

Specification for powered domestic lifts with partially enclosed cars and no lift-well enclosures

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- Association of District Councils
- British Broadcasting Corporation
- British Lift Association
- British Retail Consortium
- British Telecommunications plc
- Chartered Institute of Environmental Health
- Chartered Institution of Building Services Engineers
- Department of the Environment
- Department of Trade and Industry (Standard Policy Unit)
- Electrical, Electronic, Telecommunications and Plumbing Union
- Engineer Surveyors Section of the MSF
- Health and Safety Executive
- Institution of Electrical Engineers
- Institution of Incorporated Executive Engineers
- Institution of Mechanical Engineers
- Institution of Plant Engineers
- Lloyds Register of Shipping
- London Underground Ltd.
- National Association of Lift Makers
- Post Office
- Royal Association for Disability and Rehabilitation
- Safety Assessment Federation Ltd.

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- Association of Loading and Elevating Equipment Manufacturers
- Association of Metropolitan Authorities
- British Federation of Care-Home Properties
- British Surgical Trades Association
- Consumer Policy Committee of BSI
- Institute of Trading Standards Administration
- London Fire and Civil Defence Authority
- Trades Union Congress

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Foreword

This British Standard has been prepared by Technical Committee MHE/4. It supersedes BS 5900:1991, which is withdrawn.

The decision was taken to revise the 1991 edition following enquiries and comments from interested parties on various aspects of the standard. Some of its requirements were found, during third-party assessment, to be impossible to meet in practice: for example, the forces necessary to operate sensitive edges and surfaces; and no defined method of test was given for establishing the performance of the half-hour fire seal specified in the standard.

It was decided to remove lifts with full or partial lift-well enclosures from the scope of the standard, as there is no longer a market need for their inclusion.

This standard applies to equipment intended for installation in private dwellings (defined in 3.35) and which is capable of being operated in the normal domestic environment. It does not apply to lift installations in any other premises, which are covered by the BS 5655 and BS EN 81 series of standards.

A lift complying with this standard should be used only by persons who are either capable of using it safely and unaided after having been fully instructed in its use, or by persons who, if not so capable, only use it when adequately attended by an able-bodied person who has been fully instructed in the safe and proper use of the equipment.

This standard includes requirements for rope or chain drive and for hydraulic drive. Requirements for other types of drive systems, e.g. rack/pinion, screw/nut, pull-type hydraulic jack, will be considered for inclusion in a future revision.

Annex A identifies important aspects that should be investigated when considering the installation of a powered domestic lift for a specific user. It also gives guidance on the provision of operating instructions for the user, the services that should be provided and the considerations arising from changes of user or use.

Additional information about lifts is available from a number of sources, including the Disabled Living Foundation and similar information services, and local authority social services departments.

Three related British Standards for similar devices for use by disabled persons in private dwellings are:

BS 5776, *Specification for powered stairlifts*

BS 5965, *Specification for manually driven balanced personal homelifts*

BS 6440, *Code of practice for powered lifting platforms for use by disabled persons*

A further British Standard relevant to this specification is BS 7255, *Code of practice for safe working on lifts*.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 34, an inside back cover and a back cover.

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1 Scope

This British Standard specifies requirements for the design, construction, and installation of powered domestic lifts which are designed for use by persons with impaired mobility travelling between fixed floor levels in private dwellings. It applies to lifts that serve two floors only and that have partially enclosed cars without lift-well enclosures.

In addition to the definitive requirements, this standard also requires the items detailed in clause 4 to be documented. For compliance with this standard, both the definitive requirements and the documented items have to be satisfied.

NOTE Guidance to the purchaser of a lift, on behalf of a specific user, is given in annex A.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this British Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

BS 228:1984, *Specification for short pitch transmission precision roller chains and chainwheels*.

BS 302-1:1987, *Stranded steel wire ropes — Part 1: Specification for general requirements*.

BS 302-2:1987, *Stranded steel wire ropes — Part 2: Specification for ropes for general purposes*.

BS 302-4:1987, *Stranded steel wire ropes — Part 4: Specification for ropes for lifts*.

BS 476-20:1987, *Fire tests on building materials and structures — Part 20: Method for determination of the fire resistance of elements of construction (general principles)*.

BS 3456-101:1987, *Specification for safety of household and similar electrical appliances — Part 101: General requirements*.

BS 3456-201:1990, *Specification for safety of household and similar electrical appliances — Part 201: General requirements*.

BS 3535-1:1990, *Isolating transformers and safety isolating transformers — Part 1: General requirements*.

BS 3535-2:1990, *Isolating transformers and safety isolating transformers — Part 2: Specification for transformers for reduced system voltage*.

BS 4293:1983, *Specification for residual current-operated circuit breakers*.

BS 5594:1993, *Specification for leaf chains, clevises and sheaves*.

BS 5619:1978, *Code of practice for design of housing for the convenience of disabled people*.

