Annex 4 (SECTION TWO)

PRELIMINARIES

The Contractor shall ensure that his tender sum covers for the provision of the following lift specific preliminaries in addition to the specified works, where these are necessary for the proper execution of the Contract.

2:1:1 Safety, health and welfare of workpeople. It is a requirement of this Contract that the Contractor uses the appropriate numbers and skill level staff such that each operation is undertaken safely.

2:1:2 Holidays for workpeople.

2:1:3 Transport for workpeople.

2:1:4 First Aid facilities, to include on site First Aid trained personnel.

2:1:5 Site Welfare Facilities.

2:1:6 Keeping clean public and private roads, paths, drains and sewers where such works become necessary as a direct result of the lift contract works.

2:1:7 Demolition, excavation and the removal of all spoil to an authorised tip.

2:1:8 All gangways and passages shall be kept free of obstruction.

2:1:9 Floors shall be kept free of oil, water and any other spilled liquid, swarfs, wires, paints and tools.

2:1:10 All exits, entrances, stairways and ramps are to be kept clear.

2:1:11 No shavings or other inflammable waste shall be allowed to accumulate.

2:1:12 All working areas to be kept as tidy as possible and to be left tidy when work stops each day. All areas including the immediate places of work are to be left locked and secured during those times when the areas are unattended.

2:1:13 In the interest of safety, it will not be permissible for site staff to play radios, cassette recorders or other similar devices irrespective of whether or not these items are audible to others or are of the headphone type.

2:1:14 Toilet, washing and messing facilities.

2:1:15 All site staff are to wear regularly cleaned close fitting overalls bearing the company's full trading name and it is expected that at all times staff will be required to conduct themselves in an orderly and well-mannered fashion.

2:1:16 When special permission is granted for gas burning/welding equipment, pressurised gas bottles must be stored external to the building and removed from the premises following the completion of each item of work. Where works extend beyond the close of the working day then all pressurised gas bottles, inert or otherwise, must be removed from the premises and immediate areas.

2:1:17 Any accident or dangerous occurrence must be reported in writing to the Lift Consultant and Employer. Where the incident is serious it must be reported to the Health & Safety Executive on the appropriate form. Any action to be taken must be immediate.

2:1:18 Safeguarding the works, material and plant against damage and theft.

2:1:19 Police regulations and Local Authority licences.

2:1:20 The particular requirements of the Electricity Supply Company within the area shall be identified and complied with having particular regard to power factor and power factor correction.

2:1:21 Wherever the works present a safety hazard, purpose-made hoardings using new materials must be provided and maintained throughout. Their construction is to be in accordance with the enclosed sketch. [See Sketch Nº1] and must include secondary entrance protection in the form of a barrier rail and kick board when landing doors are removed. These hoardings must be firmly secured to avoid unauthorised removal and shall be repainted between each phase of works.

2:1:22 Hazard warning notices to be provided to all protective screens and hoardings in accordance with the drawings enclosed.

2:1:23 Protection to all floors, walls and ceilings in the vicinity of the works.

2:1:24 Protection to all architraves and entrances.

2:1:25 Fencing and security of any storage area provided by the Employer.

2:1:26 Weatherproofing where the works result in the building being temporarily exposed to the elements.

2:1:27 Prevention of the spread of dust.

2:1:28 Temporary protection of completed finishes including car interiors, doors, architraves, pushes and enclosures.

2:1:29 The Contractor shall cover up and protect the equipment and work from rough treatment, dust, grit, frost or injury from other causes.

2:1:30 Deliveries shall be made in the manufacturer's packing cases and when these are to be stored outside, then a secure waterproof covering shall also be provided.

2:1:31 All parts of plant which are liable to rust shall be covered for protection during the progress of the work. Upon completion this covering shall be removed, and all parts restored. The completed installation shall be handed over perfectly clean with all finishes unimpaired.

2:1:32 Only properly certified coded welders shall be used, where welding is necessary and when permitted.

2:1:33 Only suitably qualified lift adjusters/testers shall be employed to test and witness test the lift installation.

2:1:34 Prior to painting all welds shall be cleaned and all traces of flux residue removed.

2:1:35 Plant, tools and vehicles, barriers and lifting facilities, whether temporary or permanent.

2:1:36 Site office facilities and communications equipment.

2:1:37 Craneage and associated Road Closure licenses

2:1:38 Certified scaffolding required for the successful and safe completion of the contract. Where scaffold free installation is to be undertaken the contractor should highlight this in his method statement accompanying his tender.

2:1:39 Final cleaning in preparation for hand-over.

2:1:40 Chasing apertures forming new and making good for landing pushes, indicators and other signals.

2:1:41 Where holes must be formed in existing machine room/space slabs, these must be referred to the contractors Structural Engineers for confirmation and acceptance.

2:1:42 Where any structural modification to the lift shaft, pit, machine room/space or wheelhouse is necessary or if there is any increase in the load bearing factor on the building structure a structural engineer’s assessment and report must be provided.

2:1:43 Co-ordination and notification of the delivery of materials and receipt of equipment on site.

2:1:44 Lifting beams to be supplied and fitted (or supplied only for building-in on new construction sites) to suit all lifting requirements in the machine room/space and head of the lift shaft if appropriate.

2:1:45 All lifting beams are to be tested and marked with their safe working load using a purpose-made permanently fixed label, bearing the current certificate number.

2:1:46 Controllers are to be fully simulation tested prior to delivery to site and the Lift Consultant may elect to view these tests at the Contractor's Works.

2:1:47 All test weights, test tools, thermometers, instruments and personnel required for testing and equipment examination are to be provided. All test instruments are to be marked with the current and next due calibration dates.

2:1:48 Provide sufficient inserts in due time to be built into the lift shaft structure by others in locations determined on the general arrangement drawings. If other forms of fixings are proposed they shall be the lift contractor’s responsibility.

2:1:49 Where the method of guide or other fixing is not into inserts the Contractor will be responsible for all fixings and the forming of suitable holes or pockets and the provision of any special bolts, clips etc., together with any supporting or secondary steelwork that may be necessary.

2:1:50 All supplementary steelwork and fixings are to be provided by the Contractor.

2:1:51 All works shall be performed by fully qualified trade’s person.

2:1:52 Temporary power and task lighting together with an adequate supply of replacement lamps.

2:1:53 Where work is being undertaken to multiple Lift installations with a common set of landing pushes, allowance shall be made for providing temporary pushes in the event that the final pushes cannot be fitted without disruption to the Lifts remaining in service. Any disconnection and/or reconnection necessary shall be carried out outside normal working hours to ensure the minimum of inconvenience to the Employer.

2:1:54 Arrangements for transporting to the site the equipment and plant required for the execution of the work. All items of equipment and material shall be off-loaded, hoisted, distributed, positioned and handled on site by the Contractor. The Contractor will be required to manufacture and deliver the materials at such time as may be necessary to achieve the agreed programme.

2:1:55 Full site meetings will be held at regular intervals during the currency of the on-site works. The Contractor will be required to have representatives in regular attendance at these meetings. The representative shall be totally familiar with the particular contract and shall be authorised to make decisions on behalf of the Contractor. If it is warranted then additional site meetings may be called on the same basis.

2:1:56 The Lift Consultant may require the attendance of sub-contractor's representatives at certain of the site meetings.

2:1:57 If an adequate area within the premises is not available for the storage of removed and redundant equipment on a consolidated basis, then the Contractor must allow for piecemeal removal of equipment. Proper protection of areas allocated for storage must be provided for any material stored on site prior to its removal.

2:1:58 The Contractor is to allow in his tender for the cost of overtime working which is to avoid excessive disruption or inconvenience and to meet the agreed programme. Disruption or inconvenience is, for example: spray cellulosing in occupied premises or the disconnection / interconnection of multiple Lift installations or noisy and disruptive works.

2:1:59 The Employer will provide free of charge a 240 volt electrical power supply for use by the Contractor of small power tools, temporary lights and power. The Contractor will be responsible for providing all necessary 110V transformers, leads, plugs, &c, from this supply and ensure that these shall be kept in a safe condition.

2:1:60 Where the presence of asbestos has been highlighted, removal or treatment shall be carried out in accordance with Guidance Notes issued by the Health & Safety at Work Executive available at HMSOs. It shall be carried out by qualified specialists who shall furnish certification of proper disposal.

2:1:61 Lubricant and hydraulic fluid must be removed and disposed of by a licensed waste disposal contractor.

2:1:62 The Lift Contractor shall be responsible for the removal of the redundant lift equipment and shall ensure that such works are carried out in a careful and workmanlike manner to avoid damage or nuisance to the occupiers and/or users of the building or adjacent property.

2:1:63 Equipment shall be degreased and drained of any lubricant before removal from the machine room/space.

2:1:64 Removed or redundant equipment will not be allowed to build-up on site and must be removed regularly by the Contractor. Adequate protection must be supplied to protect any area allocated for redundant material consolidation on site, or where the transport of waste through the site may cause damage.

2:1:65 Adequate protection to existing finishes will be provided by the Contractor at all times and any damage made good at the conclusion of the contract by the Contractor, or by the appropriate specialist at the cost of the Contractor.

2:1:66 A minimum of two experienced lift engineers must be employed at all times on site.

2:1:67 Adequate allowance shall be made for off-site storage of all materials unless otherwise stated.

2:1:68 The contractor will be required to provide a Construction Phase Plan which is to include site specific Risk Assessment and Method Statements (RAMS) as required for the works being carried out as part of the contract.

**Section Three**

**Submittals**

The following shall be provided by the Contractor in the quantities and at the time indicated in the schedules unless otherwise advised by the Engineer.

**Brochures and Other Information:** To be submitted with the Tender.

|  |  |  |
| --- | --- | --- |
|  | **Type of Brochure/Information** | **Number of Copies** |
|  | Pushes and Indicators | 1 |
|  | Door Construction | 1 |
|  | Communication System | Where applicable |
|  | Group System Operation | Where applicable |
|  | Drive System Operation | 1 |
|  | Electronic Detection Equipment | 1 |
|  | Door Drive System | 1 |
|  | Full Electrical Details | 1 |
|  | Fire Certificate for Total New Landing Entrances | 1 |
|  | Hand Winding Device [gearless only] | 1 |
|  | Motor-Drive Details | 1 |

**Drawings for Review:** To be provided no later than 6-weeks after instruction to proceed has been given.

|  |  |  |
| --- | --- | --- |
|  | **Type of Drawing** | **Number of Copies** |
|  | Shaft & Pit General Arrangement | 2 |
|  | Lift Car Interior [Coloured Pictorial] | 2 |
|  | Lift Car Construction | 2 |
|  | Car Station Panel [quarter full size] | 2 |
|  | Guide Fixing Detail | 2 |
|  | Scaffolding Detail | 2 |
|  | Switch and Lighting Locations | 2 |
|  | Entrance Fixing Detail | 2 |
|  | Machine Supporting Steelwork | 2 |

**Samples:** To be submitted no later than 4-weeks after instruction to proceed has been given.

|  |  |  |
| --- | --- | --- |
|  | **Type of Sample** | **Number** |
|  | Operational Push Button | 1 |
|  | Typical Key Switch | 1 |
|  | Rigid Sample Board with permanent attached samples fully labelled | As called for |

**Drawings for Distribution:** To be submitted 2-weeks after final comment and revisions:

|  |  |  |
| --- | --- | --- |
|  | **Type of Drawing** | **Number of Copies** |
|  | Shaft & Pit General Arrangement | 2 |
|  | Lift Car Interior [Coloured Pictorial] | 2 |
|  | Lift Car Construction | 2 |
|  | Car Station Panel [quarter full size] | 2 |
|  | Guide Fixing Detail | 2 |
|  | Scaffolding Detail | 2 |
|  | Switch and Lighting Locations | 2 |
|  | Entrance Fixing Detail | 2 |
|  | Machine Supporting Steelwork | 2 |

**Owner Manual(s):** A draft copy shall be submitted to the engineer for comment and approval at least 2 weeks before the date of Practical Completion with the final document being submitted on Completion.

The Manual(s) shall be in the form of A4 sized hard-backed ring binders with a copy provided in electronic format on recordable media. The Owner Manual(s) shall contain, as a minimum, the following information:

The complete maintained on site Construction Phase Plan developed into a Health & Safety File.

Full Drawing Issue

"As Installed" Wiring Diagrams

Test Certificates in accordance with BS5655 Part 10.1.1:1995 / PAS 32-1:1999 / / BS8486-3:2017 (New Lifts)

Stainless Steel Grade Specification Certificate

Rope Test Certificates

Component Type Test Certificates

CE Certificate of Conformity (where applicable)

Electrical Installation Test Certificates (where applicable)

Structural Engineers Report (where applicable)

Landing Entrance Fire Test Certificate (where applicable)

Maintenance Instructions

Lubrication Chart

Handwinding Instructions

Operating Instructions

Component Description and Part Number List

Diagnostic Check Chart

Full description of Control System

Specialist Finish Cleaning Schedule

Manuals, "As Installed" drawings and operating instructions may also be required in electronic format. You should indicate the extra cost for current AutoCAD system compatibility.

**Sub-Contractors:**

Tenderer’s are to state the proposed sub-contractors to be used for the following work at the time of the tender in addition to the technical and constructional details of equipment requested:

1. Builders Work

2. Electrical Work

3. Lift Engineers (where sub-contracted)

4. Specialist Finishes

5. Steel Fabrication and Enclosure work

6. Access and Guarding

7. Layout Draughtsman

Please see the approved list of sub-contractors and specialists at the rear of the Specification.

Where the Contractor proposes the use of named specialists, sub-contractors or suppliers at the time of tender, these may not be varied without the written approval of the Engineer.

