THE UNIVERSITY of EDINBURGH
Estates Department



Estates Design Guidelines No. 7

Lift Engineering Installation

Important Comment on Estates Design Guidelines, Assets & Standards

These Design Guidelines, Assets and Standards and the associated suite of documents have been produced in order to furnish external design consultants and contractors with guidance on required University standards for inclusion within their proposed project design.

These guidelines are to be used as supplementary information during project design stage, and as such, detail the minimum standards expected from the University Estates Department.

Please note, these guidelines do not absolve the project design team including, sub-consultants and sub-contractors of their legal and contractual obligations under, design liability, statutory regulations and health and safety legislation.

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1.0 Introduction

1.0 Introduction

The UoE Design Guidelines (as a whole), have been developed for employees of the UoE, Design Teams, Architects, Engineers, Project Managers, external consultants and contractors. This documentation has been developed to enable Design Teams and Contractors to have a broad understanding of the principles that the University of Edinburgh will require to be adopted for any future developments.

The guide is primarily designed to be used in conjunction with Royal Institute of British Architects (RIBA) Work stages. The actual extent and scope of the design guide to be incorporated for any future development will be based upon the specific project requirements.

The UoE Design Guidelines aim to discuss strategic matters and does not provide an exhaustive treatment of statutory or best practice design and compliance requirements; its primary purpose is to establish a starting point for design briefs, support the consultation process and outline existing assets and standards. It is the responsibility of Design Team readers/duty holders to ensure subsequent designs are complete, compliant and able to meet the final approved brief when measured in use.

Reference should be made to the relevant UoE Design Guidelines throughout the Design drawings and documents and Designers should confirm that the appointed Contractors are made aware of the Guidelines to ensure that installations conform to these requirements.

1.1 Important Notice – Essential Prior Reading

It is essential for readers of this document to first refer to Design Guideline No.1 entitled ***"Estates Design Guidelines (Assets & Standards) Introduction and Application"***, which serves to provide the principles and overview with vital information and context that will apply to all projects.

1.2 Purpose of the University of Edinburgh Estates Design Guidelines (Assets and Standards)

The purpose of the Estates Guidelines is to act as a briefing document to give designers an overview of the minimum design requirements, constraints and challenges presented by the University of Edinburgh's particular needs. It applies to all new-build, refurbishment, minor works and change of use projects, including property leased by the University, controlling quality in the production of designs, specifications and the subsequent performance of buildings, developed to a consistently high standard and ensuring continuity throughout the University Estate.

The University of Edinburgh encourages innovation; however, all project Design Teams should ensure that their proposed projects have end user considerations and ease of maintenance at its core.

The use of the University of Edinburgh Estates Guidelines, Assets and Standards will not take the place of, or remove, any of the professional responsibility from Design Teams and Contractors to fully comply with the requirements within this document. Given the complex, diverse and growing estate, not all eventualities can be fully defined within this document.

Should any projects deviate from these guidelines, a technical submittal outlining the deviation, reason why and impact to the University maintenance strategy should be prepared and forwarded to the nominated University project representative for liaison with the Building Services Group (BSG).

A review of this deviation shall be carried out by the BSG; a final decision on the deviation shall be communicated to the appropriate design/construction team.

1.3 Interpretation of UoE Estates Design Guidelines, Assets and Standards

The Estates Design Guidelines, Assets and Standards are required to be issued with all project contractual documentation in order to inform project design and construction teams of expected standards to ensure quality continuity across its Estate.

1.4 Glossary of Terms:

Enforced Requirements

The use of the word(s) ‘shall’, ‘are required’, ‘is required’ ‘must’ or ‘will’ denotes a requirement that is non- negotiable and shall be used as the basis for designs, technical submissions and/or activities. If such a statement conflicts with a statutory obligation then a technical submittal shall be issued to the University project representative for liaison with the BSG for their final decision regarding compliance with the documentation.

Requirements Needing Confirmation

The use of the word ‘may’ denotes a negotiable requirement or indication of a solution, where innovation and further calculation, design and discussion may be required to arrive at an optimised solution.

Quality

The Design Guide aims to arrive at the University of Edinburgh's highest design aspirations and standards. It may be that, at the University of Edinburgh's sole discretion, solutions are value managed and then value engineered during subsequent design iterations. Design Teams and Contractors are encouraged to consider where value management and subsequent value engineering may result in an improved financial performance should funding constraints occur. All mechanical and electrical value management and value engineering exercises carried out shall be forwarded to the BSG for review.

Currency of Third Party Documents

Where superseded standards and regulatory documents are referred to in the text, the reader shall apply current revisions and amendments to their project. Should there be any ambiguity, the BSG should be contacted for clarity.

Proof

Where the word 'proof' is used, e.g. 'proof is required', a written report or installation certificate must be produced for approval depending on context.

Assets and Standards

The UoE Estates Design Guidelines endeavours to set out Assets and Standards that will maximise the benefits realisation for the UoE to achieve its strategic objectives and maximise value for money. This will involve coordinated and optimised planning in conjunction with Procurement, robust asset selection with particular reference to existing legacy assets and standards on the University Estate, for reasons of utilisation and continuity of maintenance, replacement of parts, renewal and ultimate disposal.

1.5 Review Design Data Process (RDD)

All proposed designs shall be submitted to the Project Manager and respect Estates Teams and Building Services Group for review and comments, the response will be categorised as follows:

A. Design Team to acknowledge comments and continue to develop the design to the next stage.

B. Design Team to acknowledge comments and update the design in accordance with comments and resubmit for consideration before proceeding to the next stage.

C. Design Team to acknowledge comments and completely review and update the design in accordance to the agreed design principles and resubmit for consideration before proceeding to the next stage.

In addition to the above, the UoE may request specific technical submission to support the RDD and may include the request setting out with proof, e.g. calculations, drawings, etc.

The purpose of the RDD is to ensure designs meet the strategic requirements of the UoE and do not compromise the future operations and maintenance provision. The obligations owed by external architects, consultants and contractors to UoE and their liabilities to UoE is not in any way diminished or otherwise reduced by the RDD.

1.6 The Obligations Owed

By external Design Teams, consultants and contractors to University of Edinburgh and their liabilities to University of Edinburgh is not in any way diminished or otherwise reduced by the approval process. The University of Edinburgh is not taking over the roles and duties of the external Design Teams, consultants and contractors who will remain legally responsible for the design and/or works carried out by them or on behalf of their staff, agents, sub- consultants and/or sub-contractors.

1.7 Version Control and Updates

The Estates Design Guidelines are to be reviewed and updated by the Electrical Engineering Services Working Group in each calendar year.

The UoE Estates respective Project Management (PM) teams will send e-mail notifications to the Directory of current Design Teams and Contractors appointed, following any update or change.

Any updates to the Design Guidelines, which cause significant change to a project design, should be raised and discussed with the respective Project Management Team and application of the Change Control Process will be required.
Any new or amended content is highlighted in yellow so readers can easily identify changes from previous versions. If there are no further revisions, a guidance note will accompany the issue.

1.8 Purpose of UoE Design Guideline No. 7

The purpose of this document is to set out the guidelines and standards that apply to the University of Edinburgh (hereby referred to as UoE) Estate and its design requirements for Lift Engineering Installations as set out by the UoE Lift Engineering

Team and associated Consultants. This document will apply to both newly constructed buildings and existing buildings scheduled to be refurbished. In some cases, this standard exceeds the Building (Scotland) Regulations requirements, as it represents good practice in the Higher Education sector.

The Building (Scotland) Regulations set out to ensure that new buildings and works achieve the objectives of the Building (Scotland) Act 2003 in terms of health, safety, welfare, convenience conservation of fuel, power, and sustainable development, and the purpose of this guide will be to provide a standard policy specifying the standard that is required by the UoE.

This guidelines document is for designers, engineers, specifiers, installers and commissioning and maintenance engineers of Electrical Engineering Services from Stage (RIBA Stage 2) to when the building is in use (RIBA Stage 7). The design team will be required to align the requirements of the Scottish Buildings Standards Technical Handbook / Building (Scotland) Regulations, fire safety legislation, CDM Regulations, CIBSE Guides and the University

The guidelines document provides an indication of non-prescriptive preferred solutions and appropriate standards. This is not a statement of requirements or intended to replace existing British or European technical standards or national guidance; reference to these will still be necessary.

If due to the nature of the project certain aspects of Lift Engineering Installations are not covered in this design guide, the relevant codes of practices, British Standards and building regulations are to be applied and followed. For any general and specific queries, advice is to be obtained from the UoE Lift Engineering Team and associated Consultants. If any of the documents which are being referred to within this design guide had been superseded, then most recent versions are to be used.

Any other doubts, concerns, or points of clarification on Lift Engineering Installations, please contact the UoE Lift Engineering Team and associated Consultants.

This document applies to all buildings managed or owned by the UoE. Any tenanted buildings must not have building works, adaptions or change any building or part of a building which will affect the Lift Engineering Installations or any other building without first receiving permission from UoE Lift Engineering Team and associated Consultants and the Landlord of the property or nominated agent and written in the respective lease.

This document indicates the University's generic Lift Engineering Installations Client requirements. Consultants must also refer to specific project requirements identified by the University's Project Manager. Consultants and contractors must obtain approval in writing for any variation from these requirements.

During early project RIBA stages and at technical submittal stage, the lift proposal shall be sent to UoE Development Engineer for liaison with UoE Lift Operations Team and incumbent Lift Consultant.

Please note, Main Contractor and associated sub-contractors are not permitted to procure any of the lift equipment without full consent and agreement of the UoE Estates Team.

1.9 Legislation and Best Practice Standards for Reference

Any design must, as a matter of statute, be compliant with the Health and Safety at Work Act 1974, any relevant legislation and associated Approved Codes of Practice (ACOP's.)
Examples of secondary legislation include; the Provision and Use of Work Equipment Regulations 1998 (PUWER), the Workplace (Health, Safety and Welfare) Regulations 1992, the Electrical Safety at Work Regulations 1989, the Control of Major Accident Hazards Regulations 1999, the Confined Spaces Regulations 1997 and the Gas Safety (Installation and Use) Regulations 1998.

Your attention is drawn in particular to the legal duties placed on designers by the Construction (Design and Management) Regulations 2015.

Suitable and sufficient safe access for maintenance and repair must always be provided.
The University will comply with all relevant legislation and regulations relating to the design and structure of the building. Academic, administrative buildings and all residential property are subject to the requirements of the current Technical Standards (Scotland) Regulations/Building Regulations and CIBSE Guides:

Guide A	Environmental Design
Guide B1	Heating
Guide B2	Ventilation and ductwork
Guide B3	Air conditioning and refrigeration
Guide B4	Noise and vibration control for building services systems
Guide C	Reference Data
Guide D	Transportation systems in buildings
Guide E	Fire Safety engineering
Guide F	Energy Efficiency
Guide G	Public health engineering
Guide H	Building control systems
Guide K	Electricity in Buildings
Guide L	Sustainability
Guide M	Maintenance Engineering and Management

These standards allow detailed professional knowledge and judgement to be applied in order to develop a final design solution, which will satisfy projects that are more complicated.

The list of legislations, regulations and guides above is not exhaustive. The Design Team shall prepare and submit project related list as part of RIBA Stage 3 design submission.

