rate of change in acceleration. The acceleration shall initially be set at 0.8 mps2 and it shall be adjustable between 0.8 mps2 and 1.2 mps2.

The motor control shall incorporate direct floor approach and stopping, with the machine brake being applied only after the car is stationary.

The system shall maintain its speed between -2% and +2% of its designed operating speed.

Protection to the motor windings shall be in the form of thermistors with additional protection provided by the inverter should any of the following occur:

1. Over-current in the drive circuit
2. Over-voltage of the intermediate circuit
3. Under-voltage of the intermediate circuit

4. Network voltage asymmetry not correct
5. Temperature rise of the semi-conductor cooling plates
6. Regulator electronic voltages incorrect
7. Operation of the electronic braking network incorrect
8. The speed of regulator becomes saturated

The motor shall bear the actual manufacturers name and data plate. All motor terminals shall be readily accessible and of screw fixed or bolted design located within a terminal box.

Lifting eyes are to be provided to the motor casing.

The motor shall be rated for a Lift duty of 240 starts per hour.

Motor bearings shall be of the roller type.

The levelling accuracy shall have a tolerance of +/- 3mm.

The tacho-generator or other means of speed reference shall be so sited that easy access is provided and the items are not subject to accidental damage.

In the event of loss of tacho-generator feedback under normal conditions and on car top control the Lift will immediately shut down and the brake will be applied. The Lift will no longer attempt to respond to calls until tacho-feedback has been reinstated.

Where the hand winding wheel is separate from the driving machine, tacho-generators or other feedback encoders shall not be mounted at the motor end of the high-speed shaft necessitating their removal for handwinding purposes.

Bedplate and Supporting Steelwork

Where the machine requires a separate bedplate or supporting steelwork it shall be manufactured from standard steelwork sections. The machine supports shall have machined faces. Packing other than fine shimming shall not be accepted and designs for supporting steelwork shall be by proven calculation.

Isolation

Suitable sound isolation shall be provided to prevent the transmission of noise and vibration from the machine to the building structure. The assembly is to be suitably fixed to prevent any pitching or tilting.

Drilling of Steels

The Lift Contractor shall supply, drill and tap the main supporting and all secondary steels as necessary.

Rope Retainers

The main machine and any associated pulleys are to have rope retainers, which shall prevent the main hoisting ropes leaving their respective grooves through rope bounce, etc. The rope retainers should remain in place if for any reason the guarding needs to be removed.

Brake

The brake shall:

- Under any normal load and speed conditions, smoothly bring the car to a standstill.
- Be mechanically applied and electrically held off.
- Sustain static load 125% in excess of contract load.
- Have an approved means of mechanical release.
- Under operating conditions not be released unless power is applied to the motor.
- Incombustible brake linings are to be used and where the linings are not bonded, they shall be riveted with a minimum of 8 copper or soft rivets per shoe, each firmly clenched with the correct form of oversetting tool.
- Brake springs, when used, shall be supported and in compression.
- Brake linings shall not contain asbestos.
- Any device for the adjustment of spring tensioning must be fitted with lock nuts.
- The brakes shall be mechanically applied at all times until the hoisting machine is under power.
- The brake coil terminals shall be fully enclosed.
- The bearing surface of the brake coupling shall be formed from a single forging.

Brake Switch

A brake switch shall be installed to the brake. This switch shall prove that the brake has lifted prior to the main drive unit motor being energised. If the brake does not lift the main drive unit motor shall not move the lift.

4.1.2 Geared Machines

Worm & Wheel

The worm shaft and worm shall be machined from a single steel forging and the worm wheel rim shall be centrifugally cast phosphor bronze hobbed to mate perfectly with the worm. The rim shall be bolted to the flange of the sheave shaft in such a manner that the rim can be quickly replaced should this become necessary.

Traction Sheave

The sheave shall be separate, it shall not be integral with its shaft and it shall incorporate a bolted rim.

The sheave diameter shall not be less than 40 times the diameter of the hoisting ropes.

The traction sheave shall have a minimum hardness of Brinell 210. A certificate of test to be provided by the Contractor.

Where the design or positioning of the machine requires a smaller traction sheave to achieve the required angle of wrap, the number of suspension ropes shall be increased to achieve the required traction.

Pedestal Bearing

Where an outboard pedestal bearing is provided it shall be of a proprietary manufacture, and where appropriate, suitably designed for bottom drive arrangement. The pedestal bearing shall be packed and shimmed to ensure perfect alignment of the output shaft in accordance with the manufacturer's instructions.

Slow Speed Shaft Static Load

The hoisting machine shall be designed to take the maximum design static load + 10%

Lubrication

The gear oil shall be of the grade recommended by the gear manufacturer and an external oil level gauge shall be provided.

Bearings

Bearings shall be sleeve or roller type and may be of the sealed-for-life type. All bearings on a common shaft shall be of the same type.

4.1.3 Gearless Machines

Motor

Motors shall be a permanent magnet type

Brake

The machine shall as a minimum be fitted with a double brake assembly.

The brakes shall be sized such that ether individual brake shall be capable of arresting the lift under full load conditions.

Uncontrolled movement

Gearless machines shall be permitted to utilise the redundancy within the double brake system as a method of complying with the requirements of EN81-20 relating to the uncontrolled movement from floor only if the entire assembly and appropriate monitoring system has been tested and certified by the manufacturer as a fully compliant method of achieving compliance.

Traction Sheave

The sheave diameter shall not be less than 40 times the diameter of the hoisting ropes.

The traction sheave shall have a minimum hardness of Brinell 210. A certificate of test to be provided by the Contractor.

4.2 Diverter Pulleys

Rope retainers are to be provided to the pulley wheels, which shall prevent the main hoisting ropes leaving their respective grooves, through rope bounce or the application of the safety gear.

Sealed for life roller bearings shall be used.

The diverter pulley shall have a minimum hardness of Brinell 210. A certificate of test is to be provided by the Contractor.