**Section Four**

**Specification – Ward 14 Lift**

|  |  |
| --- | --- |
|  | **STANDARDS & REGULATIONS**  The installation shall as a minimum conform to the following current Codes & Standards where applicable together with any amendments or updates issued.  The references below shall not be considered to be fully exhaustive, and any other applicable Standards & Regulations shall be included where the contractor considers them appropriate for the Scope of works.   1. Asbestos removal or protection must be carried out in accordance with Control of Asbestos Regulations 2012. 2. British Codes & Standards, including the following series: 2655, 5655; 5656; 8899 9999. 3. European Codes & Standards EN81 series. 4. [BS 7255:2012. Code of practice for safe working on lifts](http://shop.bsigroup.com/en/ProductDetail/?pid=000000000030228479). 5. BS 7671:2008 + A3:2015 Requirements for electrical installations, IET Wiring Regulations current edition. 6. BS 8300: 2018 Design of an accessible and inclusive built environment. Buildings – Code of practice. 7. [BS 8486-3:2017. Examination and test of new lifts before putting into service. Specification for means of determining compliance with BS EN 81-20. Electric / Hydraulic lifts](http://shop.bsigroup.com/en/ProductDetail/?pid=000000000030228281). 8. BS EN12015: 2014 – Electro-Magnetic compatibility. Product family standard for lifts, escalators and moving walkways. Emission. 9. BS EN12016:2013 – Electro-Magnetic compatibility. Product family standard for lifts, escalators and moving walkways. Immunity. 10. BS EN12385-5: 2002 - Steel wire ropes. Safety. Stranded ropes for lifts. 11. BS EN13015:2001 + A1:2008 – Maintenance for lifts and escalators. Rules for maintenance instructions. 12. BS EN13411-6:2004 + A1:2008 – Terminations for steel wire ropes. Safety Asymmetrical wedge sockets. 13. BS EN13411-7:2004 + A1:2008 – Terminations for steel wire ropes. Safety Symmetrical wedge sockets. 14. EN ISO 13857:2008 Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs. 15. [BS ISO 14798:2013. Lifts (elevators), escalators and moving walks. Risk assessment and reduction methodology](http://shop.bsigroup.com/en/ProductDetail/?pid=000000000030165524). 16. BS ISO 18738-1:2012. Measurement of ride quality. Lifts 17. BS EN50214:2006 – Flat polyvinyl chloride sheathed flexible cables. 18. BS EN60204-1:2006 + A1:2009 – Safety of machinery. Electrical equipment of machines. General requirements. 19. BS EN61000 series (including 3.2, 4.3, 4.4 and 6.3) – Electromagnetic compatibility (EMC). Limits. 20. [BS EN 61111:2009. Live working. Electrical insulating matting](http://shop.bsigroup.com/en/ProductDetail/?pid=000000000030175868). 21. Building Regulations (including Part M & P). 22. COSHH Regulations 2002. 23. Fire Authority requirements. 24. Fire Regulatory Reform (Fire Safety) Order 2005. 25. SAFed LG1 Guidelines on the supplementary tests of in service lifts 2009. 26. SAFed LR1 Recommendations – Safe working on lifts – Car top controls and Pit Access 2016. 27. Health and Safety at Work Act 1974. 28. Management of Health & Safety at Work Regulation 1999, plus amendment 2006. 29. Manual Handling Operations Regulations 1992 plus amendment 2002. 30. Personal Protective Equipment Regulations 2002. 31. Provision and Use of Work Equipment Regulations 1998. 32. The Electricity at Work Regulations 1989. 33. Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR). 34. Requirements of the Health & Safety Executive. 35. Scaffolding (Working at Height Regulation 2005). 36. Supply of Machinery (Safety) Regulations 2008, and amendments 2011. 37. Site Waste Management Plans Regulations 2008. 38. The Construction (Design & Management) Regulations 2015. 39. The Electric Equipment (Safety) Regulations 2016. 40. The Equality Act 2010 including (Specific Duties and Public Authorities) Regulation 2017. 41. The Lifting Operations and Lifting Equipment Regulations 1998 (LOLER). 42. The Lift Directive 2014/33/EU. 43. The Working at Height Regulations 2005, plus Amendment 2007. 44. Work Place Health Safety and Welfare Regulations 1992, including L24 (second addition). 45. Local Democracy, Economic Developments and Construction Act 2009. 46. Control of Noise at work 2005. 47. Control of Vibration at work 2005. 48. Local by-laws and any other statutory requirements. 49. [ISO 3008-2:2014 ED1. Fire-resistance tests. Lift landing door assemblies](http://shop.bsigroup.com/ProductDetail/?pid=000000000030255592).      1. [DD CEN/TS 81-76:2011](http://shop.bsigroup.com/en/ProductDetail/?pid=000000000030237903) - [Safety rules for the construction and installation of lifts. Particular applications for passengers and goods passenger lifts. Evacuation of disabled persons using lifts](http://shop.bsigroup.com/en/ProductDetail/?pid=000000000030237903). 2. [DD CEN/TS 81-83:2009. - Safety rules for the construction and installation of lifts. Existing lifts. Rules for the improvement of the resistance against vandalism](http://shop.bsigroup.com/en/ProductDetail/?pid=000000000030199322). |
|  | **SCHEDULE OF CONTRACT INTERFACES**  See attached Appendix 1. |
|  | **GEARED DRIVING MACHINE - NEW**  **Worm & Wheel**  The worm shaft and worm shall be machined from a single steel forging and the worm wheel rim shall be centrifugally cast phosphor bronze hobbed to mate perfectly with the worm. The rim shall be bolted to the flange of the sheave shaft in such a manner that the rim can be quickly replaced should this become necessary.  **Traction Sheave**  The sheave shall be separate, it shall not be integral with its shaft and it shall incorporate a bolted rim.  The sheave diameter shall not be less than 40 times the diameter of the hoisting ropes.  The traction sheave shall have a minimum hardness of Brinell 210. A certificate of test to be provided by the Contractor.  Where the design or positioning of the machine requires a smaller traction sheave to achieve the required angle of wrap, the number of suspension ropes shall be increased to achieve the required traction.  **Pedestal Bearing**  Where an outboard pedestal bearing is provided it shall be of a proprietary manufacture, and where appropriate, suitably designed for bottom drive arrangement. (Except where a slow speed shaft brake has been installed.  **Bearings**  Bearings must be sleeve or roller type and may be of the sealed-for-life type. All bearings on a common shaft shall be of the same type.  **Gear Ratio**  The ratio of sheave diameter to worm wheel pitch circle diameter shall not exceed 1.75:1.  **Lubrication**  The gear oil shall be of the grade recommended by the gear manufacturer and an external oil level gauge shall be provided.  **Bedplate and Supporting Steelwork**  Where the machine requires a separate bedplate or supporting steelwork it shall be manufactured from standard steelwork sections. The machine supports shall have machined faces. Packing other than fine shimming shall not be accepted and designs for supporting steelwork shall be by proven calculation.  **Isolation**  Suitable sound isolation to the approval of the Engineer shall be provided to prevent the transmission of noise and vibration from the machine to the building structure. The assembly is to be suitably fixed to prevent any pitching or tilting.  **Drilling of Steels**  The Lift Contractor shall supply, drill and tap the main supporting and all secondary steels as necessary.  **Drip trays**  Oil drip trays are to be provided.  **Rope Retainers**  The main machine and any associated pulleys are to have rope retainers, which shall prevent the main hoisting ropes leaving their respective grooves through rope bounce, &c.  **Brake**  The brake shall:  Be fail safe and self-adjusting.  Under any normal load and speed conditions, smoothly bring the car to a standstill.  Sustain a static load 25% in excess of contract load.  Have an approved means of mechanical release.  Incombustible brake linings are to be used and where the linings are not bonded, they shall be riveted with a minimum of 8 copper or soft rivets per shoe, each firmly clenched with the correct form of oversetting tool.  Brake springs, when used, shall be supported and in compression.  Brake linings shall not contain asbestos.  Any device for the adjustment of spring tensioning must be fitted with lock nuts.  The brake shall be mechanically applied at all times until the hoisting machine is under power.  If the brake shoes do not lift, power will be disconnected from the driving machine through an over-torque detection device and/or a brake disconnector proving switch.  The brake coil terminals shall be fully enclosed.  The bearing surface of the brake coupling shall be formed from a single forging. |
|  | **DIVERTOR PULLEYS - NEW**  New rope divertor pulley(s) shall be provided by the Contractor. These shall be formed from high quality cast iron. All retaining rings shall feature locking tabs or if bolt fixed these shall be drilled and wired to maintain adjustment.  The divertor pulley(s) shall have a minimum hardness of Brinell 210. A certificate of test to be provided by the Contractor.  Rope retainers are to be provided to the pulley wheels, which shall prevent the main hoisting ropes leaving their respective grooves, through rope bounce or the application of the safety gear.  Sealed for life roller bearings shall be used. |
|  | **TOP PULLEY WHEELS - NEW**  New Pulleys shall be installed. They shall be manufactured from high quality cast iron. All retaining rings shall feature locking tabs or if bolt fixed these shall be drilled and wired to maintain adjustment.  The rope pulleys shall have a minimum hardness of Brinell 210. A certificate of test to be provided by the Contractor.  The lift contractor shall provide all necessary new supporting steel work where required.  Rope retainers are to be provided to the top pulley wheels which shall prevent the main hoisting ropes leaving their respective grooves, through rope bounce or the application of the safety gear.  Sealed for life roller bearings shall be used. |
|  | **VARIABLE FREQUENCY MOTOR WITH REGENERATIVE DRIVE - NEW (0.63m/s and above)**  The motor shall be induction AC type incorporating forced ventilation.  The control of the motor shall be achieved, through power transistors, by finite adjustment to the frequency and voltage of an AC power supply through a Pulse Width Modulator incorporating minimum four-quadrant regeneration.  The motor drive shall include a regenerative AC Variable Frequency system incorporating Modulated Line Bridge technology to continuously supply energy back to the power network.  Current EMC standards and regulations shall be complied with.    The motor and its control shall be compatible to the power supply to the machine room/space and is to incorporate a sound filter to dampen the Pulse Width Modulator enabling the Lift to run at all loads/speed without appreciable noise or hum.  The motor drive shall be by means of a **Closed Loop** System incorporating Field Orientation Flux Vector Control that must be fully adjustable to give optimum performance throughout the intended travel of the Lift. Suitable rotational shaft position and speed information is to be provided by a high-resolution encoder mounted on the non-drive end of the motor shaft.  All speed referencing devices shall be directly driven and must not incorporate drive belts or spur gears.  The regulator will respond to feedback signals derived from the motor speed, motor voltage, distance to travel and load within the Lift car.  Lift position information is to be provided by a digital reference device located either on the Over-speed Governor or Driving Machine.  The system is to have an accurate method of controlling acceleration and the rate of change in acceleration. The acceleration should initially be set at 0.8 mps2. It shall be adjustable to between 0.8 mps2 and 1.2 mps2.  The motor control shall incorporate direct floor approach and stopping, with the machine brake being applied only after the car is stationary.  The system shall maintain its speed between -2% and +2% of its designed operating speed.  Protection to the motor windings shall be in the form of thermistors with additional protection provided by the inverter should any of the following occur:   1. Over-current in the drive circuit. 2. Over-voltage of the intermediate circuit. 3. Under-voltage of the intermediate circuit. 4. Network voltage asymmetry not correct. 5. Temperature rise of the semi-conductor cooling plates. 6. Regulator electronic voltages incorrect. 7. Operation of the electronic braking network incorrect. 8. The speed of regulator becomes saturated.   The motor shall bear the actual manufacturers name and data plate. All motor terminals shall be readily accessible and of screw fixed or bolted design located within a terminal box.  Lifting eyes are to be provided to the motor casing.  The motor shall be rated for a Lift duty of 240 starts per hour.  Motor bearings shall be of the roller type.  In the event the driving machine requires site assembly it must be carried out by the manufacturer or approved agent.  The levelling accuracy shall have a tolerance of +/- 3mm.  The encoder or other means of speed reference shall be so sited that easy access is provided, and the items are not subject to accidental damage.  In the event of loss of feedback from the speed reference device, under normal conditions and on car top control, the lift will immediately shut down and the brake will be applied. The Lift will no longer attempt to respond to calls until the speed reference device has been satisfactorily reinstated.  Where the hand winding wheel is separate from the driving machine, tacho-generators or other feedback encoders should not be mounted at the motor end of the high-speed shaft. |
|  | **INSTALLATION WIRING**  The contractor shall provide all new wiring from the fused mains disconnector for the lift installation unless otherwise specified.  Under no circumstances will it be permitted to run conduits or trunking above floor level in the motor room/space where this will constitute a tripping hazard.  When floor trunking is used it will lie flush with the floor level and incorporate chequer plate covers, which shall be removable for their entire length.  All cables shall be enclosed throughout their length in heavy gauge galvanised steel conduit or trunking. Any conduit finishes where disturbed shall be re-coated with galvafroid or similar.  No machine or control panel isolation shall be bridged by conduit or trunking systems.  Trailing cables are to be suspended without the use of junction boxes. They shall be suspended from a cable hanger incorporating clamps that will secure the cable without damage or undue pressure on the conductors or insulation.  The cable anchorage shall be installed at the top and approximately halfway position of travel. Beyond the halfway point additional intermediate clamps are to be fitted every 3 metres which shall be carried from the shaft wall or guides. Clamps must be in accordance with the manufacturer instructions.  Each trailing cable shall contain a minimum of 20% spare ways, together with 2 twisted screened pairs.  Trailing cables will be terminated direct to the controller, at one end and either within the car station panel or in a junction box on the car top at the other.  Under no circumstances will junction boxes in alternative locations be permitted.  Flexible metallic conduit shall be used only as approved by the Engineer in cases where it is necessary to provide for adjustment or to reduce the transmission of noise and vibration. Flexible conduit length to be a maximum of 450 mm. Where such approval is given the flexible conduit shall terminate in suitable couplings and shall positively grip the flexible conduit, and an additional earth continuity conductor shall be run outside the conduit between lengths.  The conduit shall be screwed between lengths and into all boxes and fittings and where bends or sets are required they shall be made from the conduit.  Hexagonal male brass bushes shall be used to terminate new conduit in boxes where an adequate screwed spout outlet is not provided.  All cables and wiring shall be of the same manufacturer and only one make of cable shall be used on the entire installation. All new cables shall be multi-strand and the minimum area of any one conductor shall not be less than 1mm sq (except travelling cables).  All wiring and travelling cables shall be 600/1000 grade having low smoke and fume insulation (LSF).  It must not be possible for any travelling cable to foul any fittings or equipment in the lift shaft and a suitable screen shall be fitted up to the halfway point in the shaft constructed from a non-combustible material. The cable screen must be of maximum width for the area of the shaft occupied by the cable and if of weld mesh, must be of continuous length, having a grid size no greater than 13mm. Any form of flexible screen must be fitted with an adjustable tensioning device capable of having adjustment of at least 100mm.  All cables and travelling cables shall be subjected at the maker's Works to the appropriate voltage tests, tests for thickness of insulation, insulation resistance, fire resistance and flexibility.  Screened ways are to be incorporated for intercom and car telephones terminated separately in the machine room/space and Lift car as approved by the Engineer.  The terminations to car lighting and fan supplies are to be shrouded and labelled.  All fixed items and components are to be fully earth bonded using 6mm insulated cable, the earthing to include such items as pit ladders, guards, lifting beams, &c.  To ensure EMC compliance the lift contractor shall provide all necessary earthing in accordance with the control panel, drive and motor manufacturer requirements. This may require change to the existing earthing arrangements within the building and the lift contractor shall be satisfied that the existing mains supply earthing is adequate.  The use of armoured cable is to be discussed and approved with the Engineer.  All trunking fittings shall be of a standard proprietary manufacture except where special fittings are necessary.  A cable strainer is to be provided in every 3 metre length of trunking.  Existing trunking and conduit may be reused where the existing run is not subject to extensive modification and where it is rigidly fixed, not corroded and in good condition and where the earth continuity satisfies current earthing requirements. |
|  | **STOP / RUN SWITCHES**  Stop/run lock down switches shall be supplied and installed in accordance with the following. When placed in the stop position, they will cause the lift to stop and prevent it being started until returned to the run position. It must not be possible for the switch to be accidentally returned to the run position.  The switch knob is to be of a push/pull type and coloured red, it shall be a minimum of 50 mm in diameter and must clearly indicate when the switch is in the OFF position.   1. In the lift pit and within 1 metre of the entrance installed 1.3 metres above the lowest floor level served. 2. At low level within the lift pit where the normal stop/run switch is inaccessible from the pit floor. 3. Adjacent to the traction sheave side of the main hoisting machine. 4. Within the top pulley wheel area. 5. In the secondary level of the machine room/space. 6. On the car top within 1 metre of any landing entrance. |
|  | **SUSPENSION ROPES**  New suspension ropes are to be provided.  No design shall carry less than four 11mm diameter ropes.  The safety factor of the suspension ropes shall be at least 12.  Where design deviates from the Code Standard proof of Notified Body approval shall be provided by the Lift Contractor upon request.  The ropes shall be delivered to site suitably wrapped and protected and all shall be cut from a common length.  The Lift Contractor shall provide appropriate test certification applicable to the method of suspension.  An automatic device shall be provided for equalizing the tension of suspension ropes.  Where other means of suspension are employed e.g. synthetic ropes or steel cored belts etc. the Lift Contractor shall provide a permanent means of checking/testing their integrity. |