1.10 University Approval Procedures

The University governance procedures are described in the Project Delivery Process Map. This includes development of a consultation strategy at RIBA Work Stage 0 and ensuring that there are MEP Design focused consultations with the Estates BSG representatives as part of the project stage approval. Refer to the project T18 document for the schedule of required consultations.

2.0 General Requirements

2.0 General Requirements

2.1 Design Consultation and Notification Process for Projects

The University Lift Engineering Team shall be consulted on any proposed works to both existing and new lift installations. The Design/Construction Team are required to forward all lift proposals via UoE PM/Development Engineer for liaison with UoE Lift Team and incumbent Lift Consultant.

Any proposed works to an existing building that may/will affect the operational capability of the lift installation, shall be reviewed by UoE Lift Team prior to commencement of any works.

The Design Team shall engage with UoE Estates, via workshops, from RIBA stage 2 within the project to discuss the proposed lift operation and maintenance strategy to ensure all requirements and expectations are met.

Early and comprehensive consultation with the UoE Lift Engineering Team and associated Estate stakeholders is key to achieving a cost-effective lift installation and operational standards compliant with relevant legislation.

The Design/Construction Team shall engage with the UoE Lift Engineering Team throughout the project via UoE PM/Development Engineer.

Procurement of lift equipment without prior agreement of UoE Estates is not permitted. All technical submittals shall be forwarded for review by UoE Estates Operations and incumbent Lift Consultant.

2.2 Lift Engineering Installations

Any design must, as a matter of statute, be compliant with the Health and Safety at Work etc. Act 1974, ANY relevant secondary legislation and associated Approved Codes of Practice (ACOP's)

Examples of secondary legislation include the Provision and Use of Work Equipment Regulations 1998 (PUWER) the Workplace (Health, Safety and Welfare) Regulations 1992 the Electrical Safety at Work Regulations 1989 the Control of Major Accident Hazards Regulations 1999 the Confined Spaces Regulations 1997 and the Gas Safety (Installation and Use) Regulations 1998

Your attention is drawn in particular to the legal duties placed on designers by the Construction (Design and Management) Regulations 2015

Suitable and sufficient safe access for maintenance and repair must always be provided

The following CIRIA guides should be used to inform your decisions, Construction work sector guidance for designers (C662) Workplace “in-use” guidance for designers (C663) and Construction work sector guidance for designers (C662D)

The following information is primarily intended to provide guidance to those responsible for the design of lift engineering services within the Estate of the University of Edinburgh. It is not intended to be exhaustive or definitive, and it will be necessary for users of the guidance to exercise their own professional judgement when deciding whether to abide by or depart from it. For this reason , any departure or exception from the guidance contained in this document should not necessarily be regarded as a departure from best practice and should always have the written approval of the Building Services Group.

2.3 Information Security

Where any system or item of equipment requires access to the UoE IT network either locally or externally, the system software will require to be assessed by UoE Estates IT team to ensure the UoE information security requirements are met. Generally, the requirements of ISO certification ISO27001 for information security management systems shall be followed.

The electrical consultant and contractor are responsible for providing the required security information as required for approval prior to specifying or ordering any system or equipment.

3.0 Design Brief & Criteria

3.0 Design Brief & Criteria

3.1 Design Brief

Designers must exercise care in ensuring that all operational requirements of the proposed building are met by careful detailed selection of their vertical transportation scheme. Where the University considers that it has relevant experience for specific installations, these will be detailed elsewhere in the site-specific briefing document.

Designers should:

- Take into consideration the requirements of the specific building design brief and Employers Requirements.
- Review the traffic patterns in similar University Buildings.
- Undertake a lift traffic analysis study, including cyclic peak periods and lunch peaks, stating all assumptions made in relation to mass student movement.
- Ensure the traffic analysis philosophy extends to flow of persons between buildings and shared facilities over the whole period etc. not solely on a population at a specific snapshot in time.
- Complete a Lifts Sustainable Design Assessment as described in section 8 within this design guide.
- Ensure mobility impaired access is available to all major areas of the building which are considered to be all normally occupied areas of the building but excluding plantrooms and roofs, this should include consideration of user mobile apps for passive lift control such as QR code mobile app access to persons with limit reach.
- Consider disabled emergency evacuation from the building using the lifts, based on building fire/evacuation strategy and risk profiles.
- Review the need for Fire Fighting Lifts where appropriate.
- Agree the specific requirements of proposed University Departments for movement of materials and equipment or hazardous products/waste.
- Consider the impact of future changes of use when designing the building transportation system.
- Consider different applications in different University Buildings, e.g. supervised Schools vs unsupervised halls of residences, and specify equipment appropriate to the application.
- Include items listed in the Lift Acceptance section 24.

3.2 Design Criteria

The following design criteria are considered appropriate for the majority of new projects. The engineering services shall be designed in accordance with the following:

- The requirements of the Project Brief including Section 24.
- The needs of the occupiers/users.
- Flexibility in use.
- Accessible and inclusive to all users.
- Compliance with an agreed set of technical criteria including handling capacity, average waiting time & interval.
- Systems reliability, maintainability and cost in use.
- Compliance with applicable Current Codes, Standards and Regulations.
- Full Product Support.
- Open Protocol Equipment.

4.0 Application of Standards

4.0 Application of Standards

4.1 All Buildings Lift Installations

All new lift installations and modernisation of existing lifts shall comply with the current issue of BS EN 81-20, BS EN 81-21, BS EN 81-28 BS EN 81-50, BS EN 81-70 and BS EN 81-73 current editions.

All lifts shall be interfaced with the building fire alarm system to BS EN 81-73 current edition, including an alternative fire evacuation floor where an alternative escape route exists.

4.2 Specific Building Lift Installations

Where Firefighting Lifts are required, they shall comply with BS EN 81-72 current edition.

Where Evacuation Lifts are required, they shall comply with BS 9999 Appendix G, BS 9991 and BS EN 81-76 current edition.

Lifts provided in Halls of Residences shall comply with BS EN 81-71 current edition Category 1 Vandal Resistant requirements, including lighting, lift calling stations and buttons and other fittings.

BS BS EN 81-70 Safety rules for the construction and installation of lifts - Particular applications for passenger and goods passenger lifts Part 70: Accessibility to lifts for persons including persons with disability.

BS BS EN 81-71 Safety rules for the construction and installation of lifts - Particular applications to passenger lifts and goods passenger lifts Part 71: Vandal resistant lifts.

5.0 Lift Sustainability Assessment

5.0 Lift Sustainability Assessment

5.1 Background and Context

The University of Edinburgh encourages the integration of physical activity into the everyday life of its buildings' occupants. So far as is reasonably practicable the use of stairs will be promoted and reliance on lifts discouraged. Wayfinding signage and point-of-decision prompts shall be present to encourage stair use and remind that the lift should only be used when strictly required.

Simultaneously the University has a legal duty (Equality Act 2010 and supporting Regulations) to give due consideration to equality and diversity, and will ensure that maximum accessibility is a consideration within the Estate to meet the objectives described in its Accessibility Policy. Lifts are installed with the aim to guarantee that mobility impaired access is available to all major areas of its buildings.

The operation of buildings account for 30% of global final energy consumption (IEA, 2023), and on average, lifts and escalators use approximately 3-8% of the overall energy consumption of a building (IEECB, 2010). Taking into account demographic trends, together with a growing need for accessibility and convenience, the provision of lifts is expected to keep increasing in the near future.

The University has a legal duty (Climate Change (Scotland) Act 2009) to help deliver Scotland's national emissions reduction target, adapt to the impacts of climate change, and to act sustainably. Consequently, the University of Edinburgh encourages their Project Teams to draw special attention to the design and specification of energy efficient vertical transportation technologies.

5.2 Design Approach

The Designer is required, when specifying lifts, to address all the issues relevant to energy efficiency and promotion of sustainability.

An approach which recognises the following needs shall be adopted:

- Reduction of energy demand and materials.
- Recognition of regenerative energy resources.
- Acknowledgement of the impact of LCA.
- Consideration of waste management and recycling.

5.3 Sustainable Design Strategies

This section describes the Sustainable Design Strategies that the Design Team will implement in the specification of Lifts.

The University of Edinburgh encourages innovation. However, all project Design Teams should ensure that their proposed projects have end user considerations and ease of maintenance at its core.

Should any projects deviate from these, it must be formally agreed with the University. A Technical Submittal outlining the deviation, reason why and impact to the University maintenance strategy should be prepared and forwarded to the nominated University project representative for liaison with the Building Services Group (BSG). A review of this deviation shall be carried out by the BSG, and a final decision on the deviation shall be communicated to the appropriate Design/Construction team.

5.4 Energy Efficient Features

The following energy efficient features shall be specified for all lifts:

- Use of LED lighting for both car and display lighting, since they require 75% less energy.
- Utilisation of standby modes when the demand declines during off-peak periods, to ensure that no unnecessary energy is wasted when not in use.
- Use of drive controller capable of variable-speed, variable-voltage and variable-frequency control of the drive motor.
- Consideration of regenerative drives, which circle energy back into the building's network. Regenerative drives will typically be appropriate for lifts with high intensity of use and travel, when the energy saving is greater than the standby energy used to support the drives.
- Consideration of other energy saving methods, such as the incorporation of gearless machinery or the use of guide rollers.
- Also refer to specific lift controls settings for energy efficiency within section 11.2 of this design guide.

5.5 Energy Consumption

BS EN ISO 25745-1:2023 and BS EN ISO 25745-2:2015+A1:2023 must be used when estimating the energy consumption on a daily and annual basis of the lifts. These guidelines also provide a method for energy classification of lifts, and recommendations on how to reduce their energy consumption.

The Design Team shall undertake an analysis of the transportation demand and usage pattern, in order to establish the optimum number and size of lifts. This shall be developed using a Computer Simulation Programme to review the people handling capabilities of various size, speed, numbers and control algorithms, to determine a best value solution. The standard assumption for modelling is that lifts

will only be used when strictly necessary (i.e., by mobility impaired users, when an occupant is carrying heavy loads, etc.).

In the energy consumption calculation, the use of regenerative drives should be considered, subject to whether the energy saving achieved is greater than the standby energy used to support the drives.

The energy consumption must be calculated in accordance with BS EN ISO 25745-Part 2 for at least two different options:

a) Either two different systems.

b) Two different arrangements and control strategies.

Of these options, the one with the lowest energy consumption should be specified, unless otherwise agreed with the University.

5.6 Life Cycle Approach

The Design Team is encouraged to specify lifts that have been designed and developed using a life-cycle approach, considering their environmental impact at each life cycle stage according to the ISO 14040 and ISO 14044 guidelines.

The use of recyclable materials in most parts of the design and manufacture, sourced from local responsible suppliers, and produced in manufacturing plants and facilities committed to continuously improve their environmental performance, shall be prioritised.

The lift should be engineered for an economical long term life cycle for a minimum of 20 years.

Information Exchange

As part of the Stages 3 and 4 Reports, the Design Team shall provide a Vertical Transport Report, which will comprise of:

a) The traffic analysis study for the different solutions.

b) Details of the energy consumption simulations for the two different scenarios, with a statement that clearly describes the reasons for the selected system and the energy saving benefit as a percentage.

c) Relevant sections of the specifications demonstrating the energy efficient features that have been implemented.

5.7 Environmental Impact

The designer is encouraged to address all the issues relevant to energy efficiency in buildings and promoting sustainability. Whether designing new buildings or

refurbishing existing buildings, designers should adopt an approach which recognises the need to:

- Reduce the demand for energy and materials.
- Consider the benefits of regenerative energy sources.
- Consider the lift cycle assessment impact of the proposed solutions.
- Consider waste management and recycling.