Plastic Diverter pulleys may be used on the car and counterweight.

4.3 Guide Rails

Substantial Tee section guide rails shall be provided to the car and counterweight, the minimum guide blade thickness shall be 16mm on the car and 9mm on the counterweight.

4.4 Uncontrolled Movement of the Lift (Upward and at landings)

A device shall be provided on the lift to stop the lift in the event of any uncontrolled upward movement of the lift.

A device shall also be provided to monitor and prevent any uncontrolled movement of the lift at the landing with the doors open.

4.5 Lift Installation Wiring

The contractor shall provide all new wiring from the fused mains disconnecter for the lift installation.

Under no circumstances will it be permitted to run conduits or trunking above floor level in the motor room where this will constitute a tripping hazard.

When floor trunking is used it will lie flush with the floor level and incorporate chequer plate covers, which shall be removable for their entire length.

All cables shall be enclosed throughout their length in heavy gauge galvanised steel conduit or trunking. Any conduit finishes where disturbed shall be re-coated with galvafroid or similar.

Trailing cables are to be suspended without the use of junction boxes. They shall be suspended from a cable hanger incorporating clamps that will secure the cable without damage or undue pressure on the conductors or insulation.

The cable anchorage shall be installed at the top and approximately halfway position of travel. Beyond the halfway point additional intermediate clamps are to be fitted every 3 metres which shall be carried from the shaft wall or guides. Clamps must be in accordance with the manufacturer instructions.

Each trailing cable shall contain a minimum of 20% spare ways, together with 2 twisted screened pairs.

Trailing cables will be terminated direct to the controller, at one end and either within the car station panel or in a junction box on the car top at the other.

Under no circumstances will junction boxes in alternative locations be permitted.

Flexible metallic conduit shall be used only in cases where it is necessary to provide for adjustment or to reduce the transmission of noise and vibration. Flexible conduit length to be a maximum of 450 mm.

The conduit shall be screwed between lengths and into all boxes and fittings and where bends or sets are required they shall be made from the conduit.

Hexagonal male brass bushes shall be used to terminate new conduit in boxes where an adequate screwed spout outlet is not provided.

An approved maker should have BASEC approval and shall manufacture all cables and only one make of cable shall be used on the installation. All new cables shall be multi-

strand and the minimum area of any one conductor shall not be less than 1mm sq (except travelling cables).

All wiring and travelling cables shall be 600/1000 grade having low smoke and fume insulation.

It must not be possible for any travelling cable to foul any fittings or equipment in the lift shaft and a suitable screen shall be fitted up to the halfway point in the shaft constructed from a non-combustible material. The cable screen must be of maximum width for the area of the shaft occupied by the cable and if of weld mesh, must be of continuous length, having a grid size no greater than 13mm. Any form of flexible screen must be fitted with an adjustable tensioning device capable of having adjustment of at least 100mm.

All cables and travelling cables shall be subjected at the maker's Works to the appropriate voltage tests, tests for thickness of insulation, insulation resistance, fire resistance and flexibility.

Screened ways are to be incorporated for communication systems terminated separately in the machine room near to the telephone line.

The terminations to car lighting and fan supplies are to be shrouded and labelled.

All fixed items and components are to be fully earth bonded, the earthing to include such items as pit ladders, guards etc.

All trunking fittings shall be of a standard proprietary manufacture except where special fittings are necessary.

A cable strainer shall be provided every 3 metres within the trunking.

The lift installation and components shall be earth bonded, this shall include connection to the building lightning protection system.

A CAT cable is to be installed from the lift controller room and terminated in the car operating panel in the lift car. The specification for the cable is to be obtained from the UPO. This is to ensure that cabling is installed for a security card reader system even if not required at the time. Details of the cable should be provided in the Owner’s Manual for future connection.

4.6 Ropes and Rope Terminations

Suspension means shall be by steel wire ropes. Belts or coated ropes shall not be used.

The minimum rope diameter shall be 8 mm.

The rope terminations shall be:

a) Ferrule secured eyes to EN 13411-3, or

b) Swage terminals to EN 13411-8, or

c) Self-tightening wedge sockets to EN 13411-6 or EN 13411-7.

Car and counterweight hitches shall be multi-point and the counterweight is to be fitted with spring tensioning depending upon rope configuration and layout.

Adjustment of the nuts on eyebolts will allow for raising the counterweight by 150mm relative to its suspension ropes.

Following completion of the installation and having given time for rope stretch, the Contractor shall return to site to shorten the ropes to maintain the necessary over travels. Any necessary overtime premium shall be included within the tender sum. (This shall also relate to governor and compensating ropes where fitted).

Wire lanyards are to be run through the car and counterweight terminations to prevent twisting. This is to be done as soon as the ropes have been fitted and properly tensioned.

Rope tails shall be between 150mm and 300mm long with the ends whipped and tied back.

4.7 Control System General Requirements

Control Cabinet

A new control panel shall be fitted being of the steel enclosed cabinet type with louvered ventilation, internally and externally finished in powder coating or plastic skin plate. The identity of all the contactors, relays, solenoids, and other equipment in the controller shall be clearly indicated by means of permanent, heat resistant non-fade, plastic labels. Dymo or similar will not be acceptable. A key to abbreviations and symbols used will be affixed to the inside of the controller or controller door.

Access shall be from the front only unless complexity of equipment necessitates rear entry also. The doors shall be full height and width of the panel and shall be of double hinged mechanically latched type.

The enclosure shall provide protection to IP23 Standard. For external controller panels a suitable IP rating is required for the controller cabinet

All cable entry shall be from below.

The new controller must be designed and constructed to pass through the building without any alteration to the building fabric. Notwithstanding this requirement, the controller shall be of a suitable design to be comfortably accommodated within the motor room.

Two external lifting eyes are to be fitted to the top of the controller cabinet to allow lifting without distortion.

All resistors are to be mounted externally to the main control equipment in a housing mounted to suit the site conditions with suitable ventilation.