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|  | **ROPE TERMINATIONS**  The rope terminations shall be:  a) Ferrule secured eyes shall be terminated in accordance with the manufacturers requirements (EN 13411-3).  b) Self-tightening wedge sockets shall be terminated in accordance with the manufacturers requirements (EN 13411-6 or 7).  c) Swage terminals shall be terminated in accordance with the manufacturers requirements (EN 13411-8).  Car and counterweight hitches shall be of a multi-point design.  Rope terminations shall be provided with a means of ensuring the uniform tensioning of each rope fall.  Two removable extension stools (where over-travels permit), 150mm maximum in length, are to be mounted on the underside of the counterweight to allow for initial rope stretch.  Adjustment of the locknuts on rope terminations shall allow for raising the counterweight by 150mm relative to its suspension ropes.  Following completion of the installation and having given time for rope stretch, the Contractor shall return to site to shorten the ropes to maintain the necessary over travels. Any necessary overtime premium shall be included within the tender sum. (This shall also relate to governor and compensating ropes where fitted).  Wire lanyards are to be run through the car and counterweight terminations to prevent twisting. This is to be done as soon as the ropes have been fitted and properly tensioned.  Rope tails shall be between 150mm and 300mm long with the ends whipped and tied back. |
|  | **COMPENSATION - NEW**  Where compensation is provided it shall be by means of wire ropes, plastic encapsulated chains, or weighted belts.  All compensation systems shall be designed to run silently.  The compensation anchorage to the car shall be so designed that in the event of the compensation fouling shaft equipment, it shall break free.  Where compensating pulleys are provided they shall be incorporated within a tied-down frame located in the lift pit. The compensating pulley shall be able to move freely on tee section guides. A compensating pulley switch shall be activated to disconnect supply to the motor in the event of:    [i] The compensating sheave rising to a position 75mm before the assembly may leave the guide housings.  [ii] Where rope stretch occasions the compensating pulley to come within 75mm of the lift pit floor.  The compensating pulley switch shall not automatically reset but shall require manual resetting. |
|  | **ASCENDING OVERSPEED PROTECTION**  The lift shall be provided with a means of protection against over-speeding in the up direction (Ascending overspeed protection).  The means shall comprise of speed monitoring and speed reducing elements, these shall detect an overspeed of the lift car in the up direction and shall cause the lift to stop, or at least reduce its speed to that for which the counterweight buffer is designed. The means shall be active during normal or manual rescue operations.  The following systems will be accepted to fulfil the above criteria on the understanding that the lift contractor shall demonstrate compliance of the system installed within the operating and maintenance manuals.   * Bi-directional safety gear. * Dual brake systems. * Sheave brake system. * Rope brake system (Excluding compressed air systems). * Dynamic braking of the motor (gearless). |
|  | **SAFETY GEAR (CAR) - NEW**  A new safety gear is to be provided which shall be designed to protect against uncontrolled movement of the lift car and any overspeed, in both directions and under all conditions, unless other means of ascending overspeed protection has been provided e.g. Dual brake systems or Dynamic braking (gearless machines). The lift contractor shall demonstrate compliance of the system installed within the operating and maintenance manuals.  The safety gear shall be mounted on the lift car frame and where appropriate the counterweight.  Where suitable the car safety gear may be of a bi-directional design.  At speeds up to 0.63 m/s they may be instantaneous types.  At speeds of 0.63 m/s and above a progressive type shall be provided.  Each safety gear shall be provided with a positively operating switch that does not rely on spring tension, such that in the event of the safety gear being engaged, supply to the motor and brake will be disconnected and require manual resetting.  The safety gear mechanism, when engaged, shall be released, without the need to remove any load from the lift car, either through the raising of the car or counterweight as required. |
|  | **SAFETY GEAR (COUNTERWEIGHT) - NEW**  A new safety gear is to be provided.  The safety gear shall be mounted on the counterweight frame.  At speeds up to 0.63 m/s the safety gear may be instantaneous types.  At speeds of 0.63 m/s and above a progressive type shall be provided.  The safety gear mechanism, when engaged, shall be released, without the need to add any load to the lift car, through the raising of the counterweight. |
|  | **UNCONTROLLED MOVEMENT OF LIFT WITH OPEN CAR DOORS**  The lift shall be provided with a means of protection against unintended movement of the car away from floor level in the up and down direction with the landing door/s not in a locked position and the car door/s not in the closed position.  The means shall:   1. Detect unintended movement of the car, causing the car to stop and keep it stopped. 2. Capable of performing as required without assistance from any lift component that, during normal operation, controls the speed or retardation, stops or keeps it stopped, unless there is built-in redundancy and correct operation is self-monitored. 3. Activate at the latest when the car leaves the unlocking zone. 4. Act on the car or counterweight or rope system 5. Stop the car at a distance of not more than 1.2m away from the landing. 6. The vertical distance between the landing sill and the lowest part of the car apron shall not exceed 200mm. 7. The free distance from the car sill to the landing door lintel or from the landing sill to the car door lintel shall not be less than 1m. 8. Stop the car with a maximum retardation of 1g. 9. Require the intervention of a competent person for release. 10. Operate an electrical safety device. |