In order to identify opportunities to improve contract performance and to minimise the sustainability impact of the University's activities designers should ensure that their design can support these objectives, and obtain a life cycle assessment of the sustainability risks/impacts of products or services as defined by ISO14040 and ISO14044 and capabilities to address these consequences throughout the supply chain.

Assess the energy efficiency classification of lifts offered in response to specifications and score accordingly to a bench mark using VDI 4707 which measures and classifies lifts according to their energy performance. It defines an Energy label and provides a figure for a "yearly nominal energy demand."

The lift works shall provide a reliable, high quality installation, engineered for an economical long term life cycle for a minimum of 20 years, to comply with the requirements of this specification and the following:

- Statutory UK & EC Regulations, Directives and Instruments.
- Building Standards (Scotland) Regulations.
- Health and Safety Executive Guidance Publications.
- HSE Memorandum of Guidance on the Electricity at Work Regulations.
- British Standards and Codes of Practice.
- (B.S. 7671) 18th Edition of the I.E.T. Wiring Regulations.
- The Construction (Design & Management) Regulations 2015.
- BS EN 81-20: current edition and BS EN 81-50: current edition.
- BS EN 81-70 in relation to Lift Accessibility.
- BS EN 81-71in relation to Vandal Resistance.
- BS EN 81-72: current edition and 73: current edition in relation to Fire.
- CEN TS 81-76 Safety Rules for the construction and installation of Lifts.
- EMC Regulations.
- The Lift Regulations 1997 as amended by the UK Supply of Machinery (Safety) Regulations 2008.
- Lifts Directive 2014/33/EU.

6.0 Lift Concept Design

6.0 Lift Concept Design

6.1 Lift Refurbishment or Replacement

For refurbishment or replacement of existing traction lifts the designer shall review the accessibility of personnel and materials to, and from the existing machine room as required under CDM Regulations. Where the machine room is suitably accessible for maintenance personnel, e.g. by stairs rather than vertical ladders or without the need to cross and external roof space, the University preferred solution is to retain machine above traction lifts, however, this should be discussed with the UoE BSG prior to any works taking place.

For existing buildings which do not have safely accessible machine rooms a Machine Room less [MRL] Traction Lift should be considered.

Existing hydraulic lifts in need of refurbishment shall be assessed in cost and efficiency against replacement with significantly more efficient MRL Traction Lifts.

When a lift is being replaced or modernised in an existing building the lift contractor shall review and discuss the aesthetic finishes on each and every floor level to ensure that any building features are retained. Finishes shall meet LRV requirements within Technical Handbooks, BS 8300-2 and specific values for these in the BS BS EN 81-70:2021+A1:2022. This will include wall and floor finishes.

Where evacuation or fire fighting lifts are proposed to be installed within an existing building as part of a refurbishment project these shall only accepted where deemed required by the building evacuation or fire strategy. Where proposed evacuation or fire fighting lift installations must meet all requirements of the relevant BS EN including the provision of evacuation or fire fighting lobbies with suitable drainage, ventilation and power supply provisions. Early consultation is required with the UoE BSG to agree the strategy for these installations.

6.2 New Lift Installations

For all ‘new build’ installations the University **preferred** solution is for Machine-Roomless (MRL) Electric Traction Lifts to be specified.

Hydraulic lifts shall **not** be installed in new buildings as they will not meet the University Energy Efficiency and Environmental Policies.

Liaison with the UoE BSG at early design stage is required to discuss and agree lift type to be utilised. Following on from early engagement, lift design progress and contractor technical submittals shall be forwarded for review prior to acceptance and installation of lift equipment.

Where the design team establish that lift service is to operate as an Evacuation Lift or fire fighting lift the relevant sections of these Guidelines identify applicable requirements.

Finishes shall meet LRV requirements within Technical Handbooks, BS 8300-2 and specific values for these in the BS BS EN 81-70:2021+A1:2022. This will include wall and floor finishes.

7.0 Lift Asset Numbering

7.0 Lift Asset Numbering

7.1 Standard Requirements for All Lift Installations

Unique lift identification/asset numbers of the form “XXXX LIFT YY” where XXXX is the building number and YY is a sequential number for each lift. They shall be provided in the following locations on each lift:

a) Each landing entrance header.
b) On the car top and pit control station.
c) Adjacent to each pit stop switch.
d) With the lift car at the top of the Car Operating Panel.
e) On each lift control panel.
f) On the main supply isolator.
g) On machine room installations on each machine and each over speed governor.

Identification numbers on landings, on the car operating panel and MRL landing emergency and intervention/maintenance control panels shall be engraved on matching material to the approval of the engineer.

0001 LIFT 0001

8.0 Controllers, Control Equipment and Wiring

8.0 Controllers, Control Equipment and Wiring

8.1 General Requirements

The electrical equipment of the lift shall comply with the requirements of EN 60204-1, BS 7671 or current regulatory standards and requirements as referenced in the clauses of this standard.

Wherever practicable the controller shall be located within a separate lift plant room and shall be floor or wall mounted with a lockable cabinet incorporating IP2X protection and forced air anti dust filtration system. Where a separate lift plant room cannot be provided the control cabinet shall be built into the top floor landing entrance/wall and shall otherwise comply with these Guidelines.

All control gear shall be mounted so as to, facilitate ease of operation and maintenance from the front.

Heat emitting components may be located in a protected enclosure external to the lift control panel and where necessary be provided with natural or mechanical ventilation to ensure no unacceptable heat build-up within the panel.

All enclosures containing electrical equipment with a potential in excess of 50V shall be marked with the graphical symbol IEC 60417-5036:



Control circuits for landing controls and indicators and the safety chain having higher voltage than 50V AC and circuits on the lift car having higher voltage than 50V AC shall be supplied via a residual current protective device (RCD) with a rated residual operating current not exceeding 30mA.

It is a fundamental requirement that all control systems shall utilise “open protocol” technology and programming.

In this specification, an “open protocol” is a protocol that the control panel manufacturer shall make available to the UoE and third parties the technical details of their protocol and provide the rights to use associated with it, allowing third parties to manufacture or programme compatible equipment.

Where the ability to interrogate and/or modify any of the control parameters requires the use of any hand held or demountable Man Machine Interface (MMI) any such components not permanently fixed to the controller shall form part of the lift installation with title to same passing to the University upon completion of the works.

Any interface tool shall not allow changes to programmable electronic systems in safety related applications (PESSRAL) which shall be protected by, e.g. using EPROM, access code, etc.

Internal components such as contactors, relays, solenoids, timers, rectifiers and other discrete equipment shall be identified by permanent labels, which shall bear the same designation as the schematic wiring diagrams and record information. A chart shall be permanently affixed to the inside of the controller's door to provide a key of abbreviations used. Sample labels are to be offered to the UoE for approval.

The controller shall be provided with an incoming mains filter to protect against spikes and harmonic disturbance of the supply, with suitable fuse and MCB protection to ensure that all circuits affecting all electrical equipment are suitably protected against short circuit, overload and/or reverse current.

The input/output structure of the controller shall be provided on separate input/output printed circuit boards. The status of each input and output shall be indicated by dedicated LEDs or via LCD diagnostic display.

The input/output structure of the controller shall be flexible with the option to increase the capability by the introduction of further input/output boards at a later stage or, alternatively, via distributed intelligence network.

All control devices, and electrical components shall be clearly identified with the same reference designation as shown in the electrical diagrams.

8.2 Fault Diagnostics & Mode of Operation

The controller shall have an Open Protocol Man Machine Interface (MMI) mounted within the control panel cabinet for fault diagnostics and event display incorporating the following Features and Modes of Operation:

- 200-event fault logging facility-indicating event, lift position at time of event, status, time and date. Once 200 events have been recorded, each new event shall cause the oldest event to be deleted. There should be no facility to manually delete events.
- Car and landing call input.
- Display of car and landing calls latched.

- Lift position, direction and status.
- Time and date adjustment.
- Site identification code input.
- Battery backup memory for the last 200 events and with a minimum 12 hours autonomy. Memory should not be disrupted by any power loss or disturbances.

To facilitate remote access in the future, the controller shall incorporate provisions to readily accept an additional of a network connection, to be agreed with the UoE.

All aspects of the installation shall comply with Electromagnetic Compatibility per BS EN 12015..

The controller shall:

- Be quiet in operation to the UoE requirements.
- Be installed to avoid transmission of vibration to the building structure.
- Provide the specified method of control with smooth acceleration, running and deceleration characteristics in both directions of trave.l
- Provide a stopping accuracy of +/- 5mm under all conditions of load and in both directions of travel.
- Relevel under change of load conditions to within +/- 5mm under all conditions at any floor.
- Incorporate a non-resetting counter recording motor hours run fitted within the control panel.
- Incorporate an audio and visible indication on/in the lift control panel during hand winding to indicate when the car is at a landing level to allow trapped passengers to be released from the car.
- Incorporate an ultimate limit reset within the lift control panel.
- Cause the lift car lighting and any mechanical ventilation to turn off after a variable interval of 5-30 minutes when no car or landing calls have been made with both being turned back on immediately a call is made. In addition, please note that the car lighting and ventilation is to be switched by a PIR within the lift car.
- Where the lift is intended to serve as an evacuation lift it shall, in the event of failure of the primary power supply, automatically reset and find its position within 1 metre once the secondary power supply has been energised regardless of whether the recall switch has been operated. Where the recall switch has not been operated, the lift shall continue to operate normally until that switch is operated.

The following other control features shall be included as a standard within the control system:

- Thermistor protection relay.
- Double journey timer.
- Car and landing call acceptance.
- Load weighing bypass of calls when 70% loaded.
- Car overloaded to 110% with a min of 75kg.
- Provision for digital position indicators.
- Provision for direction indicators.
- Provision for arrival gong.
- Inspections controls.
- On the car roof.
- In the pit.
- In the control panel.

8.3 Energy Efficiency

The control panel shall incorporate energy efficiency control features to reduce power consumption when the lift is not in use or there is little demand.

The energy saving features shall include:

- Fans to run on timer to switch off after a variable time limit of 1-10 mins after the last car call and switched via a PIR within the lift car.
- Car lighting to extinguish within a variable time of 1-10 mins after the last car call and re-initiate lighting when lift is called and switched via a PIR within the lift car.
- Indicators to reduce illumination after a pre-defined period of inactivity of the lift.
- Indicators to extinguish after a prolonged period of inactivity of the lift and resume on first landing call.
- False call (anti-nuisance) cancellation where there are car calls to a number of levels however there is no movement through the car door light ray after the second call has been answered.
- Dynamic load weighing bypass to bypass landing calls when the car is loaded to 80% of its rates load and thereby prevent unnecessary stops
- Omit homing runs.