Doors shall not be of the lift-off type and shall be separately earthed.

A notice shall be permanently affixed to the controller door detailing the final torque settings entered on to the main drive inverter.

Where location dictates, control panel(s) shall be sound isolated.

Control Components

The system shall be microprocessor controlled.

The microprocessor section of the control panel shall be separately mounted, such that the inadvertent connections of high voltages or physical damage from falling objects are prevented.

An electronic digital trip counter shall be provided to record the number of journeys for the lift.

Each control panel is to be provided with a visual display showing the operating status of the Lift and incorporating LED indicators which show each of the following sequences:

- Power on
- Power to each processor board
- Lift in service
- Lift direction
- Calls registered for car and landing
- Door open/door close
- Door lock monitoring
- Safety edge operation
- Lift overload
- Lift on car preference
- Lift on door hold

The control cabinet shall be provided with an external changeover switch to convert from NORMAL to INSPECTION operation, together with UP and DOWN buttons, and an OVER-RIDE button.

When switched to INSPECTION all safety circuits will be in use. On operating the continual pressure OVER-RIDE button, the safety gear switch on the car, buffer switches, over travel limits, governor switch and governor tension weight switch will be over-ridden. This OVER-RIDE button is to assist in the release of the safety gear or to move the Lift from the overtravel limits.

This INSPECTION/NORMAL switch will NOT OVER-RIDE the mechanics control station or any other part of the safety circuit.

For each individual Lift a MAINTENANCE/NORMAL SERVICE switch is to be provided on the control panel which will prevent the Lift answering its landing calls.

A door isolation switch will be provided which will prevent operation of the car doors.

A key operated switch shall be provided to operate the overspeed governor (remote overspeed governor).

Where the preferred method for interrogating the lift control system when fault finding or altering the lift operating parameters 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 employer's property. It shall be site specific and any unique identification number shall be recorded on the device.

Special cooling and/or filtration equipment is to be incorporated to reduce the spread of dust through the controller and to maintain satisfactory ambient temperatures and prevent local hot spots.

The following items are required:

- Phase failure/phase reversal protection
- Double journey timers
- Automatic homing [switched]
- Door nudging with audible signal
- Landing and car door bypass device
- All control equipment to be protected by miniature circuit breakers not fuses
- Door open/door close timers fully adjustable for dwell and operating speeds
- Anti-interference features for all car controls
- Earth terminals and full earth bonding
- Supplies to printed circuit boards shall be protected by miniature circuit breakers
- Microprocessor based car position reference system
- Thermal overloads for main motor protection or alternatively protection within the controller software
- Car and landing door lock short-circuit protection
- A device shall be fitted that determines the lift machine and machine room temperature. An over temperature will cause the lift to shut down at the next floor in a controlled manner.
- Suitable outputs shall be provided to provide speech generation. The processor shall provide advanced signals to highlight such items as "Doors Closing" etc.
- In the event of loss of tacho-generator feedback under normal conditions and on inspection control the Lift will immediately shut down and the brake will be applied. The Lift will no longer attempt to respond to calls until tacho-feedback has been reinstated.
- The door open button within the lift car shall illuminate during the door closing cycle.

Equipment Reliability

The control circuit where fed from an alternating current source shall be greater than 100V and not greater than 240V.

On relay components the "VOLTAGE RELIABILITY" shall be at least 80%, i.e. the control circuits must operate at 25% below design voltage.

The "COMPONENT RELIABILITY" shall not be less than three million, i.e. the expected number of operations between two failures.

All timers shall be of solid state design.

All car and landing control indicators will illuminate until their call is answered by the lift.

The lift should not interfere with the reception of radio and television programmes or the supply of computer-related equipment. The lift equipment shall be fitted with the necessary interference suppression and filtration components during manufacture.

Car position reference systems shall be actuated by one of the following:

- Encoders
- Lasers
- Remote Alarm Signal

The controller shall incorporate a lift emergency alarm activated signal and a lift in service signal. These shall be by way of a normally open relay that activates to provide the required signal to the clients BMS system.

Rubber Mat

A suitable rubber mat compliant with BS921 shall be placed in front and where necessary the rear of each controller.

Car Preference

Car preference operation will be provided. With the key in the ON position the Lift will be removed from NORMAL operation and will respond only to car calls and will ignore all other automatic operations. The key will be captivated when in the "ON" position.

When under car preference the Lift will park with both car and landing doors open.

The Lift will respond to continuous pressure on the selected car floor push only and only the first call will be answered. For any subsequent call it will be necessary to press the car button to achieve further door closing.

Wiring Diagrams

Contract specific plastic encapsulated wiring diagrams are to be provided within the machine room in addition to those provide within the O & M Manuals.

FULLY COLLECTIVE CONTROL

Following registration of a landing call, the Lift will respond to that call only when it is travelling in the direction of the call.

It will store this call in memory if travelling in the opposite direction and answer it sequentially when travelling in the direction of the call.

If the Lift responds to a floor where both UP and DOWN calls are registered it will respond only to the call in the direction in which it is committed to travel.

If no car call is then placed and there are no further hall calls in that committed direction, the doors will re-open and its committed direction will reverse and it will respond to the other call.

Car calls will be answered sequentially as their destinations are reached irrespective of the order in which they were registered. As each car call is answered it will be cancelled.

Each controller is to incorporate automatic logging which will have an indicator display board to show a record of events covering the following Lift functions:

- Primary safety circuit failure
- Primary loop failure
- Car door switch fault
- Landing door lock fault
- Failure of doors to open
- Lift overloaded condition
- Landing and car calls cancelled
- Shutdown due to successive failed attempts to start
- Limited force door closing having been operated
- Memory failure
- Programme error
- Stuck landing/car call button
- Service to engineers visit
- Two spare signal/record facilities.

4.8 Handwinding System

4.8.1 Geared Machines

A fixed hand winding wheel shall be provided for hand winding / lowering the lift in the event of a power failure.