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|  | **OVERSPEED GOVERNOR (CAR) - NEW**  The safety gear is to be operated by an overspeed governor which shall come complete with operating rope and tension weight frame.  The operating rope shall be a minimum of 8.0mm diameter and the sheave diameter is to be a minimum of 30 times the rope diameter.  The over-speed governor shall be of a design compatible with the safety gear.  An electrical contact shall be fitted to the governor tension weight, which shall operate to interrupt the safety circuit before the loss of rope tension. The contact shall be lock-off type.  The governor is to be totally enclosed mounted on a steel baseplate so designed to spread the fixing points away from the governor rope holes.  The idler pulley shall be provided with a solid debris guard.  A test groove shall be provided to demonstrate governor and safety gear operation at contract speed.  The governor shall be provided with an electrical contact, which will operate before the governor reaches the mechanical tripping speed.  Where the overspeed governor is in an inaccessible location it shall be capable of being remotely tripped and reset from a key switch mounted on the control panel. |
|  | **OVERSPEED GOVERNOR (COUNTERWEIGHT) - NEW**  The counterweight safety gear is to be operated by an overspeed governor which shall come complete with operating rope and tension weight frame.  The operating rope shall be a minimum of 8.0mm diameter and the sheave diameter is to be a minimum of 30 times the rope diameter.  The over-speed governor shall be of a design compatible with the safety gear.  An electrical contact shall be fitted to the governor tension weight, which shall operate to interrupt the safety circuit before the loss of rope tension. The contact shall be lock-off type.  The governor is to be totally enclosed mounted on a steel base plate so designed to spread the fixing points away from the governor rope holes.  The idler pulley shall be provided with a solid debris guard.  A test groove shall be provided to demonstrate governor and safety gear operation at contract speed.    The governor shall be provided with an electrical contact, which will operate before the governor reaches the mechanical tripping speed.  Where the overspeed governor is in an inaccessible location it shall be capable of being remotely tripped and reset from a key switch mounted on the control panel. |
|  | **CONTROL SYSTEM GENERAL REQUIREMENTS**  **Control Cabinet**  A new control panel shall be provided being of the enclosed steel cabinet type with louvered ventilation, finished internally and externally in powder coating or plastic skin plate. The identity of all the contactors, relays, solenoids, and other equipment in the controller shall be clearly indicated by means of permanent, heat resistant non-fade, plastic labels. A nomenclature to abbreviations and symbols used will be affixed to the inside of the control panel or control panel door.  Access shall be from the front only unless complexity of equipment necessitates rear entry also. The doors shall be full height and width of the panel and shall be of double hinged mechanically latched type.  The enclosure shall provide protection to IP23 Standard.  All cable entry shall be from below.  The new controller must be designed and constructed to pass through the building without any alteration to the building fabric. Notwithstanding this requirement, the controller shall be of a suitable design to be comfortably accommodated within the machine room/space.  Two external lifting eyes are to be fitted to the top of the controller cabinet to allow lifting without distortion.  All resistors are to be mounted externally to the main control equipment in a housing mounted to suit the site conditions and with suitable ventilation.  Doors shall not be of the lift-off type and shall be separately earthed.  A notice shall be permanently attached to the inside of the control panel door detailing the final torque settings of the drive motor programmed into the inverter.  Where location dictates, control panel(s) shall be sound isolated.  **Control Components**  The system shall be microprocessor controlled.  Electrical safety devices shall be implemented in an intrinsically fail-safe manner via electromechanical devices.    Protection by means of residual current protective device (RCD) not exceeding 30 mA shall be provided for all circuits over 50 V AC on the lift car, landing controls & indicators, and safety circuits.  Solid state controllers shall always revert to a safe condition under all failure modes.  The microprocessor section of the control panel shall be separately mounted, such that the inadvertent connections of high voltages or physical damage from falling objects are prevented.  All input/output lines must be capable of withstanding short circuits and the application of 500v for short duration i.e. megger tests, without permanent damage.  An electronic permanent display, non-resettable, digital trip counter shall be provided to record the number of journeys for the lift.  Each control panel is to be provided with a visual display showing the operating status of the Lift and incorporating LED indicators which show each of the following sequences:   * Power on * Power to each processor board * Lift in service * Lift direction * Calls registered for car and landing * Door open/door close * Door Detector operation * Lift overload * Lift on car preference * Lift on door hold   **Over-ride Controls**  The control cabinet shall be provided with an external changeover switch to convert from NORMAL to INSPECTION operation, together with UP and DOWN buttons, and an OVER-RIDE button.  When switched to INSPECTION all safety circuits will be in use. On operating the continual pressure OVER-RIDE button, the safety gear switch on the car, slack rope and chains switches, buffer switches, over travel limits, and governor switch shall be over-ridden. This OVER-RIDE button is to assist in the release of the safety gear or to move the Lift from the over travel limits.  This INSPECTION/NORMAL switch will NOT OVER-RIDE the mechanics control stations or any other part of the safety circuit.  **Landing & Car Door By-Pass**  A bypass device shall be provided to facilitate maintenance of the car and landing door electrical contacts. The device shall be protected against unintended use by mechanical movable means. The device shall be clearly identified for purpose and only function where the required criteria within EN81 has been satisfied.    **Maintenance/Normal Service Switch**  For each individual Lift a MAINTENANCE/NORMAL SERVICE switch is to be provided on the control cabinet which will prevent the Lift answering its landing calls.  **Door Isolation Switch**  A door isolation switch is to be provided on the control cabinet which will prevent operation of the car doors.  **Terminal Floor Calls**  Provision to facilitate the input of at least terminal calls shall be provided for maintenance purposes.  **Remote Overspeed Governor Operation**  Where a remote overspeed governor is installed which cannot be easily accessed from outside the lift shaft, a key switch shall be provided on the control cabinet to operate and reset the governor.  Where the Contractor's standard custom-built control system is proposed all items detailed in the specification are features and components that will be required as a minimum.  **Interrogation/Service Tool**  Where the preferred method for interrogating the lift control system when fault finding or altering specific lift operating parameters is by the use of a portable or hand held device, then any such device shall be permanently located within the controller cabinet and shall become the employer’s property. It shall be site specific and any unique identification number shall be recorded on the device.  Where the method of interrogation is through ‘on board’ diagnostic systems, any security devices/codes required to gain access to the system in order to retrieve information from the control panel shall be provided with full explanation on their use.  Such interrogation equipment shall not allow unauthorised personnel to alter parameters on the control system which may affect lift safety. Different levels of secure access facility on interrogation equipment is therefore permissible.  The Contractor's control system must be of proven design. No prototype equipment or components will be accepted. Any system with a RESTRICTED design protocol will not be acceptable.  Special cooling and/or filtration equipment is to be incorporated to reduce the spread of dust through the controller and to maintain satisfactory ambient temperatures and prevent local hot-spots.  The following items are required:   * Phase failure/phase reversal protection. * Double journey timers. * Automatic homing [switched]. * Door nudging with audible signal. * All control equipment to be protected by miniature circuit breakers not fuses. * Door open/door close timers fully adjustable for dwell and operating speeds. * Anti-interference features for all car controls. * Earth terminals and full earth bonding. * Supplies to printed circuit boards shall be protected by miniature circuit breakers. * Microprocessor based car position reference system. * Thermal overloads for main motor protection or alternatively protection within the controller software. * Car and landing door lock short-circuit protection. * A device shall be fitted that determines the lift machine and machine room/space temperature. An over temperature will cause the lift to shut down at the next floor in a controlled manner. * Lift alarm push button to be permanently illuminated even in the event of a power failure. * The door open push button shall illuminate during the door close cycle. * Suitable outputs shall be provided to initiate speech generation. The processor shall provide advanced signals to highlight such items as “Doors Closing” etc.   **Car Lighting**  The car lighting shall switch off automatically when there has been no activity of the lift car for more than a 5 minute period (adjustable). If any push button is pressed, either within the car or on a landing, the car lights shall switch on. If a fault condition arises or when the car is on Car Preference Control the car lights shall remain switched on at all times. This facility shall be provided in conjunction with a permanently illuminated Alarm Push Button.  Emergency lighting shall be provided, in the event of a power failure the emergency car lighting will continue to operate normally under emergency supply for 3 hours at a minimum of 5 lux from the same source as the alarm and fan, but separately fused.  **Speed Reference Device Failure**  In the event of loss of feedback from the speed reference device, under normal conditions and on car top control, the lift will immediately shut down and the brake will be applied. The Lift will no longer attempt to respond to calls until the speed reference device has been satisfactorily reinstated.  **Equipment Reliability**  The control circuit where fed from an alternating current source shall be greater than 110V and not greater than 240V.  On relay components the "VOLTAGE RELIABILITY" shall be at least 80%, i.e. the control circuits must operate at 25% below design voltage.  The "COMPONENT RELIABILITY" shall not be less than three million, i.e. the expected number of operations between two failures.  All timers shall be of solid state design.  All car and landing call acceptance indicators will illuminate until the call is answered.  The lift should not interfere with the reception of radio and television programmes or the supply of computer-related equipment. The lift equipment shall be fitted with the necessary interference suppression and filtration components during manufacture.  Car position reference systems shall be actuated by one of the following:  Digital Encoders; Transducers  Any other proposed system shall be with the approval of the engineer.  **Car Preference**  Car preference operation will be provided. With the key in the ON position the Lift will be removed from NORMAL operation and will respond only to car calls and will ignore all other automatic operations. The key will be captivated when in the "ON" position.  When under car preference the Lift will park with both car and landing doors open.  The Lift will respond to continuous pressure on the selected car floor push only and only the first call will be answered. For any subsequent call it will be necessary to press the car button to achieve further door closing.  **Wiring Diagrams**  Contract specific, including authorised and recorded post-test revisions, plastic encapsulated wiring diagrams are to be provided within the machine room/space in addition to those supplied with the O & M Manuals. |
|  | **CONTROL SYSTEM GENERAL REQUIREMENTS (ENERGY SAVING)**  **Control Cabinet**  A new control panel shall be provided being of the enclosed steel cabinet type with louvered ventilation, finished internally and externally in powder coating or plastic skin plate. The identity of all the contactors, relays, solenoids, and other equipment in the controller shall be clearly indicated by means of permanent, heat resistant non-fade, plastic labels. A nomenclature to abbreviations and symbols used will be affixed to the inside of the control panel or control panel door.  Access shall be from the front only unless complexity of equipment necessitates rear entry also. The doors shall be full height and width of the panel and shall be of double hinged mechanically latched type.  The enclosure shall provide protection to IP23 Standard.  All cable entry shall be from below.  The new controller must be designed and constructed to pass through the building without any alteration to the building fabric. Notwithstanding this requirement, the controller shall be of a suitable design to be comfortably accommodated within the motor room.  Two external lifting eyes are to be fitted to the top of the controller cabinet to allow lifting without distortion.    All resistors are to be mounted externally to the main control equipment in a housing mounted to suit the site conditions and with suitable ventilation.  Doors shall not be of the lift-off type and shall be separately earthed.  A notice shall be permanently attached to the inside of the control panel door detailing the final torque settings of the drive motor programmed into the inverter.  Where location dictates, control panel(s) shall be sound isolated.  **Control Components**  The system shall be microprocessor controlled.  Electrical safety devices shall be implemented in an intrinsically fail safe manner via electromechanical devices.  Means of residual current protective device (RCD) not exceeding 30 mA shall be provided for all circuits over 50 V AC on the lift car, landing controls & indicators, and safety circuits.  Solid state controllers shall always revert to a safe condition under all failure modes.  The microprocessor section of the control panel shall be separately mounted, such that the inadvertent connections of high voltages or physical damage from falling objects are prevented.  All input/output lines must be capable of withstanding short circuits and the application of 500v for short duration i.e. megger tests, without permanent damage.  An electronic permanent display, non-resettable, digital trip counter shall be provided to record the number of journeys for the lift.  Each control panel is to be provided with a visual display showing the operating status of the Lift and incorporating LED indicators which show each of the following sequences:   * Power on. * Power to each processor board. * Lift in service. * Lift direction. * Calls registered for car and landing. * Door open/door close. * Door Detector operation. * Lift overload. * Lift on car preference. * Lift on door hold.   **Eco-Mode**  The control system shall incorporate an Eco-Mode which shall be programmable by time of day.    The Eco-Mode system shall provide various stages of shut down of non-essential supplies/control circuitry. Typically, this will require the car light/fan/indicators/speech controls and other peripherals being turned off after pre-determined periods of inactivity.  Normal resumption of these supplies are to be made upon the activation of a car/landing call, special service or inspection control.  If any push button is pressed, either within the car or on a landing, or a fault condition arises the car lights shall switch on. When the car is on Car Preference Control the car lights shall remain switched on at all times. This facility shall be provided in conjunction with a permanently illuminated Alarm Push Button.  When in Eco-Mode the system shall evaluate the demand and where this is deemed to be ‘light’ then the control of the acceleration, jerk and speed of the lift will be reduced for single call journeys.  **Over-ride Controls**  The control cabinet shall be provided with an external changeover switch to convert from NORMAL to INSPECTION operation, together with UP and DOWN buttons, and an OVER-RIDE button.  When switched to INSPECTION all safety circuits will be in use. On operating the continual pressure OVER-RIDE button, the safety gear switch on the car, slack rope and chains switches, buffer switches, over travel limits, and governor switch shall be over-ridden. This OVER-RIDE button is to assist in the release of the safety gear or to move the Lift from the over travel limits.  This INSPECTION/NORMAL switch will NOT OVER-RIDE the mechanics control stations or any other part of the safety circuit.  **Landing & Car Door By-Pass**  A bypass device shall be provided to facilitate maintenance of the car and landing door electrical contacts. The device shall be protected against unintended use by mechanical movable means. 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This facility shall be provided in conjunction with a permanently illuminated Alarm Push Button.  Emergency lighting shall be provided, in the event of a power failure the emergency car lighting will continue to operate normally under emergency supply for 3 hours at a minimum of 5 lux from the same source as the alarm and fan, but separately fused.  **Remote Overspeed Governor Operation**  Where a remote overspeed governor is installed which cannot be easily accessed from outside the lift shaft, a key switch shall be provided on the control cabinet to operate and reset the governor.  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Such interrogation equipment shall not allow unauthorised personnel to alter parameters on the control system which may affect lift safety. Different levels of secure access facility on interrogation equipment is therefore permissible.  The Contractor's control system must be of proven design. No prototype equipment or components will be accepted. Any system with a RESTRICTED design protocol will not be acceptable.  Special cooling and/or filtration equipment is to be incorporated to reduce the spread of dust through the controller and to maintain satisfactory ambient temperatures and prevent local hot-spots.  The following items are required:   * Phase failure/phase reversal protection. * Double journey timers. * Automatic homing [switched]. * Door nudging with audible signal. * All control equipment to be protected by miniature circuit breakers not fuses. * Door open/door close timers fully adjustable for dwell and operating speeds. * Anti-interference features for all car controls. * Earth terminals and full earth bonding. * Supplies to printed circuit boards shall be protected by miniature circuit breakers. * Microprocessor based car position reference system. * Thermal overloads for main motor protection or alternatively protection within the controller software. * Car and landing door lock short-circuit protection. * A device shall be fitted that determines the lift machine and machine room/space temperature. An over temperature will cause the lift to shut down at the next floor in a controlled manner. * Lift alarm push button to be permanently illuminated even in the event of a power failure. * The door open push button shall illuminate during the door close cycle. * Suitable outputs shall be provided to initiate speech generation. The processor shall provide advanced signals to highlight such items as “Doors Closing” etc.   **Speed Reference Device Failure**  In the event of loss of feedback from the speed reference device, under normal conditions and on car top control, the lift will immediately shut down and the brake will be applied. The Lift will no longer attempt to respond to calls until the speed reference device has been satisfactorily reinstated.  **Equipment Reliability**  The control circuit where fed from an alternating current source shall be greater than 110V and not greater than 240V.  On relay components the "VOLTAGE RELIABILITY" shall be at least 80%, i.e. the control circuits must operate at 25% below design voltage.  The "COMPONENT RELIABILITY" shall not be less than three million, i.e. the expected number of operations between two failures.  All timers shall be of solid-state design.  All car and landing call acceptance indicators will illuminate until the call is answered.  The lift should not interfere with the reception of radio and television programmes or the supply of computer-related equipment. The lift equipment shall be fitted with the necessary interference suppression and filtration components during manufacture.  Car position reference systems shall be actuated by one of the following:  Digital Encoders; Transducers  Any other proposed system shall be with the approval of the engineer.  **Car Preference**  Car preference operation will be provided. With the key in the ON position the Lift will be removed from NORMAL operation and will respond only to car calls and will ignore all other automatic operations. The key will be captivated when in the "ON" position.  When under car preference the Lift will park with both car and landing doors open.  The Lift will respond to continuous pressure on the selected car floor push only and only the first call will be answered. For any subsequent call it will be necessary to press the car button to achieve further door closing.  **Wiring Diagrams**  Contract specific, including authorised and recorded post-test revisions, plastic encapsulated wiring diagrams are to be provided within the machine room/space in addition to those supplied with the O & M Manuals. |
|  | **HANDWINDING SYSTEM**  An electronic handwinding system shall be provided which shall incorporate both audible and LED illumination. The equipment shall be wall-mounted adjacent to its corresponding hoisting machine and shall be easily viewed from the normal handwinding position. Where the control panel is situated close to the hoisting machine, the handwinding system may form part of the control panel if the landing floor level indicators can be easily seen from the normal handwinding position.  A control switch mounted on the handwinding unit shall initiate the operation of the handwinding system. When switched "ON" and under handwinding operation, it will indicate both visually and audibly as the Lift becomes level with a landing floor level. The unit shall display the position of the lift car relative to its position within the lift shaft.  Supply to the handwinding system shall be from an independent low-voltage source incorporating an emergency supply which automatically becomes available in the event of mains power failure.  Irrespective of the position of the mains supply switch, the operation of the ON/OFF switch on the handwinding buzzer system shall render all other controller components inoperative and an illuminating indicator shall be sited adjacent to the handwinding switch to notify that the system is switched on. |
|  | **FULLY COLLECTIVE CONTROL**  Following registration of a landing call, the Lift will respond to that call only when it is travelling in the direction of the call.  It will store this call in memory if travelling in the opposite direction and answer it sequentially when travelling in the direction of the call.  If the Lift responds to a floor where both UP and DOWN calls are registered it will respond only to the call in the direction in which it is committed to travel.  If no car call is then placed and there are no further hall calls in that committed direction, the doors will re-open and its committed direction will reverse and it will respond to the other call.    Car calls will be answered sequentially as their destinations are reached irrespective of the order in which they were registered. As each car call is answered it will be cancelled.  Each controller is to incorporate automatic logging which will have an indicator display board to show a record of events covering the following Lift functions:  Primary safety circuit failure.  Primary loop failure.  Car door switch fault.  Landing door lock fault.  Failure of doors to open.  Lift overloaded condition.  Landing and car calls cancelled.  Shutdown due to successive failed attempts to start.  Limited force door closing having been operated.  Memory failure.  Programme error.  Stuck landing/car call button.  Service to engineers visit.  Two spare signal/record facilities. |
|  | **DUPLEX COLLECTIVE CONTROL**  The Duplex Control system is to fulfil the following minimum functions:  1. The system is to operate in response to landing calls where information with regard to direction of travel, load and registered calls are all to be continually monitored to determine which Lift will answer the landing call in the shortest possible time.   1. When any Lift is delayed from operation for a pre-determined time interval, it is to be removed from the Duplex operation. The remaining Lift will then continue to operate as a Simplex installation until the cause of the delay is rectified, at which time the Lifts will return to full Duplex operation.   3. The first available free Lift will automatically return to the main floor and the remaining Lift will park at a level to equally sub-divide the remaining upper floors.  4. The failure of any component within one Lift controller will not prevent the remaining Lift from Simplex operation.  5. Both Lifts will be provided with load weighing devices to detect an overload situation and to bypass landing calls when the Lifts are more than 80% loaded.  Where both Lifts are running within a fire-fighting shaft, upon operation of the fire-fighting control switch, both Lifts will return to the fire-fighting access level directly, where the non-fire-fighting Lift(s) will park with doors closed (after opening to allow the discharge of passengers).    When the fire-fighting Lift has responded to the operation of the fire control switch and parked at the fire access level, with doors open, the Lift will then only respond to calls placed on the fire-fighting car control station.  Upon call registration, which must be by continuous pressure on the selected car call button, the doors will close, and the Lift will travel to and park at the required floor with the doors closed. If pressure on the call button is discontinued before the doors are fully closed, the doors will automatically re-open.  Once the car is stationary at a landing the doors can only be opened by continuous pressure of the door open button. If the button is released before the doors are fully opened the doors will automatically re-close.  Once fully opened the doors will remain open until a new call is placed on the car control station.  When in motion, additional calls may be placed from within the Lift car. The Lift will then stop at the nearest landing door which a call is registered in its current direction of travel. At this time all other calls will be cancelled, and the car will not depart until a fresh call has been registered. |
|  | **FIRE RECALL SYSTEM (EN81-73:2005)**  On the operation of the Fire Control switch or Building Fire Alarm system, if a lift is travelling away from the Fire Service Access Level it shall stop (without opening its doors) at the next available floor according to the lift speed and minimum slow down distance of the drive system. The lift shall then reverse direction and travel without stopping to the appropriate Fire Service Access Level.  When returning to the designated landing lift doors shall open on all lifts to allow any passengers to exit and shall remain open. Where national regulations do not permit the doors to remain open a means shall be provided to open the doors even with the power on to allow Fire Fighters to check that lift cars are empty.  All control push buttons shall remain inoperative until the Fire Control Switch or Building Fire Alarm has been reset.  A ‘No Entry’ sign shall be displayed at the designated floor to indicate that the lift/s shall not be used. |
|  | **GUIDE RAILS, SUPPORT BRACKETS AND FIXINGS - NEW**  Car and counterweight guides shall be of tee section.  The guides shall be smooth, plumb and straight and their fixings and brackets secure in all respects.  Guides and their fixings shall withstand the application of the safety gear without deformation when stopping a fully laden car or counterweight. Under all operating conditions guide rail deflection shall not be greater than the Code Standard requirements.  Where cantilever car arrangements are provided the contractor shall be required to provide sufficient information to the engineer that the guide brackets and fixings are suitable for their intended application. The design shall consider the need to provide a smooth and quiet operation during lift movement.  Their faces shall be of machined steel having a minimum section T89B.  The back of each guide is to be machined at the point of connection to allow for the guides to be coupled and interlocked with tongued or grooved sections on their respective ends.  The base of the guides shall be carried within the lift pit on steel channel sections which will also act to locate and support the car and counterweight buffers.  The guides shall be delivered to site with a waterproof protective coating on all machined surfaces and where practicable all protective coverings shall remain in place during construction.  The base of each guide shall be fitted with a purpose manufactured drip tray, unless guide shoes are of the roller type.  The guide brackets shall be of substantial RSA or RSC steelwork sections.  Flat steel bar is permitted in restricted situations only.  The brackets shall be designed to support the guides without undue flexing.  The car guide brackets whether of the adjustable or of single piece design shall not require packing for a distance in excess of 13mm unless such packing is required to accommodate discrepancy in the verticality or winding of the Lift shaft.  Where adjustable brackets are used, the adjustable section shall be pinned after alignment.  Where guide fixing brackets are of the "flat strap" type that are not set to cover distance in their design, then only solid packing having a bearing surface of no less than 100mm sq shall be provided. The means of packing flat strap brackets with the use of locking nuts on continuously threaded studding will not be acceptable.  Where solid packing is used in excess of 25mm, 75% of all packing shall be as single piece.  Sliding guide clips shall be used.  The guides shall terminate within 75mm of the underside of the top of the shaft and fitted with a physical stop.  The guides shall be pinned to the lowest guide brackets to prevent any movement during the application of the up direction safety gear where installed.  The setting out of each lift shaft shall take into account all discrepancies and tolerance should be allowed for any out of plumb or twist conditions presented by the shaft construction.  Where counterweights are positioned to the rear of the car, they shall be positioned on Centre lines parallel to the car guides.  Where counterweights are contained within combination brackets to the side of the Lift car the guide system shall be set out as a single exercise.  On group systems all Lifts shall set out to the established site grid lines.  The Engineer may call for a set of the actual shaft plumbing’s taken on site by the site operatives so these must be retained by the Contractor for reference purposes. |
|  | **GUIDE RAILS, SUPPORT BRACKETS AND FIXINGS – RETAIN & OVERHAUL**  Existing guides are to be retained, their fixings and brackets are to be checked for security and condition, where found to be defective new fixings shall be provided to ensure adequate structural integrity.  Where cantilever car arrangements are provided the contractor shall be required to provide sufficient information to the engineer that the guide brackets and fixings are suitable for their intended application. The design shall consider the need to provide a smooth and quiet operation during lift movement.  Under all operating conditions the guide rail deflection shall not be greater than the Code Standard requirements.  No modifications to guide clips, their fixings or fishplate bolts will be accepted resulting from the fitting of new equipment.  The Lift Contractor shall satisfy himself that the guide fixing centres are suitable for the application. Where inadequate, new fixings are to be provided.  The guides and brackets are to be thoroughly cleaned down using a proprietary solvent.  The guides are to be realigned and boned.  Where appropriate the guides are to be extended to within 75mm of the head of the lift shaft and fitted with a physical stop.  The guides shall be pinned to the lowest guide brackets to prevent any movement during the application of the up direction safety gear where installed.  Any surface marking caused by safety gear engagement to guide faces shall be removed or dressed.  The base of each guide shall be fitted with a purpose manufactured drip tray, unless guide shoes are of the roller type.  The Engineer may call for a set of the actual shaft plumbing’s to be taken on site by the site operatives, so the Contractor for reference purposes must retain these.  Where an extension to the guide rails is required, the contractor shall ensure that any new sections of guide rails are fully compatible with the existing design properties. |
|  | **HYDRAULIC BUFFERS – NEW**  The buffers shall be capable of bringing the car/counterweight to a gradual and positive stop.  Energy dissipation buffers shall be located within the pit beneath the car and counterweight and provided with non-return switches that are manually reset.  The switches or switch strikers are to be provided with rigid anti-twist piston devices to ensure that correct alignment is maintained.  The steel buffer supports shall be of robust construction securely fixed between their respective guides and be of sufficient height to maintain the necessary over travel of the Lift and maximise man clearance.  The buffer is to be fitted with an oil drain plug. |
|  | **COUNTERWEIGHT FRAME – RETAIN & OVERHAUL**  Counterweight and fillers are to be cleaned and degreased.  The counterweight is to be checked for distortion and the Engineer advised.  The total weight is to be adjusted to suit the new operating conditions and due allowance shall be made for balancing at between 45% and 50%.  All weights are to be suitably clamped.  Where make-weights are employed they shall be full width and depth of the counterweight frame and secured by the same clamping device.  Drilling shall not be carried out to the counterweight frame without the Engineer's review.  The counterweight shall adequately withstand buffer impact.  Where an existing counterweight safety gear is to be retained this shall be dismantled cleaned and refurbished. |
|  | **PASSENGER LIFT CAR FRAME & PLATFORM - NEW**  The car frame shall be of rolled or pressed channel and angle construction and shall be capable of sustaining a fully loaded car without permanent deformation with an evenly distributed load. The frame shall be of bolted or welded construction and the use of set screws or rivets is strictly forbidden.  The design of the car frame shall incorporate a load weighing device.  The load weighing device shall prevent operation of the lift in the event of the contract load being exceeded.  The load weighing device shall provide auto-bypass information to the control system in addition to conventional load weighing. When overloaded the Lift car shall be prevented from moving.  For call transfer the load weighing device shall be operational when the load is 80% or more of the contract load. Load weighing devices shall automatically reset.  When of a cantilever construction, the car frame and guide shoes shall be designed to minimise guide shoe/roller shoe pressure to ensure a smooth and quiet operation.  The platform shall be of steel frame supporting a timber sub-floor of exterior grade plywood of 25mm thickness. The underside of the timber sub-floor shall be fully lined in sheet steel which shall be fixed at 150mm centres.  Car isolation is to be provided between platform and car frame. The isolation shall be of oil-resistant resilient compound pads of suitable density for the contract load and car weight.  Isolation shall be fitted to the top of the car enclosure and may be of an adjustable design. It shall not be fitted until the Lift car has been plumbed and levelled with all ancillary items and components attached.  Plumbing and alignment shall be made by packing to the floor frame, not by jacking of the top of car isolation.  The frame shall be of bolted or welded construction and the use of setscrews or rivets is strictly forbidden. Adequate clearance must be provided beneath the crosshead section to allow adjustment of the hoist ropes.  Buffer plates shall be provided to the underside of the car frame.  The design of the car frame shall ensure that the rope termination pick-up point shall be as close to balanced as possible. |
|  | **LIFT CAR FRAME & PLATFORM – RETAIN & OVERHAUL**  The car frame shall be retained and, with all redundant components removed, shall be checked for obvious distortion or defect. Where a defect is found it shall be brought to the attention of the Engineer and remedial action agreed. These checks must be completed and reported on within the first week of site work commencement.  All fixings used in the construction of the car frame are to be checked for security. The spring washers of any bolt fixings loosened or removed as part of these works must be replaced with new.  For Passenger Lifts new sound isolation is to be provided between platform and car frame. The isolation shall be of oil-resistant resilient compound pads of suitable density for the contract load and car weight.  New isolation shall be fitted to the top of the car enclosure and may be of an adjustable design. It shall not be fitted until the Lift car has been plumbed and levelled.  Plumbing and alignment shall be made by packing to the base, not by jacking of the top of car isolation.  A new load weighing device shall be provided such that when an overload condition occurs the lift shall be prevented from moving until the overload has been reduced.  On Passenger Lifts auto-bypass information shall be provided to the control system when the load in the lift car reaches 80% of its carrying capacity. The load weighing device shall automatically reset.  Buffer plates shall be provided to the underside of the car frame, centrally over the buffer.  The platform shall be externally lined in sheet steel if manufactured from timber. |
|  | **ROLLER GUIDE SHOES - NEW**  The car and counterweight guide shoes shall be of the roller type and fitted with guard plates to prevent a finger trap between the rollers and the guide face.  Car guide roller shoes shall be spring loaded and self-adjusting.  Roller bearings shall be of the sealed for life type.  A metal retainer shall be provided to top and bottom shoes so that the frame assembly will not move from the normal running position in the event of roller failure. |
|  | **STATIC BALANCING**  Prior to the final adjustment of the guide shoes the lift car shall be statically balanced to ensure even weight distribution with the unrestrained car suspended vertically.  Additional weights shall be provided as needed to achieve satisfactory static balancing. Weights shall be of steel or cast iron, secured to channels which are fixed to the lift car.  The contractor is to ensure that any additional weight added to the car and counterweight must not compromise the safety gear capacity, machine sheave shaft loadings and rope calculations. |