The control system shall support lift door operation when not under key control as described hereunder:

- On arrival at a landing in response to a landing call, the car and landing doors shall open automatically and remain open until a car button is operated. If the lift has no other calls registered, priority shall be given to car calls for an adjustable period of between 0-30 seconds after the doors have reached the fully open position. If during this period no car calls are registered, the doors shall start to close automatically. Adjustment of this facility shall not require the need for external tools or hand held device.
- Project Architect/Electrical Consultant and Main Contractor shall ensure that the levels indicated on the car buttons (in both numbers and braille) and announced in the car, match that of the floor designations agreed with the UoE PM during early design consultations. For example, building with 3 storeys, will be shown and announced as level 00, 01, 02 or 01, 02, 03, or Ground Floor, First Floor and Second Floor.
- On arrival at a landing in response to a car call, the car and landing doors shall open automatically and remain open for an adjustable period of between 0-30 seconds after the doors have reached the fully open position when they will start to close automatically. Adjustment of this facility shall not require the need for external tools or hand held device.
- Operation of the door open, or the corresponding floor selection, button shall cause a closing door to re-open automatically or prevent an open door closing so long as pressure is maintained on the button.
- Operation of a floor selection button (other than that for the floor the lift is at) shall instigate immediate door closure irrespective of unelapsed time remaining on normal closure or from prior use of the door open button so long as pressure is not still maintained on such button.
- Operation of the door protection device shall override door closure.
- With the doors fully closed and the lift car parked within the door zone, operation of the door open button or the corresponding landing level button shall instigate automatic door opening. Door closure pressures to meet with UoE requirements and any regulatory requirements.

The control system shall be configured such that under attendant's key control (captive key) the lift shall be removed from normal service and lift door operation shall be as described hereunder:

- In the event of any other special function, Fire Evacuation or Hazardous Material mode, this function, on arrival at a landing in response to a car call, the car and landing doors shall open automatically and remain open until the key switch on the car operating panel is de-activated after which time the doors shall remain open for an adjustable period of between 5 and 12 seconds when they shall start to close automatically.

- Irrespective of the key switch status, operation of the door open, or the corresponding landing level button shall cause a closing door to re-open automatically or prevent an open door closing so long as pressure is maintained on the button.
- Operation of the door protection device shall override normal timed door closure.

Six copies of the attendant's key shall be handed over on completion of the works.

8.4 Electrical Safety Provision

An approved electrical safety mat shall be provided adjacent to each piece of control equipment. The mat shall be compliant to B.S. BS EN 61111:2009 to a minimum of class 1 and marked as such. In addition, all necessary landing barriers shall be provided as part of the installation

Emergency and Test Operation Panels (MRL) - the necessary devices for emergency and test operations shall be provided on a panel outside of the well suitable for carrying out all emergency operations and dynamic tests of the lift. The panel shall have a hinged door with a key-operated integrated tamper/vandal proof lock, capable of being reclosed and relocked without a key. The panel shall be finished as per the requirements of the schedule of finishes.

The devices on the panel shall incorporate a permanently installed electric light with an intensity of at least 200 lux measured at the device which shall switch with the opening of the panel door to supplement the available lobby lighting.

The Emergency and Test Operations Panel shall incorporate a means of emergency operation of the lift. This shall include:

- Either an electrical or mechanical means of releasing the brake in a controlled manner.
- An electrical means of moving the car in the upwards direction with the rated load.
- An electrical means of moving the car in the down direction with no load.

  (The movement of the car in inspection operation shall solely depend on constant pressure on a direction and the "RUN" push-button).
- An intercom with Duplex Speech to the lift car.
- Controls for having the dynamic tests undertaken.
- A display showing:
  i. The position of the lift car in relation to the designated floor numbers
  ii. The direction of movement of the lift car

iii. Whether the car is in the unlocking zone of the lift
iv. The speed of the lift
v. The status of the lift safety circuit
vi. The car load
vii. Operations of the car doors
viii. The fault status of the lift

- A means to disable the door operation.
- A means to disable accepting landing calls.
- A door locking a bypass device which shall be mechanically protected against operation identifiable by the word "BYPASS" written on them.
- A means of testing and demonstrating the Un-controlled Movement Protection (UCM)

8.5 Drive System

The lift drive shall be contained within the controller cabinet, or in the case of MRL lifts a separate cabinet within the well. The drive shall be fully compatible with the selected control system and shall be configured for use in closed loop operating mode. The following functions shall be incorporated as standard within the lift drive:

- Adjustment of the rate of acceleration.
- Adjustment of the rate of change of acceleration.
- Brake controller.
- Velocity thresholds interfaced to the control system.
- Regeneration drive system if the intensity of use and travel distance warrant the inclusion of this feature.

Note, for all new lift installations and modernisation projects an Automatic Rescue Device (ARD) in line with BS EN 81-20 shall be included within the lift specification and project scope.

8.6 Control Wiring

Other than the trailing cables, all cables shall be enclosed in galvanised steel conduit or trunking, halogen free trunking will require approval from the Building Services Group Engineer. Conduit entry and exit points shall be protected with male and female brass glands as appropriate. Trunking and conduit shall be run on the plant room walls only to eliminate their constituting a tripping hazard. Trunking shall be provided with external copper earth link points at each joint and shall incorporate cable strainers at no greater than 3m intervals in vertical runs. The use of any other cabling/containment type must be agreed with the UoE Lift Consultant.

Where the use of flexible conduit is unavoidable it shall be metallic and shall be terminated in suitable couplings which shall positively grip the flexible conduit complete with all necessary fixings. An additional earth continuity conductor shall be run outside such flexible conduit between lengths.

An additional earth route shall be provided for all components and equipment including guards, ladders and landing door frames.

The installer shall utilise multi-strand 600/1000V grade control wiring having low smoke and zero halogen (LS0H) insulation. All terminations of cables shall be at designated points. Where cables are interfaced, these points shall be marked and identified with DIN rail mounted screw terminals.

Volt free contacts from fire alarm system shall be provided adjacent to lift controller position. Inclusion shall be made for liaison with the University's Fire Alarm Contractor to ensure compatibility between the control system and a fire alarm signal such that in the event of a fire alarm situation the lift shall home to a designated floor level where it shall park until the fire alarm to BS 9999 has been cleared.

Inclusion shall be made for liaison with and attendance on the University's Fire Alarm Contractor to accommodate their installation of any necessary automatic fire detection components and/or cables at the well top or within the lift plant room.

9.0 Lifting Machine

9.0 Lifting Machine

9.1 Hoist Unit

The hoist unit shall be located within a separate lift plant room preferably above the lift well. Where a separate lift plant room cannot be provided the hoist unit shall be located within the lift well and shall otherwise comply with these Guidelines.

Gearless machines shall be used for all new passenger lift applications having a speed of 0.6 m/s or greater.

Geared machines may be used for: lower speed lifts; large capacity lifts; or infrequently used goods lift where there is no significant energy efficiency saving.

The AC gearless lifting machine shall incorporate:

- A 3-phase synchronous permanent magnet motor.
- Traction sheave.
- Disc brake with 100% redundancy.
- An encoder matched to the Vector Drive and control arrangement..
- Uncontrolled Movement Protection (UCMP) in line with BS EN 81-20.

The lifting machine shall be designed with high efficiency and incorporate an internal fan. Where additional cooling is necessary, incorporate a low-noise cooling fan which shall be separately driven.

The motor shall be matched to the vector drive and shall be suitable for the specific duty demands placed on the system.

Rope retainers shall be provided at the main sheave and at all pulley wheels.

9.2 Guarding

Protection shall be provided for accessible rotating parts of machinery other than, where fitted, the hand winding wheel. Guarding shall include the sheave of all lifts within a machine room. All guarding and rotating parts should be finished in a bright yellow colour respectively to BS BS EN 81-20/50 and BS EN 7255 2012 A6. Guarding shall be provided with removable fittings.

The guarding shall consist of close fitting, site-measured guards, manufactured out of welded steel mesh complying with BS EN 13857. The mesh shall be painted off site to a safety yellow colour.

Where the guards have to be removed during regular maintenance and inspection, the fixings shall be via hinged or removable panels accessible without the use of tools, e.g. captive thumbscrews that shall remain attached to the guard or to the equipment when the guard is removed.

Fitting of any guard shall protect each individual component and not whole areas such as winding units and diverters. Additional bracing and support points shall be used to minimise deflection.

Where ropes enter the well, rope-reducing plates shall be fitted at each individual point of ingress with a minimum of a 50mm upstand. These shall be painted orange reflective to BS4800 to identify.

The over speed governor shall be provided with upstands as well as guarding.

MRL lifts shall be provided with guarding in accordance with BS EN 81-20: current edition.

9.3 Brake

The brake shall be mechanically applied and electrically held off and be capable of stopping the machine when the car is travelling downward at the rated speed and with the rated load plus 25%. Brake linings shall be incombustible and shall contain no asbestos.

Pulleys shall have machined grooves, be smoothly finished and have rounded edges.

All new lift installations and modernisations shall incorporate the following:

Automatic Battery UPS Recovery System – an emergency release system to facilitate brake release and powered movement by battery backup under power loss conditions shall be incorporated into the control system for the gearless hoisting machine.

In the event of a power loss Automatic Recovery Device (ARD) the battery UPS drive shall automatically instigate the recovery which allows a fully laden lift to drive to the nearest floor level and open its doors. The speech synthesis unit will make an announcement that the lift is returning to floor level on emergency power and to exit upon arrival. Any required regular maintenance check for this system shall be included in the lift O&M manual.

The battery UPS recovery drive feature may be supplied from regenerative power of the drive system. The battery recovery drive shall be supplied with a signal cable from the source supply to be able to identify the power supply status and not engage the UPS battery drive on deliberate isolation of the lift supply.

Full details of the recovery drive system shall be provided with the tender.

10.0 Hydraulic Drives

10.0 Hydraulic Drives

10.1 Limitations

Hydraulic drives **shall not be installed** on new projects due to energy efficiency and environmental considerations.

On building refurbishment schemes where the designer identifies that replacing a hydraulic arrangement is either the only viable solution or the optimum solution for the existing lift installation, this strategy must be agreed with the UoE BSG.

10.2 Key Considerations

The hydraulic pump unit shall be selected to provide the required contract speed and shall incorporate an electronic valve block, pressure gauge, hand pump and device/s to detect both high and low pressure. The pump unit shall be located within 6m from the hydraulic ram. The system shall include a means of detecting un-intended car movement, an anti-creep device and an oil filter accessible for inspection and cleaning.

The designer shall establish whether oil cooling equipment is necessary to facilitate the required number of motor starts per hour without overheating the motor or adversely affecting hydraulic oil viscosity. Oil cooling equipment shall be located so as to preclude the dissipated heat causing excessive plant room temperatures.

Inclusion shall be made for the provision of a suitable bund around the pump unit the internal surfaces of which shall be treated to prevent penetration by oil spillage. The external and top elements of the bund wall shall be highlighted by the addition of painted alternating yellow and black hazard stripes which shall be at an angle of approximately 45o in compliance with the Health and Safety (Safety Signs and Signals) Regulations 1996.

The hydraulic connection between the pump unit and the ram shall be undertaken by hydraulic hose which shall be installed so as to avoid twisting, sharp bends and chaffing and shall be effectively isolated from the building structure to minimise the transmission of vibration. Where the hose may cross the pit floor, it shall be routed so as to minimise tripping hazard to service personnel and supported clear of the floor by suitable pipe supports.

Single-acting or twin cylinder arrangements shall provide a 2:1 ratio of car travel to piston stroke by means of a rope or chain arrangement with suitable pulley/s. Where an indirect acting arrangement is adopted inclusion shall be made for appropriate safety gear.

Inclusion shall be made for the incorporation of a compatible rupture valve/s and for the provision of appropriate collection vessel/s fitted to the bottom of the ram cylinder to collect oil as naturally dissipated from the ram.