A notice shall be located adjacent to the hand wind wheel indicating the direction of travel for each direction of rotation.

The brake shall be fitted with a manual brake release lever to allow the release of the brake during the hand winding process.

4.8.2 Gearless Machines

The lift shall be fitted with manual or powered method of releasing the brake from the control panel, or where located within a machine room on the machine itself, to allow the lift to rise or descend under its own weight.

Powered systems shall feature a maintained UPS back up power supply with a two hour battery life.

4.8.3 Position Indication.

An electronic hand winding floor position indicator shall be provided which shall incorporate both audible and LED illumination. The equipment shall be wall-mounted adjacent to its corresponding hoisting machine (within machine rooms) or within the control panel (Machine room less) and shall be easily viewed from the normal hand winding position.

A control switch mounted on the hand winding unit shall initiate the operation of the hand winding system. When switched "ON" and under hand winding operation, it will indicate both visually and audibly as the Lift becomes level with a landing floor level. The unit shall display the position of the lift car within the lift shaft.

Supply to the hand winding system shall be from an independent low-voltage source incorporating an emergency supply which automatically becomes available in the event of mains power failure.

Irrespective of the position of the mains supply switch, the operation of the switch on the hand winding buzzer system shall render all other controller components inoperative and an illuminating indicator shall be sited adjacent to the hand winding switch to notify that the buzzer system is switched on.

4.9 Mechanics Control Station

4.9.1 Car top

The car top control station panel shall be mounted vertically within 1000mm of the landing entrance and easily accessible from the landing. (In the through car condition it shall be accessible from the side with the majority of landing entrances)

The mechanics control station on the car top shall contain maintenance and testing switches, direction push buttons, a 13amp switch socket outlet with RCD protection, and a proprietary brand of 16 watt twin fluorescent bulkhead light fitting with polycarbonate or similar shatter resistant diffuser.

The light fitting shall also be provided with an emergency power source from an independent supply of 3 hours duration. This unit shall be sited on the car top.

It is permissible to feed the emergency car lighting from this source provided that a

“3-hour” duration is maintained in each case.

All car top lighting and power points shall come from a common source but shall be individually fused.

All switches and push buttons shall be clearly marked with their functions.

Operation of these switches and push buttons shall be as follows:

- Roof Light Switch
    - Control of Roof Light
- Shaft Light Switch
    - In addition to the shaft lighting switch circuits specified for motor room and lift shaft, an intermediate switch shall be incorporated in the mechanics control faceplate, which will provide the shaft lighting system with a third point of operation.

4.9.2 Pit

A second engineer’s control station shall be located within the pit area within access of the designated refuge space.

The control station shall preferably be fixed in position. Should this not be achievable, then a wandering lead will be permitted.

Where the refuge space is located further than 1m from the landing sill a second stop/ run switch shall be fitted to the engineer's control.

Other controls shall include a normal / inspection switch, a common run button and direction controls.

4.9.3 Common controls to feature on Pit and Car top control stations.

Emergency Stop/Run Switch

The emergency stop switch shall be a push/pull type (push to stop pull to run). The button shall be at least 50mm in diameter and coloured red.

The stop button shall be proud of its shroud only in the "run" position.

The button shall show visual indication of both operational positions and incorporate the word STOP placed on or near it.

Inspection/Normal Operation Switch

NORMAL - Normal operation

INSPECTION - Car and landing push buttons isolated: push buttons on mechanics control panel become operative, and the Inspection/Normal Operation switch becomes illuminated.

This words NORMAL and INSPECTION shall be marked on or near the switch.

The switch is to be protected against involuntary operation and a bi-stable design. The switch shall be shrouded.

The switch shall be positioned in the extreme top left on the car top control panel.

Door Control Switch

The words DOOR OPEN AND CLOSED placed on or near the switch and shall be positioned to the extreme bottom left on the car top control panel.

Up, Run and Down direction buttons

The up direction button, the run button and the down direction button shall be arranged centrally and vertically in line with the up direction button positioned at the top of the car top control panel.

These shall operate car in the UP or DOWN direction (only while the respective direction button and the intermediate run button are depressed). These shall operate under constant pressure.

Engineers Alarm Button

An enshrouded continuously illuminated alarm push in yellow and engraved alarm over a red back ground and located below the stop button.

A mechanically operated UP inspection limit is to be incorporated in the control circuit so that when the INSPECTION switch is in the INSPECTION position and the UP button is depressed, the car shall stop at the top of the lift shaft low enough to ensure that a 2 metre tall person standing on the top of the car shall be in no danger of coming into accidental contact with any overhead equipment or structure. Immediately after the UP test limit has been set and checked for final position the limit supporting arm, in addition to the conventional clip fixings, is to be twice pinned through the guide flange. In addition, a notice is to be fitted with the wording WARNING - DO NOT MOVE UP INSPECTION SAFETY LIMIT.

All controls shall be fully shrouded and sensibly positioned, accessible and no further than 1 metre from the entrance.

4.9.4 Priority of controls

In the event that both engineer's control stations have been switched to 'Inspection' it shall not be possible to operate the lift in inspection mode unless both controls are operated simultaneously.

4.9.5 – Emergency Communication System

The Emergency Communication System should be run with the appropriate CAT cabling directly to UCL security. UCL ISD department should be contacted to ensure that this requirement is adhered to

The emergency communication system should have the ability to alter the volume of the microphone and speaker of an induction loop will benefit people who wear hearing aids. A visual indicator that provides confirmation that an emergency call has been received and is being acted upon must be installed.