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|  | **LIFT CAR – RETAIN & OVERHAUL**  The existing Lift car is to be retained and refinished internally in accordance with the *Schedule of Finishes,* which form part of the works.  All fixings shall be checked and re-secured.  Any distorted or damaged panels are to be replaced.  All timber external surfaces shall be lined in 20swg steel sheet.  The car roof must withstand the weight of 2 operatives working thereon without permanent deformation and should provide a smooth working surface.  A quiet running isolated extract fan is to be located on the car roof. It shall be properly enclosed to prevent accidental damage and shall be capable of 3 changes of air in the Lift car in 15-minutes.  Any redundant apertures shall be filled.  Adequate ventilation shall be provided.  An inductive loop cable shall be fitted and wired to all speech units within the lift car.  Where a car roof access hatch is retained it shall be hinged outward with a full width hinge. A mechanical lock and electrical contact shall be provided which shall ensure that the mechanical lock is secured before the electrical contact is made. |
|  | **CAR OPERATING PANEL**  The facilities and features shown elsewhere within the specification shall be provided, with the design and final layout to be approved by the Engineer. Each lift car shall have 2no Car Operating Panels (COPs) situated at the “near-right” orientation as viewed from both front & rear entrances.  The push buttons shall be installed at a height of between 900mm & 1100mm from the finished car floor and positioned on the side wall 400mm from the front return. Push button pressels shall be in contrast to their surroundings.  Where applicable a CE marking and notified body identification number shall be displayed in a position to be agreed by the Engineer. The lift contractor’s logo shall not feature on the COP.  Where called for the following will be provided:  **Alarm Button**  The alarm button shall be permanently illuminated and yellow in colour and shall incorporate a tactile bell shape symbol. It shall be fully illuminated during power failure.  The alarm button shall be located below the car call push buttons.    **Audible Annunciator**  A programmable audible annunciator is to be incorporated which shall be simply and easily recorded to provide a variety of messages within the lift car. The volume shall be adjustable and as a minimum the available messages shall comprise ‘Doors Opening’, ‘Doors Closing’, ‘Lift Going Up’, ‘Lift Going Down’,’ Lift Overloaded’ and ‘Floor N’ where N is the actual floor where the lift is positioned.  The voice messages shall be of high quality and clarity.  **Emergency Communication System**  In the event of the alarm button being pressed an Auto-Dial system will be activated and will sequentially dial a minimum of three preset numbers, which shall be notified by the employer.  The emergency alarm device shall be equipped with both visual and audible signals, integrated into the car operating panel, comprising of:   * A yellow illuminating pictogram in addition to the audible signal for the emergency alarm transmission to indicate that the alarm has been given. * A green illuminating pictogram in addition to the audible signal normally required (voice link), to indicate that the emergency call/alarm has been registered. The audible signal (voice link) shall have a sound level between 35dB(A) and 65dB(A), adjustable to suit site conditions. * An induction loop shall be provided to aid people with impaired hearing.   The type and manufacturer of the auto-dial system shall be an approved device and shall be of such design which does not prevent other contractors from maintaining or reprogramming the system.  The auto-dial unit shall be installed behind the car operating panel faceplate or front return panel.  The operational procedure of the auto-dialler shall be engraved on to the car station panel. The lift contractor must ensure that the engraved instruction exactly matches the operational requirements of the fitted auto-dialler, i.e. if it requires an Alarm press of 3 seconds, this must be what is stated on the instruction.  The auto-dialler is to be enabled by the operation of the alarm bell push button and disabled at the receiver terminal.  With the exception of a time-out facility that will be initiated by operation of the alarm push button, it shall not be possible to enable the system to listen into the Lift car.  A timer unit capable of 0 to 60 minute setting shall be incorporated which will allow the receiving station to communicate with the car at any time during the agreed set period, which can only commence on operation of the alarm push button.  The alarm push button will also operate a "comfort" alarm bell mounted on the car top and a separate Alarm Bell mounted at Main Floor level.  **Car Fan**  The car fan shall be operated by a two-position key-switch mounted on the car operating panel. When pressed the fan shall operate for 15 minutes and then switch off automatically.  The fan shall be capable of three air changes in 15 minutes.  In the event of a power failure the fan will continue to operate normally under emergency supply for 3 hours from the same source as the alarm and emergency light unit, but separately fused.  **Car Light Switch**  The car light switch shall comprise a three position double pole switch within a unit of similar size to the car pushes.  Position 1 is to be ON  Position 2 is to be OFF  Position 3 is to be TEST which will test the emergency lighting unit within the lift car.  **Car Position Indicator**  A visual display unit incorporating either a dot matrix or LCD position indicator behind a coloured diffuser shall be located in the car station panel. It shall be a minimum of 50mm in height and shall incorporate a scrolling feature as well as separate direction of travel indication.  The visual display unit shall be located within the car operating panel positioned at a height between 1600mm and 1800mm above the car finished floor level.  The visual display unit shall be easily visible and legible and shall be capable of displaying a variety of standard messages, as well as floor position, including but not restricted to:  Lift Overloaded  Lift Out of Service  Lift on Preference Control  Lift on Fire Control  Lift Returning to Main Floor  **Car Preference**  A key operated car preference switch is to be incorporated in the car operating panel. The key shall be captivated when in the "ON" position.  **Car Push Buttons**  The car push buttons shall be of micro movement design with raised tactile facility and shall have both audible and visual call registration indication.  The push buttons shall have LED illumination and their pressels shall be in contrast to their surroundings.  A single operation of the push buttons shall register a call on the lift control system, whilst subsequent operation of the push shall initiate quick close of the doors.  The main exit floor push button shall be green in colour and project from the car operating panel by 5mm.  **Door Open Push**  A door open push shall be provided with LED illuminated halo which shall be activated during the door closing cycle.  **Door Close Push**  A door close push shall be provided.  **Overload Warning Indicator**  A message shall be announced when the lift car becomes overloaded and the visual indicator shall display a standard message to advise of the overload condition. Both audible and visual messages will cease when the overload condition has been corrected. |
|  | **MECHANICS CONTROL STATION – CAR TOP**  The mechanics car top control station shall be mounted vertically within 1m of the landing entrance, and easily accessible from the landing threshold (where a through car condition exists it shall be accessible from the side with the majority of landing entrances).  The mechanics car top control station shall contain maintenance and test switches, direction push buttons, a 13amp switch socket outlet with RCD protection, and a proprietary brand of 16 watt twin fluorescent bulkhead light fitting with polycarbonate or similar shatter resistant diffuser.  The light fitting shall also be provided with an emergency power source from an independent supply of 3 hours duration with a minimum of 5 lux.  It is permissible to feed the emergency car lighting from this source provided that 3-hour duration is maintained in each case.  All car top lighting and power points shall come from a common source but shall be individually fused.  All switches and push buttons shall be clearly marked with their functions, with the push buttons being distinguished by colour also.  Operation of these switches and push buttons shall be as follows:  **Roof Light Switch**  Control of Roof Light  **Shaft Light Switch**  In addition to the shaft lighting switch circuits specified for machine room/space and lift shaft, an intermediate switch shall be incorporated on or near the mechanics car top control, which will provide the shaft lighting system with a third point of operation.  **Stop / Run Switch**  The stop switch shall be a push/pull type (push to stop pull to run). The button shall be at least 50mm in diameter and coloured red.  The stop button shall be proud of its shroud only in the “run” position.  The button shall show visual indication of both operational positions and incorporate the word STOP placed on or near it.  The stop button shall be position at the extreme top right position on the car top control panel.  **Inspection/Normal Operation Switch**  NORMAL - Normal operation  INSPECTION - Car and landing push buttons isolated: push buttons on mechanics control panel become operative, and the Inspection/Normal Operation switch becomes illuminated.  The words NORMAL and INSPECTION shall be clearly marked on or near the switch.  The switch is to be protected against involuntary operation and of a bi-stable design. The switch shall be shrouded.  The switch shall be positioned in the extreme top left on the car top control panel.  Returning to normal shall only be effected by switching all the inspection switches back to normal.  **Door Control Switch**  The words DOOR OPEN AND CLOSED placed on or near the switch and shall be position to the extreme bottom left on the car top control panel.  **Up, Run and Down direction buttons**  The up direction button, the run button and the down direction button shall be arranged centrally and vertically in line with the up direction button positioned at the top of the car top control panel, it shall be possible to activate the run and direction buttons with one hand.  When pressed the car shall move at the designed test speed in the UP or DOWN direction (only whilst the respective direction button and the intermediate run button are depressed). These shall operate under constant pressure.  **Engineers Alarm Button**  An enshrouded continuously illuminated alarm push in yellow and engraved **alarm** over a red back ground and located below the stop button.  **Up Inspection Safety Limit**  A mechanically operated UP inspection limit is to be incorporated in the control circuit so that when the INSPECTION switch is in the INSPECTION position and the UP button is depressed, the car shall stop at the top of the lift shaft low enough to ensure that a 2 metre tall person standing on the top of the car shall be in no danger of coming into accidental contact with any overhead equipment or structure. Immediately after the UP test limit has been set and checked for final position the limit supporting arm, in addition to the conventional clip fixings, is to be twice pinned through the guide flange. In addition, a notice is to be fitted with the wording WARNING - DO NOT MOVE UP INSPECTION SAFETY LIMIT. |