11.0 Safety Gear, Stopping Devices and Temporary Waiting Spaces

11.0 Safety Gear, Stopping Devices and Temporary Waiting Spaces

11.1 Safety Gear

Safety gear shall be mounted on the lift car sling to prevent uncontrolled descent of the lift car, and additionally for traction lifts uncontrolled bi-directional movement.

Every effort shall be made to avoid the possibility of accessible space below lift pit. Where this cannot be achieved, if accessible spaces do exist below the base of the pit, it shall be designed for an imposed load of at least 5000 N/m^2 and the counterweight or the balancing weight shall be equipped with safety gear.

Instantaneous or progressive safety gear as appropriate to the speed and rated load of the lift shall be selected to work in conjunction with suitable over speed governor/s.

11.2 Stopping Devices

Where maintenance work is to be carried out from the car roof a mechanical device shall be provided to prevent movement of the lift car. This shall be electrically interlocked as 5.11.2 of BS EN 81-20: current edition.

When this mechanical device is in its active position and cannot be disengaged due to forces exerted on it; it shall be possible to leave the well via the landing door by a clear opening of at least 0, 50 m x 0, 70 m above the car door header/door operator.

Where machinery is to be maintained or inspected from the pit and if any kind of uncontrolled or unexpected car movement resulting from maintenance/inspection can be dangerous to persons, a permanently installed device shall be provided to mechanically stop the car with any load up to rated load and from any speed up to rated speed to create a free distance of at least 2m between the floor of the working area and the lowest parts of the car.

The necessary devices for emergency operation and for dynamic tests shall be arranged so that they can be carried out from outside of the well in accordance with 5.2.6.6.

11.3 Headroom and Pit Clearances

The designer shall ensure adequate pit and headroom provision is made within the building design to achieve the required clearances as stated in BS EN 81-20: current edition.

Low headroom or low pit installations shall not be considered for new installations, however, where driven by building constraints these can be considered for modernisation projects. These shall be in line with BS EN 81-20 & 21.

11.4 Car Top Balustrade

The car roof shall be provided with a balustrade whose height shall be in accordance with the requirements of BS BS EN 81 20: current edition only in relation to the perimeter gap around the car top. It shall include a mid-rail and toe board. The rail shall be located within 150mm of the outside edge of the lift car top.

It is permissible to mount equipment outside of the area of the car top balustrade. The rails and toe board shall be painted bright yellow. A sign shall be provided on the car top to advise on the allowable numbers of persons on the car top and the posture of the safe refuge space that is provided accordingly. This shall be clearly displayed at the access point to the car top on the balustrade, readable from the landing, and also to the rear of the car.



The area of the car top that the safe refuge is available shall be clearly defined by a green boarded refuge area which will define the refuge space per person.



On all University lifts of 8 persons and above, a minimum of two refuge spaces shall be provided which shall accommodate the lift engineer attending another trade, e.g. a fire alarm engineer.

11.5 Pit Refuge Space

With the car on its compressed buffers a safe refuge space as per Table 4 of BS EN 81-20: current edition shall be provided.

Where the detailed maintenance information identifies that a 2 person tasks are involved with lift maintenance then refuge spaces for 2 persons shall be provided.

A pit refuge space shall be clearly defined within the lift pit by a green bordered sign together with a notice at the entry to the pit consisting of at least a warning triangle sign advising on the posture of the safe refuge and the need to use any mechanical props to achieve the refuge space.





12.0 Ropes, Belts, Suspension & Governor

12.0 Ropes, Belts, Suspension & Governor

12.1 Ropes

The selection of the size, construction and lay of SDR ropes shall be the responsibility of the manufacturer to suit the characteristics of the lift installation to achieve compliance with BS EN 81-50: current edition.

Plastic encapsulated/sheathed steel wire ropes **shall not be used** on University projects.

12.2 Belts

Belts shall have a minimum estimated life span of a minimum of 10 years for the rated duty cycle of the specified lift, measured at a rate of 300,000 journeys per year.

It shall be possible to establish the condition of the steel cores of the belt with either permanently attached monitoring equipment or portable test equipment. Where permanently attached monitoring equipment is not provided the portable equipment shall be provided as part of the contract with open protocol for third party use.

Permanently attached monitoring equipment shall provide a visual indication of the status of the belt cores and have status inputs to the control panel or E&I panel on MRL.

12.3 Suspension

The suspension using polyurethane or equivalent coated steel wire cores belts is permissible providing that belts shall be terminated in a manner which allows adjustment of the belts due to stretch.

12.4 Governor

These governor must comply with EN 81-20/50 or ASME A17.1, and include bi-directional overspeed protection, remote tripping/reset capabilities, and Unintended Car Movement (UCM) detection.

The governor can be installed within the hoistway (top or bottom), or mounted on the guide rails.

A 24-230V DC/AC remote tripping device to activate the safety gear remotely, along with a remote reset functionality shall be include.

Governors must provide overspeed protection in both upward and downward directions.

The governor shall provide detection for uncontrolled movement with doors open, triggering safety gears or rope brakes to stop the lift.

Maintenance access to the governor and safety system must be accounted for, a manual lever or remote system for testing shall be included where necessary.

13.0 Lift Plant Room Sundries

13.0 Lift Plant Room Sundries

13.1 Information Board

An information board shall be erected in the plant room. The board shall incorporate the following information and equipment:

- Manufacturer's instructions.
- Service log card.
- Details of suspension and governor ropes.
- A door release key.
- Labelled keys for any attendant controls.
- Labelled key for emergency lighting test switch.
- Labelled key and a padlock to fit the main isolating switch.
- A set of signs as BS EN 7010 as BS 7255 Fig C1 to apply to each landing entrance when a lift is taken out of service and during an emergency release procedure.

13.2 Landing Entrance Barriers

A landing entrance barrier shall be provided in the building at a location to be agreed with the University. The barrier shall incorporate a permanent legend identifying it as being the property of the University and shall be capable of being securely fixed to landing architraves.

13.3 Signage & Labels

Appropriate and site-specific emergency hand lowering procedures shall be displayed adjacent to the lifting machine or pump unit to BS 7255

Treatment for Electric Shock and Electricity at Work posters shall be displayed in a prominent location in the plant room.

Permanent labels shall be added, as Manufacturers Guidelines and secured to each item of switchgear or outlet to identify their function. Sample labels are to be offered to the UoE for approval.

A clear polycarbonate rear screen-printed sign in accordance with BS EN 7010 and as BS 7255 Fig C2 shall be fixed to the outside of the plant room door using brass screws and brass screw cups.

14.0 Lift Car and Equipment

14.0 Lift Car and Equipment

14.1 Lift Car

A steel sling shall be installed which shall be of robust construction to withstand normal operation, buffering or operation of safety gear without any damage or deformation and which shall incorporate:

- Safety gear complete with actuating mechanism and rope hitch.
- Welded or bolted steel channel construction.
- Centrally located buffer plate.
- Crosshead construction with self-locking bolts.
- Rope-hitch plate.
- Guide shoes with lubricating system.
- Car anti-vibration mountings.
- Primed anti rust finish and painted two coats of matt black paint.

A car cabin shall be installed to interface with the sling assembly and the interior shall be installed with walls vertical and floor and ceiling level. A toe guard shall be fitted to the car sill. The lift car shall be statically balanced such that the car hangs centrally within the existing guide rails without the use of guide shoes.

The whole assembly shall be constructed and shall incorporate sufficient isolation material such that in-car noise and vibration meets or improves on the minimum criteria given in Section 12.12 of the Chartered Institution of Building Services Engineers Guide D. Particular care shall be exercised in the installation of anti-vibration mountings and isolation between the car frame and the car enclosure and BS Guidelines. Additional sound insulation in the form of fire-retardant anti-drumming compound shall be applied externally to the car enclosure.

Internal car finishes shall be selected in conjunction with the University and/or the Design Team to suit the environment. The lift car shall be appropriately sized based on the LTA and use of the building. Generally a minimum car size of 10 persons is the smallest lift within UoE buildings in order to provide sufficient space for wheelchair users. Lift cars shall also be provided with full height mirrors, handrails and flip-down seats where required. Refer to UoE Design Guide No 12, Inclusive Design for further specific considerations.

Cabin lighting should be designed to provide at least 100 lux at the car floor level and to facilitate re-lamping from within the lift car and incorporate 3 hour non-maintained emergency lighting to provide at least 5 lux at the car floor level for 1

hour. Emergency light/s shall not be mounted within the car operating panel. BS EN 81-20 and BS EN 81-50 current editions.

The designer/specifier shall ensure that both in new lifts and modernised lifts, that all lift car and landing controls along with finishes etc meet the requirements for Light Reflectance Value contrast as per the guidance in Technical Handbooks, BS 8300-2 and specific values for these in the BS BS EN 81-70.

The lift car design shall incorporate mechanical ventilation or natural ventilation slots in the side walls which shall provide an effective area of at least 1% of the car floor area. Ventilation openings shall be fitted with baffles to preclude the insertion of objects.

The lift car design shall incorporate discreet hooks to allow protection of the car finishes by the installation of heavy duty drapes which shall include transparent section to facilitate use of the COP with the drapes in position. One full set of drapes shall be provided to the University for each lift car.

14.2 Car Operating Panel (COP)

A COP shall be installed in the lift car which shall include a satin stainless steel face plate and incorporate features in line with BS EN 81-70 and include the following equipment:

- The installers name.
- Lift manufacturers serial number.
- Year of installation.
- UKCA mark.
- Notified body number.
- Induction loop symbol.
- Elevator load in kg and persons.
- LCD position indicator.
- Tactile LED illuminated floor selection buttons. Note the floor indicator panel must clearly indicate the accessible entrance level to the building.
- Alarm button interfaced to emergency communication system.
- Door open button.
- Door close button.
- Attendant’s key control switch.

Where large lift cars are specified, duplicate Car Operating Panel shall be provided on the opposite side of the car in accordance with BS BS EN 81-70.

Inclusion shall be made for audible feedback of all push buttons operation per BSBS EN 81-70:2018. This shall be facilitated by the control system network with a dedicated CAN node for connection of the COP.

The installer's name and contact details shall be incorporated on a removable plate mounted on the COP.

14.3 Guide Shoes

Shall be installed to interface with the sling assembly and shall be provided with integral lubrication devices. Guide shoes shall be provided in primed anti-rust finish and shall be self-adjusting with renewable liners and adjustable stops.

The UoE preference is for roller shoes to be provided on all new lift installations.

14.4 Load Weighing Device

The lift car shall be fitted with an electronic load weighing device complete with sensors to interface with the control system to prevent an overloaded car from leaving a landing and to bypass landing calls when loaded to an adjustable percentage of rated loads.

The device/s shall be capable of having all adjustments undertaken from the car top area. A certificate of completion and compliance shall be incorporated in the O&M manual.

14.5 Car Top Controls

A car top control station shall be installed on the lift car to interface with the control system and shall be complete with integral or adjacent metal clad 13A RCBO protected socket outlet; self-contained maintained emergency and mains luminaire to BS 7255.

The unit shall comply with BS EN 81-20 Fig 22, requirements incorporating colour coded directional; run; door open and door close buttons. The car top control station shall incorporate an emergency stop button switch positioned within 1m from the landing threshold.

The stop switch shall be red mushroom headed type. The switch shall be marked "push to stop", using a durable label with self-monitored contacts PEW Type FISS6.