4.10 Protective Screens & Guard

1. All rotating equipment and extended rope traverses shall be guarded.
2. Equipment guards shall comprise a profiled rod frame with 10 swg welded mesh infill. Mesh shall be a maximum of 20mm grid.
3. The fixings for the guards are to be easily removable and are to be retained as part of the guard construction.
4. Framed hinged access flaps shall be provided, sensibly sited for ease of inspection and maintenance.
5. Steel rope hole reducers shall be floor fixed and incorporate a 50mm raised collar and felt restrictor providing a safe minimum running clearance.
6. The flanges of beams and other hazards with less than 2.1 metres clear height shall be clad in 25mm thick Neoprene padding having BLACK and YELLOW warning stripes.
7. Where light fittings are suspended giving less than 2.1 metres clearance they shall be provided with a wire mesh guard.
8. Access hatch covers in the lift motor room are to be faced in aluminium chequer plate, which has an embossed non-slip surface. All edges of the plate covering are to be ground to an angle finish to prevent tripping hazard. Suitable recessed handholds shall be provided.
9. Where the access hatch is located in the floor of the motor room it shall incorporate a safety handrail which engages with the flap or flaps of the hatch. The engaging bar will mechanically latch the flaps in the vertical position.
10. All unguarded upper machine room levels shall be fitted with removable tubular steel safety handrails. The tubing shall be completely demountable with a minimum 50mm cross section. In addition to upright supports at each end, intermediate supports shall be located at a maximum of 1 metre pitch. A horizontal mid-rail shall also be provided which shall be a minimum of 25mm cross section.
11. All holes and apertures in the lift shaft, machine or pump room or top wheelhouse shall be properly filled or screened.
12. A permanently fixed flat step steel access ladder and handrail is to be fitted between differing machine room levels.
13. Rope hitch plates where exposed in working areas shall be covered in removable steel sheet guards. These guards shall be secured with wing-nuts.
14. Steel fascias of a minimum 16 swg shall be provided the full width of the header. Bracing and stiffening is to be provided to prevent distortion. The header is to extend from sill level to the header of the floor below.
15. At the lowest terminal floor a ramped steel fascia will extend to 750mm. At the upper terminal floor a similar ramped section will be affixed to the header.
16. A ramped toe-guard shall be fitted to the underside of the car of sheet steel construction. It shall extend 50mm beyond each side of the clear opening and be

ramped and braced back to the underside of the car. The toe-guard shall be 16 swg steel sheet minimum and extend 750mm below the car sill. Countersunk screw fixings shall be used at 150mm centres.

17. All ledges over 150mm shall be ramped in 16 swg steel sheet to an angle of 70o with the design of ramp to suit the particular application.
18. Voids in the lift shaft shall be guarded with mesh suitably braced screens which shall comprise 38mm RSA frames with 16 swg mesh infill. Mesh shall be a maximum of 50mm grid of 10 gauge galvanised weld mesh.
19. Shaft division screens shall be framed in a minimum of 38mm RSA with a 50mm grid of 10 gauge galvanised welded mesh suitably braced.
20. The counterweight screen is to be framed in 25mm RSA with 25mm weld mesh infill. Where clearance does not permit the use of an angle frame, either a flat bar or rod frame is permissible. The counterweight guard shall completely enclose the buffer area from a point 75mm below the fully buffered position to a height of 2.5 metres from this point.
21. Where trailing cables may come into contact with the lift shaft walls or shaft equipment, a flex screen shall be fitted. The screen shall be in the form of a cable tray approximately 300mm wide fixed from the halfway point downwards. Additionally, tensioned vertical air cord or vertical conduit may be used secured between bracket fixings.
22. A permanently fixed pit access ladder shall be fitted. It shall comprise flat steel steps and a separate grab rail and shall be easily accessible from the lowest terminal landing.
23. Where a deep pit condition exists, steel chequer plate decking shall be fitted to provide an adequate working platform and to act as staging for the lower pit level.
24. A 1 metre high barrier rail shall be fitted to the rear and sides of the car roof, where clearance permits. The handrail shall not run within 70mm of the perimeter of the Lift car. The rail shall be of 35mm square section and shall not bridge the car isolation. In addition, a 100mm kicking board shall be provided to the car top, which shall be painted in black and yellow diagonal stripes.

4.11 Demonstration of Lift Defects and Liability Maintenance

Defects Liability Maintenance

12 months defects liability maintenance shall be included within any lift project from the client accepting the lift for service. This shall include at no additional cost to the client within the first 12 months:

- 12 maintenance visits - Permit to work must be issued by the UPO for access to the lift equipment during the warranty period.
- Attendance to all call outs 24 hours a day, 7 days per week.
- All repairs to the lift apart from what is agreed with the client as miss-use or vandalism.
- A yearly SAFED inspection previously known as LG1.
- A quarterly report on the condition of the lift and confirmation of the maintenance visits.

Keys

6 Keys for each key switch shall be provided to the client.

Demonstration of Lift

The lift and ancillary equipment installed shall be demonstrated to the client prior to the lift being put into service. The demonstration shall include:

- All emergency communication devices.
- Functionality of the lift alarm system.
- The functionality of all lift control systems.
- Emergency fire return to fire access floor.

A log card must be retained on site to record all attendances for maintenance, callouts and repairs.
Electronic copies must be made available when requested.

5.0 Machine Room Less Lifts (M.R.L)

In addition to the aforementioned requirements the following specification for machine-room-less lifts shall be provided. Generic lift equipment from the approved components must be used.

Guides
Guides shall be positioned in a conventional layout with one guide each side of the lift car and separate counterweight guides. All guide fixings shall be independent of each other. Substantial Tee section guide rails shall be provided to the car and counterweight. The minimum guide blade thickness shall be 16mm on the car and 9mm on the counterweight.

Type of Roping
The roping layout for the lift shall be 2:1.

Drive Unit
The drive unit shall be a gearless unit. The drive unit shall be mounted within the lift headroom area or in a separate machinery space where available.

Controller
The controller shall be as detailed within the aforementioned specification.
The controllers shall be positioned within a suitably sized secure room where the equipment can be worked on safely. There shall be at least 1.5 metre x 1.5 metre of free working space in front of the controller for each lift. Consideration should be given to the location of the control equipment with respect to ventilation. Please refer to Section 13 M and E requirements.
Lift electrical services and the lift mains supply shall be provided in the controller room including local isolation to the controller.
A 200mm square straight duct shall be provided from the controller room to the lift well. A draw wire shall be left in the duct if it is over 1 metre long.