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|  | **MECHANICS CONTROL STATION – PIT AREA**  The mechanics pit control station shall be mounted vertically within 0.30m of the pit refuge space.  The mechanics pit control station shall contain maintenance and test switches, direction push buttons. All switches and push buttons shall be clearly marked with their functions, with the push buttons being distinguished by colour also.  Operation of these switches and push buttons shall be as follows:  **Stop / Run Switch**  The stop switch shall be a push/pull type (push to stop pull to run). The button shall be at least 50mm in diameter and coloured red.  The stop button shall be proud of its shroud only in the “run” position.  The button shall show visual indication of both operational positions and incorporate the word STOP placed on or near it.  The stop button shall be position at the extreme top right position on the car top control panel.  **Inspection/Normal Operation Switch**  NORMAL - Normal operation  INSPECTION - Car and landing push buttons isolated: push buttons on mechanics control panel become operative, and the Inspection/Normal Operation switch becomes illuminated.  The words NORMAL and INSPECTION shall be clearly marked on or near the switch.  The switch is to be protected against involuntary operation and of a bi-stable design. The switch shall be shrouded.  The switch shall be positioned in the extreme top left on the car top control panel.  Returning to normal shall only be effected by switching the inspection switch back to normal, and in conjunction with the electrical reset device located on the landing mechanical release device or within a locked cabinet in close proximity to the pit access door (where provided).  **Up, Run and Down direction buttons**  The up direction button, the run button and the down direction button shall be arranged centrally and vertically in line with the up direction button positioned at the top of the car top control panel, it shall be possible to activate the run and direction buttons with one hand.  When pressed the car shall move at the designed test speed in the UP or DOWN direction (only whilst the respective direction button and the intermediate run button are depressed). These shall operate under constant pressure.  Note; where mechanics control stations are provided within lift pit area, these shall be installed in conjunction with the following:     * Pit prop safety devices. * Safe man clearances identified. * Access control monitoring (mechanical lock release). * Resetting of access control monitoring switches via reset button on the switch or electro mechanical means within the lift lobby area, together with resetting required at the control panel. |
|  | **AUTOMATIC RESCUE DEVICE (ARD)**  The Lift Contractor shall include to install a suitable automatic rescue device (ARD), powered by a trickle charged battery source, each to be provided as part of the contract.  The ARD system shall be designed to enable the automatic and safe rescue of passengers from a stalled lift.  The ARD shall be integrated with the lift controller and shall continuously monitor and detect any loss of mains power. In the event of a mains electrical supply failure, the ARD shall monitor the lift safety circuits, doors lock and Inspection/Normal functions. Provided that the safety circuits are in the ‘normal’ condition and provided also that the lift is not on Inspection Control, the ARD shall cause the lift to move to the nearest landing, stop at floor level, open its doors and keep them parked open.  The ARD functionality shall be disabled whenever the loss of mains power is due to the lift having been manually switched off at the mains isolator. Therefore, the design shall incorporate a means to detect whether the lift main switch has been physically switched off or whether an electrical mains failure has occurred. For example, a 4 pole mains isolator could be used for this purpose with the 4th pole used to activate or isolate the ARD interface as appropriate.  The ARD shall also incorporate a self-checking ‘fail safe’ facility to ensure full functionality, battery condition etc. If failure is detected, a signal shall be sent to the fault logging system (or BMS system if fitted) and the lift shall home automatically to the nearest floor and park with doors open.  Whenever an automatic rescue is triggered, either by an electrical mains failure, or self-test/battery condition functionality failure, in each case manual intervention shall be required to reinstate the lift to normal passenger use.  Full details including EHO/HSE approval of the system shall be provided with the offer. |
|  | **INFRA-RED ENTRANCE PROTECTION**  A protective device shall be fitted to the full height of the leading edge of the car doors. Its field of operation shall be a minimum of 50mm from the leading edge and it shall initiate re-opening before any contact with obstruction.  It shall comprise a curtain of intersecting beams and shall continue to function with up to 25% failure in any of the modules. |
|  | **CAR DOOR OPERATOR - NEW**  The new door operator(s) shall provide a high speed, smooth and quiet motion of the car and landing doors.  The door speed during operation shall have sinusoidal characteristics with variable speed control.  The doors shall be driven by an AC Variable Frequency or Linear controlled motor in both opening and closing directions.  The lift shall normally park with the doors closed.  All couplers shall be of metal construction, and where moving skates are used then, for rigidity in door coupling, twin pick-ups are to be used.  All door gear components shall be of the same manufacture.  The car top door operating equipment shall be provided with suitable removable mechanical protection constructed to withstand a force of 1000 Newton’s without permanent deformation or damage. |
|  | **CAR ENTRANCE - NEW**  The car doors are to be constructed in 16 swg sheet steel.  The doors shall be of welded construction incorporating purpose-designed mounting plates, cross-bracing and fire-retardant anti-drumming compound.  The steel mounting plates shall be of a minimum 6mm thick suitable for drilling and tapping. [*The use of RIVNUTS or similar fixings will not be acceptable*].  Door hangers shall be fixed with bolted fixings into the door panel and will allow a minimum of 15mm penetration.  The door panels shall incorporate additional stiffening at their base for the fitting of door shoes.  The finished faces of the door panels shall show no visible fixings or weld marks and, where facing material is applied, it shall be fully wrapped and riveted in addition to the bonding material. [*See Sketch SK No 2*].  It is permissible to profile the leading edge of the door panels.  The top track shall be separately fixed to the header to allow for replacement.  All rollers shall be polyurethane tyred with a steel boss and shall incorporate a minimum of 2 bolted fixings into the door assembly.  Provision shall be made to adjust the door height by 5mm.  Where the design of the top track does not prevent the rollers from leaving the tracks or tipping, anti-kicking rollers will be required.  Two sliding shoes per door panel shall be provided each having an offset vertical flange secured to the well side of the door so that the shoes can easily be replaced without lifting the doors.  In the event of the failure of the door shoes and/or fixings the doors must be retained in their bottom track.  The bottom track shall be machined, supported throughout its length and all packing used is to be steel full size of the track section.  Where dissimilar metals abut, they shall be separated by a plastic membrane to prevent electrolytic corrosion.  The door contact for each door panel shall be housed within a substantial casing and shall be easily adjustable. It must *not* be possible to open the car doors while the Lift is in motion.  The clearance between door panel and surrounds shall be between a minimum of 3mm and a maximum of 6mm.  The back edge of the doors shall overlap the clear entrance width by a minimum of 15mm [*See Sketch SK No 2*].  Where the entrances are arranged as 2-speed, an approved mechanical link shall be provided between the fast and slow speed doors, and the slam post is to be formed as a rebate for the fast speed door.  The fast and slow speed doors shall each overlap by a minimum of 15mm and shall overlap the architraves by 15mm.  Where any doors contain glass vision panels these shall be of approved Laminated Safety Glass only. |
|  | **LANDING ENTRANCE - NEW**  The landing doors are to be constructed in 16 swg sheet steel.  The doors shall be of welded construction incorporating purpose-designed mounting plates, cross-bracing and fire-retardant anti-drumming compound.  The steel mounting plates shall be of a minimum 6mm thick suitable for drilling and tapping. [*The use of RIVNUTS or similar fixings will not be acceptable*].  Door hangers shall be fixed with bolted fixings into the door panel and will allow a minimum of 15mm penetration.  The door panels shall incorporate additional stiffening at their base for the fitting of door shoes.  The finished faces of the door panels shall show no visible fixings or weld marks and, where facing material is applied, it shall be fully wrapped and riveted in addition to the bonding material. [*See Sketch SK No 2*].  It is permissible to profile the leading edge of the door panels.  The top track shall be separately fixed to the header to allow for replacement.  All rollers shall be polyurethane tyred with a steel boss and shall incorporate a minimum of 2 bolted fixings into the door assembly.  Provision shall be made to adjust the door height by 5mm.  Where the design of the top track does not prevent the rollers from leaving the tracks or tipping, anti-kicking rollers will be required.  Two sliding shoes per door panel shall be provided each having an offset vertical flange secured to the well side of the door so that the shoes can easily be replaced without lifting the doors.  In the event of the failure of the door shoes and/or fixings the doors must be retained in their bottom track.  The bottom track shall be machined, supported throughout its length and all packing used is to be steel full size of the track section.  Where dissimilar metals abut they shall be separated by a plastic membrane to prevent electrolytic corrosion.  The gate contact for each door panel shall be housed within a substantial metal casing and shall be easily adjustable. It must *not* be possible to open the doors while the Lift is in motion.  The clearance between door panel and surrounds shall be between a minimum of 3mm and a maximum of 6mm.  The back edge of the doors shall overlap the clear entrance width by a minimum of 15mm [*See Sketch SK No 2*].  Where the entrances are arranged as 2-speed, an approved mechanical link shall be provided between the fast and slow speed doors, and the slam post is to be formed as a rebate for the fast speed door.  The fast and slow speed doors shall each overlap by a minimum of 15mm and shall overlap the architraves by 15mm.  All landing entrance assemblies are to be certified for 2-hour fire rating. **The submission of a valid Fire Test Certificate and entrance design is required at tender submission stage.**  **All landing entrance designs and method of installation must be compatible with the lift shaft front wall construction and installed in accordance with the manufacturer design requirements.**  The landing doors shall be located within a bolted angle section frame, which shall consist of two side angles, a bottom sill and a connecting header.  The wall anchors shall be designed to suit the building fabric.  Where sills are fitted to concrete nosing’s the recesses are to be cleaned prior to the positioning of the sill and a bonding agent applied prior to the bedding in of the sill. (Bonding agents must be applied in accordance with the manufacturer’s instructions).  Where tracks are fitted to a steel angle nosing the angles are to be provided by the contractor and any steel packing used shall be full size track section.  Electro mechanical interlocks shall be provided to each door panel and these shall be provided with metal removable covers. The locks shall be pinned following final positioning. All contacts shall be enclosed.  A triangular lock release mechanism shall be provided at each landing door panel.  A spring-loaded lever action automatic door closer shall be provided to each door panel.  Alternatively gravity type closers may be incorporated. These however, must be metal weights running within plastic tubes fixed to the door frame or other fixed position. Tubes fixed to the rear of the moving door panels will not be acceptable.  Rubber buffers shall be provided to the rear of the doors to prevent them opening more than 5mm beyond the clear opening width.  A full height sight guard shall be fixed to the edge of the leading door panel and shall be finished in the same material as the landing doors. The sight guard may be formed as part of the door panel folding process.  Where any doors contain glass vision panels these shall be of approved Laminated Safety Glass only. |
|  | **STEEL ARCHITRAVES - NEW**  The architraves shall be constructed in 3 pieces.  They shall be of steel construction of a minimum 14 swg.  Architraves shall be back filled with concrete.  Steel reinforcing is to be provided at the top of the uprights to securely fix the soffit panel across its full depth.  Fixings shall be designed to suit site conditions.    The architraves shall incorporate additional ties to the 2 uprights to ensure satisfactory bonding of the infill material.  The structural integrity of the architrave shall not be less than that of the original entrance / architrave.  The architraves shall project from between 20mm and 25mm form the finished front wall.  Where the entrance is fire certified the installation of the architrave and any associated fixings shall not compromise the fire integrity of the entrance. |
|  | **PROTECTIVE SCREENS & GUARDS**   1. All rotating equipment and extended rope traverses shall be guarded. 2. Equipment guards shall comprise a profiled rod frame with 10 SWG welded mesh infill. Mesh shall be a maximum of 20mm grid. The fixings for the guards are to be easily removable. All fixings shall be of a standard size and require the use of a specific tool for releasing. The tool shall be provided and kept mounted on the machine room/space toolboard. Framed hinged access flaps shall be provided, sensibly sited for ease of inspection and maintenance. 3. Steel rope hole reducers shall be floor fixed and incorporate a 50mm raised collar and felt restrictor providing a safe minimum running clearance. 4. Motor and generator commutators shall be guarded, the guards to comprise a rod frame and 12mm mesh with the design being specific for each application. 5. The flanges of beams and other hazards with less than 2.1 metres clear height shall be clad in 25mm thick Neoprene padding having BLACK and YELLOW warning stripes. 6. Where light fittings are suspended giving less than 2.1 metres clearance they shall be provided with a wire mesh guard. 7. Access hatch covers in the lift machine room/space are to be faced in aluminium chequerplate which has an embossed non-slip surface. All edges of the plate covering are to be ground to an angle finish to prevent tripping hazard. Suitable recessed handholds shall be provided. 8. Where the access hatch is located in the floor of the machine room/space it shall incorporate a safety handrail which engages with the flap or flaps of the hatch. The engaging bar will mechanically latch the flaps in the vertical position. [*See Sketch SK No 6*]. 9. All unguarded upper machine room/space levels shall be fitted with removable tubular steel safety handrails. The tubing shall be completely demountable with a minimum 50mm cross section. In addition to upright supports at each end, intermediate supports shall be located at a maximum of 1 metre pitch. A horizontal mid-rail shall also be provided which shall be a minimum of 25mm cross section. 10. All holes and apertures in the lift shaft, machine or pump-room or top wheelhouse shall be properly filled or screened. 11. A permanently fixed flat step steel access ladder and handrail is to be fitted between differing machine room/space levels. 12. Rope hitch plates where exposed in working areas shall be covered in removable steel sheet guards. These guards shall be secured with wingnuts. 13. Steel fascias of a minimum 16 SWG shall be provided the full width of the header. Bracing and stiffening is to be provided to prevent distortion. The header is to extend from sill level to the header of the floor below. 14. At the lowest terminal floor, a ramped steel fascia will extend to 750mm. At the upper terminal floor, a similar ramped section will be affixed to the header. 15. A ramped toe-guard shall be fitted to the underside of the car of sheet steel construction. It shall extend 50mm beyond each side of the clear opening and be ramped and braced back to the underside of the car. The toe-guard shall be 16 SWG steel sheet minimum and extend 750mm below the car sill. Countersunk screw fixings shall be used at 150mm centres.   Where a shallow pit depth prevents the use of a standard 750mm fixed length toe guard, a sliding multi-leaf toe guard shall be installed to provide maximum protection for the given dimensions. This design of toe guard shall incorporate an electro-mechanical locking mechanism, released through the use of a standard euro key, such that the lift will only operate normally when the toe guard is in its raised position.  Instructions on the release of the toe guard to its full length shall be mounted on the face of the toe guard.   1. All ledges over 150mm shall be ramped in 16 SWG steel sheet to an angle of 70o with the design of ramp to suit the particular application. 2. Voids in the lift shaft shall be guarded with mesh suitably braced screens which shall comprise 38mm RSA frames with 16 SWG mesh infill. Mesh shall be a maximum of 50mm grid of 10 gauge galvanised weld mesh. 3. Shaft division screens shall be framed in a minimum of 38mm RSA with a maximum 40mm grid of 10 gauge galvanised welded mesh suitably braced. Mesh grid dimensions are subject to the horizontal clearances between adjacent lifts as defined in BSEN ISO13857 table 4. 4. The counterweight screen shall be of sufficient rigidity to ensure that when a force of 300N is applied over an area of 5cm²the screen shall not deflect to cause the counterweight to collide with the screen. The screen can be of imperforate sheet metal or weld steel mesh, but shall, include an inspection panel to assess the over-travel between the counterweight and buffer. Where clearance does not permit the use of an angle frame, either a flat bar or rod frame is permissible.   The counterweight screen shall extend from the lowest point of the counterweight when resting on a fully compressed buffer, and a position of no more than 300mm above the pit floor, to a height of no less than 2.5 metres from this point. Where the counterweight guide rails are greater than 150mm from the shaft wall, this area shall also be guarded, apertures for compensation are permitted.   1. Where trailing cables may come into contact with the lift shaft walls or shaft equipment, a flex screen shall be fitted. The screen shall be in the form of a cable tray approximately 300mm wide fixed from the halfway point downwards. Additionally, tensioned vertical air cord or vertical conduit may be used secured between bracket fixings. 2. A permanent pit access ladder shall be fitted. It shall comprise flat steel steps and a separate grab rail and shall be easily accessible from the lowest terminal landing. Where a removable ladder is provided it shall be electrically interlocked. 3. Where a deep pit condition exists steel chequerplate decking shall be installed to provide an adequate working platform and to act as staging for the lower pit level. 4. A balustrade shall be fixed to the rear and sides of the car roof where a void of 300mm or more exists around the perimeter of the car roof. The height of the balustrade shall be 700mm where the void is 500mm or less and 1100mm high where the void is in excess of 500mm. The balustrade shall not run greater than 150mm of the perimeter of the Lift car. The rail shall be a minimum of 35mm square section and when a force of 1000N is applied at any point on the top edge of the balustrade in shall resist without elastic deformation greater than 50mm, also it shall not bridge the car isolation.   In addition, a 100mm kicking board shall be provided to the car top, which shall be painted in black and yellow diagonal stripes. Where the overhead clearances do not permit the installation of fixed height balustrades, purpose designed folding balustrades shall be provided. Folding balustrades shall incorporate electrical interlocks such that the balustrades must be secured in their folded/stored position before the lift is able to return to normal operation. Advisory/warning signs are to be fixed to the car top and/or balustrades to inform users of the safety procedures when entering the lift shaft. |