An additional well terminal switch shall be installed and interfaced with the car top control station such that when under inspection control the ascending lift will stop with its roof not less than 1.8m (reduced height for MRLs shall be agreed with the UoE lift consultant) from the nearest obstruction. Alternatively this can be provided

via the floor selection system if agreed with the UoE lift consultant. In addition, a notice shall be fitted bearing the legend WARNING – DO NOT MOVE UP TEST SAFETY LIMIT.

14.6 Lift Shaft & Machine Room Lighting

Shaft lighting should provide a minimum of 50 lux a metre above the car roof vertically, 1 metre above the pit floor everywhere a person can stand, work or move between work areas, and 20 lux elsewhere excluding any shadows. See also clauses 18.7 & 18.8 below.

The UoE preference is for lift shaft lighting to be provided via full height LED strip lighting with emergency battery back-up or separate standalone emergency luminaires. **This shall be incorporated within all project specifications.**

Emergency lighting on the car roof must now be sustained at 5 lux for one hour. The car roof itself should also have an anti-slip working surface.

The machine room or machinery space within the shaft should have a lighting of a minimum 200 lux.

14.7 Car Door Operator

A door operator of VVVF design shall be installed at the lift car to interface with door equipment. The operator shall facilitate individual adjustment of parameters independent of external hand held or semi-permanent programming devices, types, usage and applications. The lift door operator shall be medium duty type as a minimum.

In the event of detector or door open button failure, an internal closing force detection system shall be permanently incorporated to afford passenger protection.

The door operator shall include facility for selecting from three opening and two closing speeds and each speed shall have separate torque adjustment to enable adjustment to suit site conditions.

Skate assemblies shall be included to operate correctly the landing mechanical locks and shaft facias.

Reduced speed door nudging shall be incorporated which shall include the sounding of a warning buzzer in operation and which shall be capable of being selected and deselected by the University's maintenance engineers.

14.8 Car Doors

Power operated car doors shall be fitted to the lift car to provide a clear opening of not less than 900 mm width and 2000 mm height. Car door panels shall be finished with linen pattern stainless steel and shall incorporate full height electronic safety edges the power for which shall be from a dedicated supply from the elevator controller and not from the car top light supply.

The doors shall include car door locking with a full height car door lock release chord provided to the rear of the door to facilitate emergency manual opening of the car doors.

Visible components, i.e. pictograms, shall be integrated into the COP and shall not be mounted on a separate plate. Inclusion shall be made for all necessary power supplies, interconnections, trailing cables, anchorages, power supplies and marshalling boxes.

14.9 Speech Synthesiser

A speech synthesiser shall be installed to interface with the controller complete with all necessary connections to a discrete speaker in the lift car. The system shall incorporate a compatible hearing aid ceiling mounted induction loop system.

Inclusion shall be made for the incorporation of messages announcing arrival at each floor, together with:

- Doors opening.
- Doors closing.
- Going up.
- Going down.
- Lift overloaded, last passenger please leave the car.
- Lift returning to ground under fire alarm control, exit on arrival.
- Lift returning to ground under evacuation controls, exit on arrival.

Each message shall be initiated automatically by the controller for announcement over the car speaker in sequence with other messages or individually as appropriate to the car's programmed operation. The system shall incorporate a means to turn off messages and also to adjust the volume of messages on site without the need for special tools or new components.

14.10 Induction Loop

The lift car shall be provided with an induction loop system which conforms to BS7594 and BS EN60118-4.

The outputs of the speech synthesis unit and the emergency auto-dialler shall be fed into an amplifier via transformer isolated inputs which shall provide a corresponding electric current in the loop proportional to the source input signal. The electric current in the induction loop will produce a magnetic field which can be detected by hearing aid users with their hearing aids set on the 'T' setting.

There shall be sufficient field in the induction loop circuit to generate an adequate magnetic field at a height of not more than 1200 mm above floor level of the lift car, corresponding to the height of a wheelchair user's hearing aid.

The frequency response shall be to cover the range 80Hz to 5 kHz ± 1.5dB relative to 1 kHz at low level, measured as loop current with no metal loss correction.

The induction loop cable shall be run around the perimeter of the ceiling in a concealed location with non-metallic containment providing 300mm separation from electrical switching equipment on the car, e.g. door operator which may provide interference to the magnetic field.

The system shall include a "metal loss correction" adjustment where the loop can only be installed above the car roof to compensate for the reduction in field penetration.

The induction loop field strength shall be tested as part of the commissioning procedures of the lift and demonstrated to the engineer using a calibrated magnetic field strength meter and loop listening device.

14.11 Lift Alarm System

Operation of the push button on the COP by persons trapped in a lift car shall cause a 100 dB sounder to operate. A sounder shall be installed within the lift well at the main entrance floor at the header level. The designer shall specify the sounder so as to avoid any possible confusion with other sounders for other purposes within the building.

The system shall incorporate a mains failure battery of 3 hours duration with trickle charger.

The system shall be configured such that pressing the alarm button continuously for three seconds shall initiate the emergency communication system's auto-dialler.

14.12 Emergency Communication System

Equipment shall be manufactured by or SafeLIne with 4G VoLTE auto-diallers or equal and approved by the Building Services Group and must be connected to UoE Security Control. The auto-dial hands-free two-way communication system shall be mounted on the lift car incorporating communication to and from the lift car, the car top, the lift pit, but not the underside of the car and University Security. Inclusion shall be made for co-operating with the University's telephone service provider to ensure the compatible interface of telephone equipment and connections.

The auto-dialler and remote alarm signal path shall meet the requirements of BS BS EN 81-28 and be capable of multiple digital signal paths. The primary signal path shall be via a roaming non-steered GSM communication SIM card with a minimum 12-month contract. The secondary signal path shall be alternate GSM provider via the roaming SIM card. The GSM unit shall be fully BS BS EN 81-28 compliant and to be 4G VOLTE type. This shall include the facility for remote alarm monitoring enabled.

The final provision must be agreed with the Universities Lift Consultant and BSG.

Inclusion shall be made for remote monitoring. The complete remote alarm signalling system (i.e both auto-dialler and GSM gateway) shall incorporate battery back-up to facilitate full functionality in the event of mains failure for a period of up to two hours. The system shall incorporate a compatible hearing aid induction loop system.

14.13 Car Apron

A car apron shall be provided complying with BS EN 81-20 5.4.5.1. The apron shall be manufactured from 16 gauge sheet steel shall be fitted to the car sill across the full width of the clear landing entrance and be of at least 750mm in vertical height. The apron and any supports shall be primed and finished with two coats of matt black paint. The apron shall be retractable for lifts with shallow pit depths.

14.14 Trailing Flexes

Low Smoke Zero Halogen [LSZH) travelling cables shall only be used. Travelling cables shall contain wires which shall be grouped their specific functions and shall have a cross-sectional area of not less than 0.75 mm2 and shall be installed in flat form. A minimum of 10% spare cores shall be provided. All spare flexes shall be terminated at a designated earth point within the termination housing. Screened twisted pair cores shall be provided where necessary for all communication and CCTV connections.

14.15 Halfway Box

Where the termination of connections to the lift car requires being via a halfway box, the box shall be metal clad in design with a hinged lid for access and a termination legend shall be affixed to the underside of the lid to identify all terminations. High and low voltage shall be separated as to preclude damage by short circuit. Reduction of conductor size will not be permitted.

15.0 Lift Well and Pit Shaft Signal Device

15.0 Lift Well and Pit Shaft Signal Device

15.1 Lift Car Positioning System

A shaft position system shall be provided. A high-resolution encoder shall calculate the cabin position via suitable mounting on the overspeed governor. This device shall be connected to the control system via the CAN network.

15.2 Guide Rails and Brackets

Drawn steel T-section car and counterweight guide rails with machined running blades shall be installed. The size, profile and fixing method shall be selected to suit the total load, the selected arrangement of equipment within the well and the backgrounds available for fixing. All guide rails shall be aligned to the following tolerances:

- Distance between guides –0mm + 1mm.
- Accuracy of angular alignment +/-0.5mm.
- Accuracy of vertical alignment over any 5 metre vertical length +/-1mm.

A purpose designed oil collection device shall be fitted to collect used lubricant at the bottom of each guide rail where lubricant is used.

15.3 Counterweight

A robustly constructed channel frame type of counterweight shall be installed in filled with multiple section filler weights; either cast iron or flame cut mild steel complete with counterweight safety gears.

The counterweight shall be balanced by the suspended weight of the lift car and its attachment with 45% - 50% of the contract load placed in the lift car as determined by traction and economical running of the car.

Provision shall be made for securely clamping the filler weight in position so that under no circumstances, including operation of the car or counterweight buffers, can they become dislodged. Counterweight buffers shall not be attached to the counterweight.

Where extensions are attached to the bottom of the counterweight to allow for adjustment of the run by after normal stretching of the hoisting ropes has taken place, these shall be fabricated from rolled steel section. The whole assembly shall be site painted with safety yellow proprietary machine paint.

Guide shoes to match the guide rails shall be fitted and the counterweight shall be statically balanced such that the counterweight hangs centrally within the existing guide rails without the use of shoes. It is acknowledged that the shoe type may be determined by the project.

15.4 Counterweight Screen

On all University projects counterweight screens **must be provided** irrespective of individual manufacturers standard provision.

A counterweight screen shall be provided complying with the provisions of BS EN 81-20 5.2.5.5.1. A sign shall be placed on or near the counterweight screen stating the maximum allowed clearances between the counterweight and the counterweight buffer when the car is at its upmost landing level in order to maintain the car headroom dimensions. The counterweight screen shall be painted safety orange. A hinged access panel secured with wing nuts shall be provided to afford access to buffer units.

15.5 Limit Switches

Lift well limit switches to BS EN 81-20 5.12.2; shall be installed in the proximity of terminal floors and selected to interface with the control system and the lift well signal device. The final position of limit switches shall be determined by liaison with the control system supplier.

The fixing of limit switches may be on individual brackets or frames. At the point of contact to the guide rails and after final test all brackets shall be through bolted with a minimum of a M8 machine screw, complete with locking washer or nut. Dedicated galvanised trunking shall be routed as close as practically possible to the limit switches as to minimise the use of flexible conduit a dedicated earth connection shall be routed to each limit switch.

The maintenance test limit switch position shall allow egress from the car top with a vertical distance of 1000mm

15.6 Pit Mounted Buffers

Energy accumulation or energy dissipation type buffers as appropriate to the speed and rated load of the lift shall be selected shall be installed in the pit below the car and the counterweight to arrest either should one or other over travel into the pit. Buffers shall not be attached to the car or the counterweight. Buffers shall be mounted on robust steel plinths to achieve the required clearances of BS BS EN 81-20 5.2.5.8 and shall be securely fixed to the base of the pit. A data plate shall be affixed to all energy dissipation buffers providing the information stated in BS EN 81-20 5.8.1.8 in the English Language.

15.7 Stopping Devices

A stopping device shall be provided for stopping, and maintaining the lift out of service, including the power operated doors. The switch shall be marked "push to stop", using durable label with self-monitored contacts PEW Type FISS6. Twist out stop switch will not be accepted:

a) In the lift pit, installed directly adjacent to the pit access ladder at waist height.
b) Where the pit depth necessitates, a second pit stop switch shall be installed within easy reach of the pit floor.
c) In the pulley room, pit pendent as EN81-20.
d) On the car roof.
e) At the inspection control devices.
f) At the lift machine, unless there is a main switch or another stopping device nearby that is directly accessible within 1m.
g) At the test panel(s), unless there is a main switch or another stopping device nearby that is directly accessible within 1m.