Counterweight Frame
A conventional counterweight frame must be employed on the lift. The counterweight shall weigh a value equal to the lift car weight + 50% of the contract load.

6.0 Hydraulic Lifts

In addition to the aforementioned requirements the following specification for hydraulic lifts shall be provided.

Guides
Guides shall be positioned in a cantilevered arrangement up to a Lift Contract Load of 8 Persons 630 Kg. Above this contract load the car guide rails shall be positioned each side of the Lift Car. Substantial Tee section guide rails shall be provided to the car and counterweight. The minimum guide blade thickness shall be 16mm on the car.

Ram/Cylinder
Up to a Lift Contract Load of 13 persons 1000 Kg a single ram may be employed. Above this contract load at least two rams shall be employed, subject to design and arrangement.

Type of roping
Where lifts are of an indirect design the roping layout for the lift shall be 2:1 rope suspended.

Drive Unit
The drive unit shall consist of a steel fabricated tank with rubber isolation between its feet and the floor. The unit shall incorporate a submerged motor and screw pump. The control valve shall be mounted to the top of the tank and shall incorporate closed loop feed-back technology.

The drive unit shall incorporate as a minimum a hand pump, a pressure gauge, a manual lowering facility and high and low pressure switches. A low-pressure protection facility will prevent the lift being manually lowered if the working pressure to the ram is reduced to below the minimum allowable working pressure.
It shall be designed as a minimum to be able to cope with 60 motor starts per hour.

Machine Room
A machine room shall be provided. It shall incorporate the drive unit, controller, and Lift Electrical services. The machine room shall be suitably heated and ventilated to dissipate the heat generated by the lift equipment. A bund wall must be built across the machine room entrance designed to contain any oil spillage within the machine room.

Maintenance Pit Prop
A pit prop, designed for use under the lift car during maintenance and repairs shall be supplied for every project.
The prop shall feature an electrical interlock such that the lift cannot operate with the prop in place.
The prop shall be marked with the correct safe working load.

Lift Speed
Hydraulic lifts shall not exceed a contract speed of 0.6 m/s due to potential heat build-up. Higher speeds may be acceptable but must be agreed by the engineer.

Unintended Car Movement

In addition to the standard protection against excessive speed or freefall, the lift shall be fitted with a device to prevent the unintended movement or creeping away from floor level in accordance with the recommendations of EN81-20.

7.0 Evacuation Lifts

It is noted in the London Plan and the Inclusive Design Specification that all new buildings must be provided with an Evacuation Lift(s).
New buildings and where possible on refurbishment projects:

- As a minimum at least one lift per core (or more subject to capacity assessments) should be a suitably sized.
- Where a firefighting lift(s) are provided, they may be used to evacuate people who require assistance to evacuate, in lieu of a dedicated evacuation lift.

Refurbishment of either existing lifts or premises must consider the provision of converting an existing lift to become:

- An Evacuation lift suitable for use by disabled people.
- or, subject to an assessment of lift facilities and local physical conditions, an **adapted standard lift (ASL**- see UCL Fire Safety Technical Guidance TN010) could be provided as a simpler and more cost effective solution. Where, as part of a PEEP the ASL provides a solution (subject to local constraints) that is simple, easy and quick solution to provide assistance to individuals.

Consultation on refurbishments must take place with both the UCL Fire Safety Manager and the Access and Inclusion Manager.

In addition to the aforementioned requirements where evacuation lifts are installed the following is required as a minimum.

Controller
The controller shall comply fully with the requirements to function as an “Evacuation Lift” and as detailed within BSEN81-72/BS9999.
In the event of power failure the control system shall “remember” what floor the lift is on.

Communication
A communication system shall be installed between the machine room, the lift car and each landing. The master communication panel shall be installed at the main fire access level and it shall be possible from this floor to contact and speak to any other communication panel.
All other communication panels shall be able to contact and speak to the master panel.
The communication panel shall incorporate a “euro” type key switch, which when activated will instate the communication system and switch on the evacuation control mode of the lift.

Secondary Back Up Power Supply
A secondary back up power supply for the lift in accordance with BSEN81-72/BS9999 shall be provided.

WHEN INSTALLING AN EVACUATION LIFT, THE LIFT SHALL BE TRACTION DRIVEN IF SERVING 3 OR MORE FLOORS. IT CAN BE HYDRAULIC IF THE LIFT ONLY SERVES TWO FLOORS.

8.0 Fire Fighting Lifts

Fire fighting Lifts shall be designed in accordance with current standards and Regulations.

All the requirements covered within this design brief shall be met apart from the following differences:

- When installing Machine Room Less Lifts, the drive unit shall be positioned at the top of the lift shaft and the roping arrangement can be 1:1 if required.
- Position Indicators shall be of UK third party supply suitable for the temperature range needed to comply with this standard.

8a Fire Control

The fire control switch should be of a Euro type

9.0 Additional Requirements

During planning of the lift facility for a building a traffic analysis shall be carried to establish the number of lifts required together with the performance requirements of the lift. This will establish the lift speed and size and duty requirements.

Regenerative drive systems should be considered as applicable for passenger lifts. Investigations should be carried out to determine if a regenerative drive system would be suitable in its environment.
All holes between the lift shaft and machine room and other shaft penetrations shall be adequately fire stopped.
Machine room heating and ventilation must be in accordance with BS 5655 Part 6 Clause 5.8, also see M and E element of this document.
All lift shafts shall be painted.
All lifts shall be numbered in accordance with the UCL Lift numbering spreadsheet, with engraving in the lift car and an additional sign on the lobby floor architrave. UCL estates or the lift consultant will be able to provide this information.