|  | **HALL FIXTURES**  **General**  The fixtures shall be fitted within plastic or steel back boxes.  The back boxes shall be keyed before building-in and lie flush with the finished front wall. Where existing back boxes can accommodate the units specified they may be re-used.  Faceplates shall be of 3mm thickness with edges bevelled at an angle of 30o to the face.  Faceplates shall be secured by at least 2 tamper-proof fixings and shall be directly earthed.  **Push Buttons**  The push buttons shall be of micro movement design with raised tactile facility and shall have both audible and visual call registration indication.  The push buttons shall have LED illumination and their pressels shall be in contrast to their surroundings.  Push buttons shall be of the same type and design as the car pushes.  The push buttons shall be installed at a height of between 900mm-1100mm from finished floor level.  **Direction of Travel/Position Indicator [Hall Lanterns]**  The Hall Lantern shall comprise a visual display unit incorporating either a dot matrix or LCD indicator behind a coloured diffuser. The display will show the intended direction of travel and car position.  The illumination shall have a minimum size of 50mm x 40mm.  The unit shall incorporate an electronic and audible adjustable tone generator which shall sound once when the committed direction of travel is UP, and twice when the committed direction of travel is DOWN.  The display shall remain illuminated while the Lift is at the floor and until the doors have commenced to close.  The display shall incorporate a scrolling feature as well as separate position and direction of travel indication.  The visual display unit shall be easily visible and legible and shall be capable of displaying a variety of standard messages, including but not restricted to:  Lift Overloaded  Lift Out of Service  Lift on Preference Control  Lift on Fire Control  Lift Returning to Main Floor  **Alarm**  The lift audible alarms shall be clearly identifiable from other building signals. The alarms shall be located within 6 metres of the lift shaft at the main floor and on the car top. |
|  | **ASSIGNED FLOOR INDICATION (with DESTINATION CONTROL)**  A visual indication of the floor to be served by the lift shall be displayed in a prominent position, and visible by the passenger whilst entering the lift car. |
|  | **3-PHASE ELECTRICAL SUPPLY – RETAIN & OVERHAUL**  The electrical installation shall conform to current IET Wiring Regulations and shall be tested and certified in accordance with these Regulations.  It is anticipated that the existing 3-phase supply to the lift will be retained and re-used.  If the supply is inadequate or unsuitable for connection to the new equipment then the contractor shall include the cost for running a new 3 phase neutral and separate earth supply cable from the intake room to the machine room/space and shall note within the covering letter accompanying his tender the reasons why.  A certificate shall be provided by a NICEIC registered electrician for the adequacy of the new or existing supply.  Whether the existing or a new supply is provided, it will be terminated adjacent to the machine room/space door in an HRC switched fused disconnector suitably rated.  This shall incorporate a facility to lock the switch in the “off” position.  In order to avoid potential problems with the control and motor drive systems it is vital that the buildings earthing arrangements are checked and verified for compatibility with the new equipment. |
|  | **SINGLE-PHASE ELECTRICAL SUPPLY - RETAIN & OVERHAUL**  The electrical installation shall conform to current IET Wiring Regulations and shall be tested and certified in accordance with these Regulations.  It is anticipated that the existing single-phase supply to the lift will be retained.  **If the supply is inadequate or unsuitable for connection to the new equipment, then the contractor shall include the cost for running the new supply cable from the intake room to the machine room/space and shall note within the covering letter accompanying his tender the reasons why.**  A certificate stating either that the existing supply has been tested and is adequately rated, or that a new supply is required is to be provided by a NICEIC registered electrician.  Whether the existing or a new supply is provided, it will be terminated adjacent to the machine room/space access point in a suitably rated consumer unit having a minimum of 10 ways per lift, to feed the following:   1. Car Lighting and Car Emergency Lighting 2. Shaft Lighting 3. Machine Space/Pulley Room Lighting 4. Machine Space /Pulley Room/Pit Emergency Lighting 5. Machine Space Heating 6. Machine Space Ventilation 7. Alarm Supply 8. Machine Space, lift pit and/or pulley room power sockets   It is vital that the buildings earthing arrangements are checked and verified for compatibility with the new equipment. |
|  | **SINGLE PHASE ELECTRICAL REQUIREMENTS**  The electrical installation shall conform to current IET Wiring Regulations and shall be tested and certified in accordance with these Regulations.  The following is to be provided by the Lift Contractor:  **Machine Space Lighting**  Machine Space lighting shall comprise double tube fluorescent fittings sensibly sited to give an even spread of light with a minimum of 200 lux at floor level in all work areas.  It is permissible to retain existing fluorescent light fittings where these are in good condition and sensibly sited, but new tubes and starters are to be fitted.  All machine space lighting shall be switched from a position adjacent to the normal machine space access. The switch to incorporate an emergency machine space light test facility.  Light fittings adjacent to control equipment, hoisting machines and access door shall incorporate an emergency light conversion unit to operate either existing or new luminaires giving 3 hours-maintained illumination.  Secondary machine spaces shall be provided with light fittings of similar characteristics. All fittings to be approved by the Engineer.  **Machine Space Heating**  Enclosed tubular heaters with remote thermostatic controls shall be wall mounted and positioned safely.  The heaters shall be fed from a separately protected supply.  The heater must be capable of maintaining the machine room/space at a minimum of 5ºC with an outside ambient air temperature of 0ºC.  A suitable protective guard shall be provided.  All fittings to be approved by the Engineer.  **Power Outlets**  13-amp socket outlets shall be provided close to the position of the main switch in the machine space and adjacent to the stop/run switch in the lift pit and secondary machine rooms.  The socket outlet is to be switched and shall incorporate an illuminated indicator to show power ON.  If the supply for the emergency lighting of the Lift car is taken from the machine room/space, it shall be from a switched outlet point incorporating an illuminated indicator and positioned adjacent to the main switch.  All power socket outlets shall have RCCD protection.  All fittings to be approved by the Engineer.  **Lift Shaft Lighting**  Shaft lighting shall comprise twin bulkhead fluorescent fittings with each lamp wired to operate independently should either lamp fail. The level of lighting shall be at least 50 lux, 1 metre above the car roof and the pit floor even when all doors are closed, and a minimum of 20 lux within all other areas.  Diffusers shall be of a high impact resistant prismatic type held by captive screws.  Fittings shall be located at 500mm from the head of the shaft, 500mm from the pit floor and one at each floor level.  The shaft lights shall be positioned such that lamps or tubes can be easily replaced from the car top.  All fittings to be approved by the Engineer.  The luminaire within the pit area shall incorporate an emergency back-up supply providing 3 hours-maintained illumination.  It is permissible to retain existing shaft lighting provided it complies with the Specification.  Shaft lighting shall be 2-way and intermediate switched. The switches shall be located as follows:  One in the machine space.  One on the car top (on or adjacent to the car top control unit).  One within the lift shaft accessible from the lowest terminal floor landing. The lowest terminal floor shaft light switch shall incorporate a facility to test the pit emergency luminaire.  The wiring shall be within galvanised steel conduits, and all bends and elbows shall be completed with the use of access boxes fitted with screwed covers. |
|  | **LIFTING BEAMS - NEW**  Suitable lifting facilities shall be installed in the machine space/top of the shaft, marked with their Safe Working Load upon a traffolyte label secured to the beam and a copy of the Test Certificate(s) shall be plastic encapsulated and displayed in the machine space. |
|  | **LIFTING BEAM – RETAIN & OVERHAUL**  The existing lifting facilities are to be inspected, tested and marked with their Safe-Working Load upon a traffolyte label secured to the beam and a copy of the Test Certificate(s) shall be plastic encapsulated and displayed in the machine space. |
|  | **GENERAL STEELWORK**  Where the specification provides for equipment requiring supporting, adapting or additional steelwork the Lift Contractor shall be responsible for supply and fit. The location, position of all such steelwork shall be identified on the Lift Contractors drawings. |
|  | **STRUCTURAL ASSESSMENT**  **The lift contractor shall allow for cost and arrange with an appropriate specialist** to verify the adequacy of the existing building fabric to suit the loadings imposed by the new equipment. The structural survey and report is to be carried out by a qualified Structural Engineer and provided with the layout drawings. |
|  | **PAINTING**  **The following schedule of painting is for guidance and pricing purposes only. The final finish colours may vary and will be advised by the Engineer prior to work being undertaken.**  All painting including priming and undercoating shall be completed in accordance with the paint manufacturer's instructions.  Any factory-sprayed equipment shall be to the standard contractor's colour. If any factory-sprayed equipment becomes damaged then it must be properly re-sprayed on site to leave the equivalent of a factory applied finish.  Where equipment to be painted on site has become rusted, or is otherwise coated in some form of protection, it shall be solvent cleaned, all rust and deposits removed and then painted in accordance with the paint manufacturer's instructions.  All spray painting shall be undertaken outside of normal working hours.  All paint shall be non-toxic and low fume.  **Final Finish Colours**  Royal Blue Gloss:  Complete hoisting machine  Generator  Black Gloss oil-based enamel to  BS4800 BS No 00-E-53  All machine supporting steels  Machine bedplate  Diverter mountings  Machine room/space access ladders and barriers  Rope hole reducers  Toolboard  Lifting beams (where less than 2.1 metres clear headroom,  2" YELLOW diagonal stripes to be added)  Matt Black shaft side of car and landing doors  Door frames and angle nosing’s  Guide brackets and guides  Car and balance weight frames  Fascia’s and toe-guards  Buffer channels and drip trays  Decking  External faces of lift car (unless Zintec or stainless-steel sheet) and car top equipment  Grey Gloss oil-based enamel to  BS4800 BS No 00-A-01  Shaft division steels and top steels  Shaft screen framing & screens  Yellow Reflective to BS4800  All rotating pulleys, sheaves, flywheels  Brake release device  Counterweight frame and fillers  Car top perimeter  Access ladders  Car top and pit area refuge spaces  Orange Reflective to BS4800  All wire mesh guards except shaft division screens  2:1 pulley guards  Car top barriers  Rope traverse guards  Spray cellulose semi-gloss to BS4800 colour to selection  Landing entrances  Car entrances  Lift car  Machine space, shaft and pulley rooms  At the commencement of site works all machine, shaft and pulley room walls and ceilings shall be sealed with a suitable sealant and one coat of white emulsion applied.  At the conclusion of the installation two further coats of white emulsion are to be applied to machine, shaft, ceilings and pulley rooms and two coats of proprietary floor dressing are to be applied to each floor.  Lift Pit  The lift pit is to be cleaned, degreased and painted with two coats of proprietary floor dressing, up to 300mm from the pit floor upon completion. |
|  | **NOTICES** [See Sketch SK No1]  Where standard wording is used notices shall be of the prescribed standard size.  ***All notices shall be in English.***  Notices shall be screw fixed.  Notices shall be screw fixed or engraved on the relevant item.  All non-standard signs shall be manufactured from Paxolene, Traffolyte or Fibrolyte, or similar purpose-made material.  They should be engraved through the face of the base material to display the colour of the middle layer.  A suitable notice, above the ground floor entrance, shall be fitted, to advise that the lift car has been wired with an inductive loop system.  **The colours of signs and notices shall be as follows:**  **Prohibition:** White script on red background.  **Warning:** Black script on yellow background.  **Mandatory:** White script on blue background.  **Emergency/Safe Condition:** White script on green background.  **Information:** Black script on white background.  **Machine Space Notices:**  Notices of the appropriate kind shall be fitted to the following, where applicable:  Machine room/space door and access traps.  Controller doors advising of live condition.  To consumer units and all controlled electrical circuits.  Identification of each machine controller isolator, governor & generator.  Direction of rotation of hoisting motor.  Gear lubricant type.  All run/stop switches.  Wheelhouse doors.  Fully detailed and illustrated hand winding instructions incorporating the use of the emergency hand winding floor level indicator system.  Emergency passenger release procedure.  Electric shock notices.  Asbestos / Asbestos free brake linings.  Tool board identification.  Governor data plate information.  Intercom and telephone terminations and systems.  Safe working loads on lifting beams. The load details must be in the form of a separate notice and painting of this information on the steels will not be acceptable.  Where applicable, a notice shall be displayed to advise the correct procedure, when gaining access to the lift car top from the landing entrance, to operate the lift on test control and to return the lift to normal service when exiting the shaft.  All electrical junction box terminals shall be identified with a permanent label.  **Lift Shaft Notices:**  Restricted headroom.  Advising clearance from crosshead and where applicable restricted headroom.  UP test limit.  Pit switch.  Shallow or deep pit configuration.  Shaft lighting switch.  Hydraulic buffer oil type.  Buffer data plate.  Sump pump details.  Car crosshead data plate.  All mechanics car control station switches.  To the rear of each landing entrance the relevant floor number will be stencilled in 75mm high white numerals. |
|  | **MISCELLANEOUS**  **Control Panel mats**, appropriately marked with their safe insulation value, are to run the full width of the control cabinet and to a minimum of 1 metre to the front of the cabinet. Where rear access is required then a suitable insulating mat shall be provided.  **Tool Board.** The board shall accommodate the landing door release key, tool for release of all guarding, hand winding wheel brake release device and padlock for mains disconnector. Each component shall be clearly identified by permanent labels and the design of the complete unit shall be approved by the Engineer. A pocket enclosure shall be provided for the Maintenance Log Cards and Supplementary Test Certificates.  Legend for all controller components.  **Maintenance Log Cards**.  **A portable collapsible entrance barrier** complete with requisite danger notice, stored within the machine room/space.  **A mechanical restraint** where the safe man clearance space beneath or on top of the car is below the minimum requirements as defined within the Harmonised European Standard.  **A wall mounted spares cabinet** is to be provided of sheet steel construction having a key lockable door and adjustable shelf to be approximately 600mm high, 600mm wide, 300mm deep. The cabinet shall be similar in design and finish to the control panel cabinet. (This will only be required on group installations).  **3 sets of operating and emergency keys** with all identifying labels.  **A handwinding wheel and brake release** lever shall be provided.  The **safe refuge spaces** shall be clearly marked and identified within the pit and on the car top.  Where equipment or procedures require a preset sequence or events these shall be detailed on notices in appropriate locations as required by the Lift Consultant.  A facility shall be provided to enable **emergency manual movement** of the lift car under all load conditions. |