15.8 Lift Well Lighting - LED

The UoE preference is for lift well lighting to be provided via full height LED strip lighting.

Alternatively lift well lighting shall be provided by surface mounted LED luminaires having impact resistant diffusers which shall be to IP 65. Luminaires shall be positioned such that there shall be a minimum of one luminaire per landing level to provide sufficient illumination to allow detailed inspection of the whole landing entrance unit. Luminaires shall additionally be positioned above and below the top floor level and at the pit area.

The switching arrangement of the lift well lighting shall provide two way and intermediate switching with switches installed in the plant room, in the pit adjacent to the emergency stop button and at the lift car top control station.

15.9 Emergency Lighting – LED

The UoE preference is for lift shaft lighting to be provided via full height LED strip lighting with emergency battery back up. or separate standalone emergency luminaires. **This shall be incorporated within all project specifications.**

Emergency lighting shall be provided in the pit and lift well at intervals of not less than every other floor by, self-contained, non-maintained LED luminaires with 3-hour emergency mode duration. An emergency lighting test switch shall be erected adjacent to the pit light switch which shall incorporate a key switch.

15.10 Pit Access Ladder

A pit ladder shall be provided in accordance with Appendix F of BS EN 81-20. A ladder shall be installed in the pit, within safe reach from the landing and extending from the pit floor to 1.1m above the bottom floor sill level. To enable mounting direct to the lift well wall the rungs of the ladder shall provide full application of the foot and a textured finish will be provided to offer a grip finish for each rung. For new installations pit to be suitable tanked against water ingress.

If due to insufficient running clearances a fixed ladder cannot be installed, then the ladder shall be removable. The ladder shall have permanently mounted fixings at the bottom and top of the position and shall have an electrical interlock so as to prevent any movement of the car on normal or test when the ladder is in position. The contact shall be by either a position switch or a safety switch. The lift shall come complete with a suitable landing door safety barrier.

Where folding ladders are used these shall be two piece ladders only and shall open in such a manner as the ladder cannot fold when the load is applied if the mechanical locking lugs have not correctly engaged.

15.11 Lift Pit Controls

All new lift installations must be provided with lift pit inspection controls in line with BS EN 81-20.

15.12 Lift Well Fascia's with car door locking.

Sheet steel fascia plates, primed and painted, shall be fitted between each floor from the top track and the sill of the floor above and between the sill of the lowest level served and returning at an angle to the pit wall at the lowest limit of car travel. Fascia plates shall be manufactured from 16 gauge sheet steel to full architrave width and shall flex no more than 5mm at any point with the force of 75 kg applied.

All frames and supports shall be manufactured from rolled channel. All fascia's, frames and supports shall be provided and be finished with two coats of matt black paint or bare galvanised steel.

16.0 Landings, Door and Devices

16.0 Landings, Door and Devices

16.1 Landing Door Equipment

Landing door equipment shall be installed to interface with the door operator drive and shall be supplied with a clear opening of not less than 800 mm width (preferably 900mm minimum) and 2000 mm minimum height (preferably 2100mm minimum.)

The lift door equipment shall be medium duty type as a minimum.

Exposed door and architrave finishes shall be linen pattern stainless steel. Entrances shall include the following components:

- Hanger mechanism.
- Door mechanical and electrical interlocks.
- Door panels.
- Bias weights to close the doors.
- Landing sills and door shoes and include a kicking plate in the centre of each door panel to prevent the possibility of cat-flapping.
- Emergency lock release device (unlocking triangle).
- Wrap round architraves and header.
- Emergency unlocking from lift pit area to be provided on all new door equipment.

Landing entrances shall possess UKCA certification in accordance with BS EN 81-50 and shall also have fire test certification to BS EN 81-58 for a 2-hour period.

Inclusion shall be made for the permanent marking of each floor level on the inner face of each landing door set. This may be by stencilled numerals or adhesive numbers.

16.2 Landing Call Stations

Each landing call station shall comprise of vandal resistant flush mounted stainless steel face plate, compact tactile LED illuminating call button/s, network PCB (node) and sounder. Landing call buttons shall not be heat activated touch sensitive type and shall not operate as a result of conditions resulting from the effects of fire.

Landing call stations shall include illuminating halo up and down buttons at intermediate floors and have a single directional button at each terminal floor. Inclusion shall be made for audible feedback of push button operation per BS EN 81-

70. This shall be facilitated by the control system network with dedicated CAN nodes for connection per call station.

16.3 Position Indicators

LCD position and direction of travel indicators shall be installed above or adjacent to each landing entrance. The mounting height and style of indicators shall be compliant to BS EN 81-70 and shall be complete with stainless steel back plate. The height of the floor numerals shall be at least 60mm and the height of the direction arrows 80mm.

Inclusion shall be made for the incorporation of a quiet tone audible signal which shall emit before the car arrives at the landing and an audible announcement made when the lift arrives. To assist the sight impaired, the signal shall sound once for upwards travel and twice for downwards travel.

17.0 Painting/Coating

17.0 Painting/Colours

17.1 Equipment

All equipment shall be suitably prepared, primed, undercoated and then painted with an approved colour before shipment to site. All shaft steelwork within the shaft shall be primed and then painted two coats of machine paint after erection. Any existing steelwork retained within the shaft, pit or motor room shall be wire-brushed, cleaned, treated, primed, undercoated and then painted with an approved shade of machine colour. Any damage to the painted surfaces before completion shall be made good. Any new steelwork that will not be accessible after erection shall be painted with red oxide paint (or paint of similar protective quality) before installation.

17.2 Lift Machine Room

The lift machine room shall be painted with two coats of white vinyl silk emulsion to prevent dust generation as BS 5655 Part 6.

17.3 Lift Shaft Painting

The pit area shall be cleared of all debris and dust. Cracks and other defects shall be stopped. Stopping shall be allowed to dry out and shall be rubbed down prior to painting. The pit floor and shaft walls up to a height of 1500mm shall be cleaned and painted using oil resistant paint such as Amtred Ltd, Drycote or equal and approved in full accordance with the manufacturer's instructions.

For modernisation of lifts within existing brick built lift shafts, the complete lift shaft shall be sealed and painted.

The application of paint shall not cover any conduits or trunking or degrade in any other identification of services or tripping hazards. The lift well shall be painted from top to bottom with two coats of matt white emulsion paint to seal the lift well against dust generation and to assist the well illumination. The painting of existing lift wells shall also be included within the scope of any lift replacement project.

17.4 Colours

The following colours shall be used uses to highlight specific equipment or hazards:

- Red – shall be used to highlight fire alarm equipment, stop switches.

- Orange – shall be used for guarding. This shall include machine guards, governor guards, well divider screens, counterweight screens, etc. RAL 2004 orange.
- Yellow – shall denote caution and be used for machine plinth guard rails, car top balustrades, rotating parts of machinery, etc. RAL 2016.
- Yellow/Black Stripes – shall also denote hazards and be used to highlight tripping hazards in machine rooms, tripping hazards in lift pits, head hazards in machine rooms, etc.

18.0 Evacuation & Fire Fighting Lifts

18.0 Evacuation & Fire Fighting Lifts

18.1 Evacuation Lifts – Strategy

The current guidance on evacuation lifts is outlined in BS9999:2017, section G.2 Evacuation Lifts and in addition CEN/TS 81-76:2011 - Safety Rules for the Construction and Installation of Lifts. Evacuation lifts within residential properties such as HMOs is outlined in BS9991:2024

Where a lift is part of the evacuation sequence for people requiring assistance, it should be an evacuation lift. Where an evacuation lift is used, it is expected that the evacuation will be assisted by a competent and authorised person(s). An evacuation lift, where provided, should always be available for evacuation purposes.

Wherever practicable it needs to be a lift used routinely as a passenger lift and not one used solely for evacuation or occasionally as a lift for transporting goods. It should be designed and installed in accordance with the relevant provisions in BS EN 81-20 EN 71-70 and BS EN 81-76.

An evacuation lift should be situated within a protected enclosure consisting of the lift well itself and a protected lobby at each storey served by the lift, and should be provided with a protected route from the evacuation lift lobby at the final exit level to a final exit. It should be associated with a refuge.

The project design team shall assess the need for an evacuation lift/s to be implemented into the project design based on the overall fire/evacuation strategy and risk profile of the building. Proposed evacuation lifts that **do not** meet the overall requirements of BS9999, and in particular sections 45.9, G.1, G.2 and G.2.2, will not be considered as acceptable to UoE Estates. It is essential that the design team hold combined consultations with the UoE PM/BSG/FSU/H&S to discuss the provision of evacuation lifts.

The evacuation lift/s should be clearly identified with conspicuous signage provided at all floor levels and mounted where possible directly above the lift doors. An example of this signage is provided below.



EVACUATION LIFT No.1

18.2 Evacuation Recall Switch

An evacuation recall switch shall be mounted at high level beside the landing doors on the opposite side of the entrances to the landing pushes and indicators. The recall switch shall comprise of a flush mounted stainless steel face plate incorporating a Euro triangular shaped key switch including the permanently engraved legend EVACUATION LIFT. Operation of this switch shall instigate the evacuation mode as described under the Control and Operation of Evacuation Lifts below.

18.3 Power Supplies

The primary electrical supply should be obtained from a sub-main circuit dedicated to the evacuation lift and independent of any other main or sub-main circuit. Other lifts in the same well may be fed from the same supply, provided that the capacity is adequate for the purpose and that arrangements are such that a fault occurring in any other lift in that well or their power supplies do not affect, in any way, the operation of the evacuation lift.

An alternative independent power supply should be provided from one of the following:

a) A secondary power supply, such as an automatic start stand-by generator or supply from a separate utility meeting the recommendations in BS 8519. Where a secondary supply is specified for other life safety systems then it should be of adequate capacity and used to supply the evacuation lift.

b) A separately fused circuit fed directly from the main incoming electrical supply to the building, located in a fire protected enclosure. The adoption of such an alternative supply route should be only after risk assessment taking factors into account such as the travel of the lift, the implications of a failure of the primary supply, the alternative evacuation planning, etc. Evacuation lifts using such an alternative supply route through the building should have an automatic rescue device which, in the event of a power failure, allows them to move automatically to an adjacent storey and open their doors to allow their passengers to escape.

Please note: should the project in question be deemed as requiring an evacuation standard lift, and the proposal is to utilise option B noted above, a full risk assessment based primarily on the risk to life, is to be provided. A risk assessment based on failure of the electrical supply is also required. This is not a UoE preference, this is in compliance with BS9999 and should be treated as such. Risk assessments shall be forwarded to relevant UoE PM for liaison with UoE BSG/FSU/H&S teams prior to consultation.

The cables transmitting the secondary supply or alternative circuit should be separated from those of the primary supply and routed through areas of low fire risk throughout their length, or should be physically protected so that a breakdown, or any cause of a breakdown, on one supply cannot lead to simultaneous failure of the other supply.

Any power switches or isolators should be clearly identified and labels should be provided at the main switchboard and at the incoming power supplies indicating the presence, purpose and location of the two circuits. The arrangements for cable specification, routing and installation, automatic change-over devices between primary and secondary circuits and the fire protection of any enclosures should be in accordance with BS 8519.

Battery inverters should not be used as secondary power supplies for fire safety purposes.