10.0 Platform Lifts

Platform Lifts may need to be provided with card access or free from control depending on locations within the UCL security boundary.
Emergency egress for disabled people and associated arrangements and equipment should be discussed with the UCL Fire Safety Manager in all cases.
Platform lifts shall comply with BS 6440:2011 & EN81-40 / 41: 2008 and BS8300-2:2018 where applicable to the particular requirement.
The maximum vertical travel shall be 4 metres.
The minimum size of the platform shall be 1100mm wide x 1400mm deep for vertical platform lifts and a minimum of 900mm x 1200mm for stair platform lifts.
The platform must be directly driven through a mains supply and must not rely on batteries that are charged when the platform is not in use.
Platform Lifts shall only be installed where it is not practical to install a conventional passenger lift.
All users, including wheelchair users, should be able to reach and use the controls that summon and direct the lifting platform.
Transition ramps onto vertical lifting platforms should be avoided. Where possible, the floor level and the lifting platform floor should finish level.
Vertical lifting platforms should be provided with easily accessed and clear instructions for use and fitted with an emergency alarm control device (a two-way voice communication system) in case users get into difficulty.
Doors should have an effective clear width of at least 800 mm for a 900 mm wide lifting platform, and at least 900 mm for a lifting platform that is 1 100 mm wide or larger and where door openings are at 90° relative to each other.
Lifting platform controls must be located between 800 and 1100mm from the lifting car floor and at least 400mm from any return wall. Lift landing call buttons must be located between 900 and 1100mm above lift landing floor level and be at least 500mm from any return wall.
Clear instructions for use that are of a clear, suitably sized text should be installed.

11.0 Platform Stair Lifts

Stair lifts shall comply with BSEN81–40:2008 and BS8300-2:2018. Prior to the installation of a wheelchair stairlift in a public building, a risk assessment is required to ensure that means of escape are not compromised. For a building with a single stairway, the clear stairway width for means of escape should be maintained between the carriage rail of the wheelchair stairlift and the handrail opposite. For a building with two or more stairways between storeys, a wheelchair stairlift should only be installed on a stairway that is not intended to be used as a means of escape.
The Stair Lift must operate via a continuous direct power supply. Stairlifts operating via batteries, which are charged at top and bottom stations, must have alarms which sound when the lift is not at the charging station at either the top or bottom.

- The platform size must be a minimum of 800mm X 1200mm to accommodate larger mobility units
- The capacity should be at least 300kg
- The Platform Stair Lift should have battery back-up which can to be used in the event of an emergency/ evacuation
- Wheelchair stairlifts should be fitted with an alarm.
- When in a parked position, a wheelchair stairlift should not obstruct the required clear width of a stairway, or cause a potential hazard for people who are blind or partially sighted using the stairway or the adjoining landings. It should not restrict access to handrails.
- There should be a minimum clear width of 600 mm between the folded down platform of a wheelchair stairlift and the handrail opposite.
- Controls should be continuous pressure and controls should be designed to prevent unauthorised use.

Following a risk assessment and before proceeding when replacing an existing platform lift, discussions with the Fire Officer are required to agree the position of the lift and clearance dimensions allowed.

A stair lift must only be installed as a last resort.

12.0 Hand Over and Commissioning

12.1 In addition to the Owner's Manuals which will include the relevant latest standard of Test sheet ensure that the following certification is included but not limited to:

- Fire Alarm Test sheets
- Emergency lighting test sheets
- Electrical Installation test sheets
- Grounding of lifts as part of a fire alarm signal.

All O and M documentation is to be presented in hardcopy and electronically by either a download or a memory stick.

13.0 Electrical/Mechanical Services Associated with Lifts

13.1 General Requirements

This design guide specification covers the specific requirements for the electrical and mechanical services elements associated with lift installations. It is to be read in conjunction with the current version of the UCL Design Guide for Electrical & Mechanical Services, UCL's Design Guide for Vertical Transportation Systems and all UCL Technical Notes. This design guide does not cover the electrical services to be provided by the lift specialist.

The Lift Consultant is to provide electrical loading requirements and indicative controller positions to the electrical/mechanical designer, together with the heating load of the machines/controllers.

All electrical accessories are to be from the MK Ltd Metal Clad Plus Range. Switchgear/isolators/distribution boards are to be from the MEM or Schneider Range, UPO to confirm manufacturer for each project.

The electrical/mechanical sub-contractor, to the lift specialist main contractor, is to provide working drawings for approval for all systems and will test all the electrical installation including all the elements within the lift shaft (all circuits from the lift motor room distribution board).

The electrical/mechanical sub-contractor used by the lift specialist main contractor should be one of UCL's preferred/recommended contractors.

13.2 Mains Distribution and Supplies

Each lift shall be provided with a three phase supply using a 4 core cable and separate CPC. The lift motor room shall be provided by a 12way distribution board as a minimum dependant on the number of lifts installed (fully populated with MCB's/RCBO's) and a single phase supply. All supplies are to emanate from the building origin, where practicable. All supplies, except those for a firefighting or fire evacuation lifts, shall be wired in XLPE/LSF/SWA/LSF cables on heavy duty return edge cable tray. All supplies are to be metered to UCL's metering strategy. Where the lift is to be used for firefighting or fire evacuation, both the primary and secondary supply shall be fire rated and take differing paths where practically possible. Parts of the lift motor room supplies will also need to be retained on the secondary supply, if not supplied by the lift controller (i.e.: lift car lighting). These requirements are to be agreed with the UPO and Lift Specialist before designing. An automatic transfer switch (ATS) is to be provided for firefighting or fire evacuation lifts, plus any additional switchgear to accommodate the lift motor room supplies. The ATS units are to be supplied by ABB, shall be 250A rated, with an enclosure and a OMD800 controller (1TVC025014S8000). The ATS shall be set with a time delay of 15-60 seconds, which shall be agreed with the Lift Specialist.