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|  | **TESTING, WITNESS TESTING & HANDING OVER**  After installation the Contractor shall carry out his own testing and commissioning procedures following which they shall complete any outstanding items. A copy of the Contractor's items list and completed test sheet must be supplied to the Engineer appointed to carry out the Witness Test. Only after this has been received will witness testing be undertaken.  Where the lift contractor has not completed this procedure, resulting in the failure of the witness test, where the unit requires subsequent retesting, we reserve the right to contra charge the lift contractor for the abortive test/visit by a negative variation order.  Witness Testing will be carried out in accordance with the appropriate Sections of British Standard Specification 5655: Part 10.1.1:1995, PAS 32-1:1995 and/or BS8486-3:2017 plus all subsequent revisions. It will be carried out in the presence of the Engineer and shall incorporate all requirements as set out in the Specification.  Full dynamic tests shall form part of the full witness test procedures. These shall be but not necessarily confined to:   * Rated load/rated speed buffer tests to car and counterweight. * Rated load/rated speed car and counterweight safety gear test. * Uncontrolled upward movement test. * Movement away from landing with car door open test. * 125% rated load Brake test. * Rope Brake test. * Traction test. * Door pressure test.   Full control and dispatching systems check shall be undertaken upon completion of each lift in any group.  The cost of any consequential damage to the lift car, finishes and equipment shall be covered by the Lift Contractor.  All test weights, thermometers, instruments and personnel shall be provided together with the appropriate "Test and Examination" Certificates duly completed including all Certificates required.  Personnel carrying out the witness tests shall be the Test Engineer who tested on behalf of the Contractor.  Items requiring rectification following the test shall be carried out by the installing engineers who should also be present during the witness testing procedure.  The Contractor shall not offer the installation for witness testing until all works are completed including the Contractor's own testing and application of all finishes.  The Contractor shall give a minimum of one weeks' notice to the Engineer prior to the date for testing and immediately advise of any changes.  If the installation is not ready for testing at the appointed time, then any subsequent visits by the Engineer may be to the cost of the Lift Contractor. [*It is to be noted that test items are considered to be adjustments and minor rectifications only*].  Following completion of the witness testing a date will be set for the completion of any outstanding items. When these have been confirmed by the Contractor as completed, the Engineer will accept the installation at a formal handover in the presence of the Contractor.  Tenderers are to note that their programme must include for the testing and snagging periods and completion will not be granted until all items have been accepted.  A full set of Test Certificates and where appropriate CE marking and Declaration of Conformity shall be provided upon completion including a grading certificate for all stainless steel, plus Certificates for all electrical services. |
|  | **MAINTENANCE DURING THE WORKS**  The Contractor will assume maintenance of both Lifts covered by this Contract from the start date on site.  The Contractor is to indicate on the tender summary sheet the cost of Maintenance of the lifts from the start date on site to final Completion of both lifts. This maintenance is to be on the same fully-comprehensive basis as the existing maintenance contract.  The lift remaining unmodernised (i.e. the “2nd lift”) will be the subject of regular monthly oiling, greasing, cleaning, adjusting, all repairs and 24-hour callbacks, at the lift contractor’s cost.  When the 1st lift has been completed it will be the subject of Fully Comprehensive Maintenance until the 2nd lift of the Contract is Completed, and the 12 months Defects Liability and Maintenance commences.  When the project commences on the 1st lift, appropriate spare parts from that lift are to be dismantled and shall be retained for use on the 2nd lift as required until that lift is modernised. |
|  | **TWELVE MONTHS DEFECTS LIABILITY & MAINTENANCE PERIOD**  From the date of Completion of the final lift on the project the contractor shall commence the fully comprehensive maintenance and defects liability which shall continue for 12 months or as otherwise agreed.  Regular maintenance shall be carried out monthly and shall include the cleaning, oiling, greasing, adjustment and replacement or repair of all parts of the installation and accessories as necessary to ensure satisfactory operation of the installation, including checking of levelling and making any necessary adjustments. Maintenance visits must be carried out strictly on a one visit per Lift, per month basis and under no circumstances will the routine maintenance visit be incorporated with the periods of attendance for breakdowns or other specific requests.  Any components which become necessary but are not covered by the Defects Liability shall be provided at no extra cost.  The servicing of the Lift during the initial twelve months Defects Liability & Maintenance Period shall include the full cleaning of the lift machine room/space, lift pit and lift shaft and shall include the cleaning and dusting of all voids, ledges, and internal building fabric in addition to the installed Lift equipment.  The Contractor will not be permitted to store cleaning material, grease or oil in the lift shaft or machine room/space.  The Contractor shall renew all lamps which may be found at the time of any inspection to be defective. This includes shaft lighting, machine and car lighting.  A report shall be made available, upon request, which shall provide details of the following:   * The service visits performed and their dates. * Whether the installation is in a satisfactory and serviceable condition. * A detailed list of all breakdowns and other site attendance together with the remedial action taken. * The Contractor must attend to breakdowns and emergency visits on a 24-hour a day basis at no extra cost, with attendance to breakdowns being within 4 hours. * The Contractor shall include for giving full instructions as to the running, operation and hand winding of the installation to the Employer’s appointed staff or their client’s appointed employees.   Failure to submit the reports as requested will result in the final payment not being released. [Refer to appropriate section in this Specification]. |
|  | **ASSOCIATED SPECIFIC WORKS**  The information and requirements of the INTRODUCTION & PREAMBLE form an integral part of the Contract requirements**.**   * Making good of any holes in lift shaft or machine room, including any fire stopping where applicable. * Protective covering to existing finishes and floors. * Making good of existing finishes to agreed demarcation line. * 3no. of each type of key associated with the new fixtures, etc. * Provision of out of hours equipment-transportation through the hospital as necessary, to minimise possible disruption to the building and maximise public safety. * Attendance for fire alarm contractor to interface building alarm system to lift controller for BS EN81-73 features. * All costs associated with Principal Contractor duties. * Provide any ‘service tools’ required to allow the system to be fully ‘open protocol’. * Provide full Safety File at project completion, including O&M Manual and all required post-project Health & Safety File information. * Undertake to address all items required to satisfy BS EN81-80. A full audit of the code requirements shall be performed at Practical Completion, and the lift contractor is to ensure that they include to address all outstanding requirements. Outstanding items include, but are not necessarily limited to:   + The split-level motor room plinth access for the should be improved, with new ladder and new plinth-edge balustrade.   + The lift is required to provide protection against uncontrolled upward movement.   + The main drive gearbox steel frame should requires guarding beneath the steels.   + Upgrade shaft lighting - requires full upgrade to include 3-way switching, and Pit switch to be within easy reach of the bottom floor landing. Additionally, include an RCD protected double socket within the pit area.   + Provide a new suite of safety signage for the entire installation.   + The roof access ladder requires replacement with new compliant equivalent.   + The shaft should be cleaned down and painted in white emulsion.   + The pit area should be cleaned down and painted in non-slip red.   + Provide a new landing entrance protection barrier, if not already on site.   + Lifting beams should be tested prior to use or installed as required.   + The motor room door lock should be replaced.   + Car top guardrails to be min. 900mm to all 3 sides of the lift car, plus toe-boards.   + Provide ascending car overspeed protection.   + Provide means to prevent unintended movement of the lift cars whilst car & landing doors are open.   + The motor room walls & floor should be treated in paint coating to protect against dust.   + The motor room light tubes are not appropriately diffused / protected and should be either fully diffused or replaced.   + An emergency light fitting should be provided.   + Rope holes upstands are required around the existing apertures.   + The lift’s mains isolator should be replaced.   + The floor designations of the building should be reflected within the lift car operating panel.   + An additional emergency stop switch should be provided at the pit level and the existing stop switch replaced & repositioned.   + A new compliant pit ladder should be provided.   + The overspeed governor tension wheel should have an electrical ‘safety check’ contact fitted.   + A new imperforate counterweight screen should be provided.   + A new lift car load-weighing device should be introduced.   + Provision of marked-out safe refuge spaces should be introduced to the car top & pit area. * Undertake to address all items required to satisfy BS EN81-70. Outstanding items include, but are not necessarily limited to:   + The car & landing push buttons should be replaced.   + Voice announcements should be provided within the lift, to confirm operations such as ‘doors opening’, ‘doors closing, ‘1st Floor’, etc.   + Due to the existing car interior width, a 2nd COP should be installed to the opposite side wall.   + The car operating panels should be located within the side walls, in the front section rather than in the centre.   + Ensure fixtures include both visual & audible indication of a call having been registered.   + Provide the emergency communication system (Memcom or equivalent approved) to include visual & audible signals, plus engraved instructions on the correct use of the system. The instructions must accurately match the specific requirement.   + Ensure car light levels achieve min. 50 lux on the COP controls.   + The car & landing push buttons should be at the correct height for compliance to BS EN81-70.   + Ensure emergency light fittings are present within the lift car.   + Hall position indicators / lanterns should be provided at the main floor as a minimum but are recommended on each floor level. |