Any electrical substation, distribution board, generator, hydraulic pump or other apparatus should be protected from the action of fire in the building for a period not less than that specified for the enclosing structure of the evacuation lift installation and in accordance with the general principles of structural fire protection for a lift machine room or machinery space.

18.4 Control and Operation of Evacuation Lifts

On the operation of the “evacuation lift” switch, or on a signal from a fire detection system, the evacuation lift should isolate all car and landing call controls and return to the final exit storey and park with its doors open.

Once at the final exit and storey and once the “evacuation lift” switch has been operated, the car controls should be enabled; the evacuation lift should then operate only in response to the lift car control panel and the communication system provided should be in operation.

For existing evacuation lifts with a “peekaboo” facility the following operation of the lift car control panel – under staff control, will apply:

- On arrival at a designated floor the doors can only be opened by constant pressure on the “door open” button.
- Peekaboo system of the car door open push button function, during the above mode.
- Constant pressure on car call button or door close button closes the door.

Please note that more recent evacuation lifts installations, do not have a “peekaboo” facility, on the basis that the lift car will access a dedicated 60min fire protected lobby enclosure. Please reference BS standards.

Lift override keys (4) shall be provided. One key will be made readily available for use by staff and stored within a break glass box, positioned immediately adjacent to the fire alarm and emergency voice communication panels at fire service access level.

To ensure a standard and consistent application, the override mechanism and associated key should be provided to an agreed specification with the Building Services Group.

An Emergency Voice Communication System (EVC), should be provided to enable the rapid and unambiguous identification of those locations (e.g. temporary waiting spaces) where people requiring assistance with evacuation may be waiting and the relaying of this information to the person/s managing the evacuation. EVC’s will be provided in the following areas and communicate directly with an EVC systems control panel:

- Within the lift car – flush fitting.
- Within lift lobby area.
- Temporary Waiting Area within escape stair enclosures.

18.5 Evacuation Intercom

Equipment shall be manufactured by Baldwin Boxall or equal and approved an evacuation intercom system shall be integrated within the lift car. Inclusion shall be made for all liaisons with the University’s specialist intercom contractor to ensure compatibility with existing systems installed at other lifts throughout the campus.

An EVC system control panel shall be provided adjacent to the main fire alarm panel at the fire service access level and speaker boxes installed adjacent to all other landing doors and in the lift plant room above the lift or adjacent to the emergency and intervention panel of MRL lifts, all as agreed with the Fire Safety Unit.

The EVC system shall enable communication between any of the outstations and the system control panel at the fire service access level. All fascia plates shall be to a green finish and shall be located at a height within reach of a wheelchair user.

Each speaker box shall incorporate a CALL button, microphone, speaker and the EVC system control panel shall incorporate also flashing buttons for each speaker box to enable the evacuation manager to enable two-way communications with any speaker box and to terminate such calls on completion of that call. The EVC system

control panel shall include visual and audible indication of incoming calls from speaker boxes.

18.6 Fire Fighting Lifts

Due to the nature, use and construction of buildings within the UoE estate, fire fighting lifts are not generally required in the majority of building projects.

For major new building projects, fire fighting lifts shall only be included if specifically required due to the fire strategy for the building and where specifically agreed with the UoE BSG and FSU. A detailed review of the building fire strategy shall be required to agree the size, provision and location of any fire fighting lifts and lobbies within the building.

Where required, fire fighting lifts shall be provided in line with the following:

- BS EN 81 - Safety rules for the construction and installation of lifts.
- BS EN 81-72 - Specifies the additional or deviating requirements to EN 81-20:2020 for new passenger and goods passenger lifts, which can be used for firefighting and evacuation purposes under firefighters' control.
- BS9999 - Code of practice for fire safety in the design, management, and use of buildings.

BS EN 81-72 applies when the following conditions are fulfilled:

- The lift well and the lift environment are designed to restrict the ingress of fire, heat, and smoke to the lift well, machinery spaces and safe areas
- The building design limits the flow of water into the lift well
- The firefighter's lift is not used as an escape route
- The lift well and the lift environment are fire protected for at least to the same level as the building structure
- The power supply is secure and reliable
- The electrical cable(s) providing power to the lift is fire protected to the same fire protection level as given to the lift well structure
- A suitable maintenance and verification plan is implemented

19.0 Lift Acceptance Procedure

19.0 Lift Acceptance Procedure

19.1 Inspection & Handover Requirements

The incumbent lift consultant or other UoE appointed persons for either central /peripheral area lifts will carry out a lift acceptance survey on behalf of the University, in readiness for lift acceptance, the installing lift contractor will be required to provide the following:

- The contractor shall provide a programme of testing and commissioning, covering all aspects of the lift installation.
- Main Contractor shall provide to the incumbent UoE Lift Consultant handover a completed T59D document in addition to completed T59B and T59C documents.
- The main contractor must provide to the University at handover a certificate of the completion/conformity prior to lift being put into service and emergency contact details.
- The contractor shall provide an event log.
- The contractor shall provide 1No hard copy of the lift manual, the manual should contain wiring diagrams and all relevant copies of test certificates and in addition electronic copies on USB drive or file transfer.
- The contractor should supply full access diagnostic tool.
- The contractor shall provide six full sets of lift operational keys.
- The emergency door release keys must be handed over only to the Estates Operations Department at lift handover demonstration.
- The lift contractor shall supply 600V rubber insulated mats as required adjacent to all switch gear.
- The lift contractor will supply lift door landing barrier and pit access ladders where necessary.
- Project to include full warranty and first year's PPM requirements. 12 visits per annum.
- Documentation:
    i. EC Declaration of Conformity – signed and dated by the person placing the lift into service.
    ii. Test Certificate in accordance with BS 8486 Examination and Tests – Passenger and Goods Passenger Lifts Conforming to BS EN 81-20.
    iii. Manufacturer’s O&M Manual.
    iv. “As built” drawings.

20.0 Platform Lifts

20.0 Platform Lifts

20.1 General Requirements

All proposed enclosed platform lifts, wheelchair platform lifts and stair lifts shall adhere to the UoE asset number as per section 11.

Note stair lifts should be avoided and are only permissible within existing buildings.

The lifts will be designed, installed, tested and certified to:

- BS EN 81-41: Safety rules for the construction and installation of lifts — Special lifts for the transport of persons and goods :Part 41: Vertical lifting platforms intended for use by persons with impaired mobility.
- BS EN 81-40: Safety rules for the construction and installation of lifts — Special lifts for the transport of persons and goods. Part 40: Stair lifts and Inclined Lifting Platforms intended for use by persons with impaired mobility.
- BS 9102 Safe working on Platform Lifts (Code of Practise).
- BS EN81-28: Safety Rules for the Construction and Installation of lifts: Remote alarm on passenger and goods passenger lifts.
- BS:8300+A1: Code of Practice for Access for Design of Buildings and their approach to meet the needs of disabled persons.
- Machinery Directive.
- Building Regulations Part M and Scottish Technical Handbook.
- BS8300-Part2 Section 10.5.

21.0 Modernisation of Existing CE Marked Lifts

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The lift modernisation should ensure that the safety of the lift is not reduced and that the modernised lift continues to meet the essential Health and Safety requirements to which it was installed. The approach which should be taken to ensuring the conformity of a modified lift depends partly on the original conformity solution used. This should be evident from the original Declaration of Conformity provided for the new lift and could be one of:

- Design based on fully complying with the relevant harmonised standards e.g. BS EN 81-1, BS EN 81-2 or BS EN 81-20.
- Design based on a model lift subject to EC Type Examination by a Notified Body.
- This solution is typically used for serially produced lifts whose design parameters can be defined and where the design includes novel technical solutions which do not meet the harmonised standards. Examples of this are lifts without machine rooms before the inclusion of these in the harmonised standards or the use of new suspension methods such as flat belts, ropes using materials such as aramid or coated in a polymer sheath, and even steel wire ropes falling outside the harmonised standard owing to their reduced diameter or when used on reduced diameter traction sheaves.
- Design which has been based on compliance with the relevant harmonised standard except for deviations which have been assessed and approved by a Notified Body who has issued a Design Examination Certificate (DEC). This route can be taken for similar reasons as for a model lift but it is usually found where the numbers of lifts involved is small since a DEC must be obtained for each lift. The approach to be taken in each case also depends on the scope of the modernisation being undertaken and the consequential changes required

Any proposed modernisation should involve a documented assessment of the impact of the modifications in relation to the EHSR's of the Lifts Regulations and should take the form of a risk assessment following the format of BS EN ISO 14798. This should take into account the guidance in BS 5655-11 & BS 5655-12 and the design/ compliance solution of the lift. If it is found that one or more EHSR's may not be fully met then the modernisation must be adapted to ensure the EHSR's will be met.

22.0 Appendices

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22.1 Appendix No. 1: Schedule of Existing Assets

Item	Manufacturer	Description
HV Switchgear	Brush	Eclipse range, vacuum type circuit breakers
Transformers	Schneider	As described in HV section
LV Switchgear	AF Switchgear / E&I Switchgear	As described in LV section
Metering Equipment	Schneider	Schneider PM5111 Range
Distribution Boards	Various Manufacturers	Schneider Acti 9/KQ Loadcentre ranges etc.
Cabling	BASEC, LPCB and CPR approved manufacturer	As described in cabling section
Standby Generator and Fuel Storage	FG Wilson	Generator to have 1st year maintenance included in contracted works
Generator Controls	ComAP Control Suite	As described in generator section
Wiring Accessories	Various Manufacturers	All wiring accessories to be CPR accredited. Accessories to achieve required LRV's. Metal clad in all plant areas
Lighting (Internal/External)	Various manufacturers	All lighting to be LED and designed to suit environment. Maintenance/replacement of all fittings to be considered.
Emergency Lighting	Various Manufacturers	Emergency lighting system to be addressable, self-test, GSM/LAN connected and provide backup alternative automatic testing

		(ATS). Agreement with BSG required.
Lighting Control	Various manufacturers	No complex front-end systems that require interrogation for maintenance are permitted. System type may be required within sensitive areas, therefore, system shall be agreed with the BSG. Modular lighting systems permitted.
Fire Detection	Advanced/Apollo/Vesda	System to have 1st year maintenance included under contract works.
EVC System	Baldwin Boxall	System to have 1st year maintenance included under contract works
Structured Cabling	Commscope	Refer to IS Guidelines
Containment	Various manufacturers	As described in sections 5.0 and 6.0
CCTV	NVRs Geutebruck (Central Area & Kings Buildings), Milestone (Little France) Avigilon (Easterbush), Camera Manufacturer (open protocol only)	Early liaison required on all projects with UoE Security Team. System to have 1st year maintenance included under contract works
Intruder Alarm	Various	Early liaison required on all projects with UoE Security Team. System to have 1st year maintenance included under contract works
Access Control Systems	C*CURE 8/9000, iStar etc.	Refer to IS Guidelines. All access control requirements to be discussed with CIS Manager and BSG at design stage
Lifts	In compliance with UoE Lift Guidelines	All lift proposals to be sent to BSG at early stage for UoE independent lift consultant review. System to have 1st year maintenance included under contract works

All proposed project equipment and associated manufacturers, including any associated calculation documents shall be provided via technical submittal to the BSG for review prior to ordering.

Warranty information shall be provided within O&M documentation on all installed mechanical and electrical equipment, detailing duration (start/end dates), transfer of warranty from purchasing contractor to UoE (if required) and specific requirements for systems where warranty is dependent on general maintenance.