13.3 General Lighting Installation

The lighting installation shall be wired in LSF single cables in galvanised steel conduit and trunking. The lux levels within the lift motor room (LMR) shall be 300-500lux generally, with a minimum of 200lux at the base of each lift controller. Within the lift shaft there shall be a minimum of 50lux throughout. All lighting is to be LED, with the Thorn AquaForce II LED used within the lift motor rooms and the lift shaft. Within the shaft a minimum one luminaire shall be allow at each level, with units placed in the lift pit and top of the lift shaft also. A lift motor room less installation may require additional lighting, which must be agreed with the UPO and Lift Consultant. All lighting is to be taken from the lift services distribution board.

Light sources should not be located immediately adjacent to the control panel. Lighting minimum requirements of 50 lux at the landing and car sill, and 100 lux on the control devices and at 1 m above the floor at any point not less than 100 mm from any wall of the lift car must be achieved.

13.4 Emergency Installation

The emergency lighting installation shall be wired in LSF single cables in galvanised steel conduit and trunking, together with the self-test loop data cable specified by the luminaire manufacturer. The lux levels within the lift motor room shall be 50lux generally, with a minimum of 100lux at the base of each lift controller. Within the lift motor room, a minimum of one emergency luminaire shall be sited at the entrance/exit, above each controller and near/adjacent to each machine to allow the lift to be manually winched in a mains failure situation. Within the shaft a luminaire shall be sited as a minimum in the lift pit, at the top of the lift shaft and at the middle of the shaft (height up to a shaft of four levels). Where the shaft is over four levels, there shall be a luminaire at every second level. Depending on the type of self-test system within building, either a Thorn Voyager ‘C’ LED Series Surface (MCE) luminaire is to be used or an Advanced MOR-LED. Where there is no self-test system is in place, either product can be used. Allowance for the manufacture to test and commission the system on completion should be included, together with a pre-check to ensure the local network loop and control cards have capacity to accept the new fittings. If capacity is not available, guidance shall be taken from the UPO. An emergency lighting test switch is to be provided with the lift motor room, if a self-test system is not installed within the building. All emergency lighting is to be taken from the lift services distribution board.

13.5 Small Power

The small power requirements, including socket outlets and mechanical services supplies, shall be wired in LSF single cables in galvanised steel conduit and trunking. A twin socket outlet, RCBO protected, is to be provided within the lift motor room. Where require, independent radial circuits are to be provided for lift motor room heating, ventilation,

cooling and any shaft sump pumps. A twin socket outlet will be provided, RCBO protected, in the lift pit, which will be installed by the lift specialist.

13.6 Fire Alarm Installation

The fire alarm installation shall be installed to meet the current requirements of BS5839 and UCL's Technical Notes. Detection within the shaft, within the lift lobbies adjacent to the lift doors and in the lift motor room shall be as the British Standards. Within the lift motor room a sounder beacon and interface is to be provided. The interface is to allow the lift to ground in a fire condition and shall be connected to the lift controller. The cabling and connections between the fire alarm interface and the lift controller, shall be by the lift specialist. Cabling and equipment shall match the existing building arrangement. Cabling would normally be Soft Skinned Fire Rated, with some using an enhanced version, but in some cases the cable is MICS. Where more than one cable is to be installed, they shall be fixed to a 50mm cable tray as a minimum and all fire alarm cabling shall be a minimum or 300mm away from any other service. Fire alarm devices are to match the existing and reference to the UCL Technical Notes should be taken. Where possible the lift shaft detection shall be by a probe type detector to allow testing/servicing outside of the lift shaft. The grounding of the lift shall be demonstrated to the Lift Consultant/UPO and allowances for attendance by UCL's fire alarm specialist shall be included within the specification. This will form part of their hand over procedure.

13.7 Data/Telephone Installations

A telephone/data point is to be provided to each lift motor room/lift. Containment shall be as the lighting/small power installations, with the wiring being carried out by UCL's ISD or telephone department. Where an existing telephone point is existing, this shall be relocated to suit the new room layout. Final requirements to be agreed with the UPO. Communications should be direct with UCL security via suitable data cabling to be agreed with UCL's ISD group.

13.8 Security Installations

Within the lift section of this design guide, allowance has been made for cabling to allow installation of access control to the lift installation and/or a CCTV camera. If requested by the UPO, an access control reader to operate part or all the lift controls internally within the lift car, externally at landings or both will be provided. This will form part of the project and the UCL Security Specialist shall be employed to design, supply and commission the system. CCTV to the lift car can also be requested by the UPO, again the installation shall be by UCL's Security Specialist.

Where access control readers are to be installed in lifts this should be discussed with UCL's Access and Inclusion Manager. Lift access controls should be reviewed on a regular basis and de-activated if no longer needed.

Communications should be direct with UCL security via suitable data cabling to be agreed with

13.9 Mechanical Services

The lift controllers and machines have a working tolerance of 5 to 40 degrees C. The lift motor room shall be provided with a heater, forced or natural ventilation and cooling if required to keep the room within these working temperatures. Heating is to be provided by a protected tubular heater, with local low limit enclosed thermostat. Ventilation can be via natural vent, natural vent, where a 'Gilberts Grill' could be used or forced with the use of a fan. The fan will be again be controlled by a upper limit enclosed thermostat. All options could be ducted to external if required. In some cases cooling will be required, this shall be agreed with the UPO before designing.

13.10 Wheel House Requirements

Where an existing or new lift is provided with a wheel house, lighting, emergency lighting, fire alarm and small power shall be provided as a lift motor room.

13.11 Existing Lift Motor Room less Requirements

Where an existing lift motor room less lift is replaced, a room will be provided for the new controller. This may require further services alterations or additions, together with the requirements to relocate existing telephone lines, fire alarm interfaces, etc. A further requirement is to provide a containment route between the new room and the lift shaft. Final requirements are to be agree with the UPO.

During planning of the lift facility for a building as traffic analysis and disabled access assessment shall be carried to establish the number of lifts required together with the performance requirements of the lift. This will establish the lift speed and size and duty requirements.