BS 6977:1991, *Specification for insulated flexible cables for lifts and for other flexible connections*.

BS 7071:1992, *Specification for portable residual current devices*.

BS EN 55014-1:1997, *Electromagnetic compatibility — Requirements for household appliances, electric tools and similar apparatus — Part 1: Emission — Product family standard*.

BS EN 60335-1:1995, *Specification for safety of household and similar electrical appliances — Part 1: General requirements*.

3 Terms and definitions

For the purposes of this British Standard, the following definitions apply.

3.1

authorized person

individual who has:

- a) received sufficient training and has sufficient knowledge and experience of the relevant type of lift to enable him/her to recognize the hazards of such a lift; or
- b) been instructed on the specific task assigned to him/her and on how to avoid the associated hazards

3.2

brake

electromechanical mechanism employed to bring the car to rest and hold it in this position

3.3

buffer

resilient stop at the end of the travel of the car or counterweight

3.4

car

load-carrying unit of the lift, complete with its platform, frame attachments and enclosure

3.5

car enclosure

enclosing bodywork of the car

3.6

chain

transmission chain within a drive system, that either transmits rotary motion from one shaft to another or transmits motion directly to the car and/or counterweight

3.7

chainwheel

wheel having machine-cut teeth designed to engage with a chain

3.8

contactor

electromagnetically operated drive for switching a mains electrical power circuit

3.9

control devices

manually operated devices used to control the lift

NOTE Switches and push-buttons are examples of control devices.

3.10

controller

assembly of electrical components, mounted within an enclosure, for controlling the lift

3.11

counterweight

weight or series of weights used to counterbalance the weight of the car and part of the rated load

3.12

direct-acting lift

hydraulic lift where the ram or cylinder is directly attached to the car or its sling

3.13

disabled person

person with impaired mobility

3.14

domestic lift

lift serving fixed landing levels in a private dwelling

3.15

door system

door or door-and-ramp system that closes the entrance of the lift car

3.16

door lock

electromechanical device used to lock the door system, the unlocking of which is controlled by the position of the car

3.17

down direction valve

electrically controlled valve in a hydraulic circuit for controlling the descent of the car

3.18

final limit safety switch

electrical safety switch positively and mechanically operated by the car in the event of overtravel.

3.19

floor stopping switch

switch or combination of switches arranged to bring the car to rest automatically at or near the landing of any preselected floor, including the terminal floor

3.20

follow-through

amount of additional free movement provided in the actuation of an electrical switching device after the electrical contact has been made or broken.

3.21

guide

component that guides the car and the counterweight

3.22

guide bracket

member which secures the guides to the building or structure

3.23

guide shoe

component attached to the car frame, and to the counterweight (if fitted), to ensure continuous alignment with the guides

3.24

guide roller

roller attached to the car frame, and sometimes to the counterweight (if fitted), to ensure continuous alignment with the guides

3.25

hydraulic lift

lift in which the lifting power is derived from an electrically driven pump transmitting hydraulic fluid to a jack, acting directly or indirectly on the car

NOTE Multiple motors, multiple pumps and/or multiple jacks are sometimes used.

3.26

indirect-acting lift

hydraulic lift where the ram or cylinder is connected to the car or the car sling by means of suspension (e.g. by ropes, chains)

3.27

jack

combination of a cylinder and a ram forming a hydraulic actuating unit

3.28

journey

movement of the car from one level to the other level, involving one start and one stop

3.29

landing

area for access to the car at each level served

3.30

liftway

space in which the car (and counterweight or balance weight, if there is one) travels

3.31

non-return valve

valve which allows flow in one direction only

3.32

overspeed governor

device which causes the lift to stop when it reaches a predetermined speed, and if necessary causes the safety gear to be applied

3.33**partially enclosed car**

car without a roof, comprising a platform, permanent sides and an entrance which is protected by a door or door-and-ramp system

3.34**pressure relief valve**

valve which limits hydraulic pressure to a predetermined value by exhausting fluid

3.35**private dwelling**

self-contained building or part of a building used as a single-family dwelling, having one or more storeys or levels and its own main entrance door situated at ground level or at any level that serves as ground level

3.36**ramp**

hinged flat surface, attached to the car, that, when lowered, provides access to the car and, when raised, restrains a wheelchair

3.37**rated load**

load for which the equipment has been built and for which normal operation is guaranteed by the supplier

3.38**rated speed**

speed of the car for which the equipment has been built and for which normal operation is guaranteed by the supplier

3.39**rupture valve**

valve designed to close automatically when the pressure drop across it, caused by increased flow in a predetermined direction, exceeds a preset value

3.40**safety factor**

ratio, for a particular member under static conditions, of the yield load to the load that can be imposed upon the member by the maximum working load

NOTE This definition of "safety factor" applies except where the term is defined otherwise in the text.

3.41**safety gear**

mechanical safety device attached to the lift car to prevent the car and counterweight (if fitted) from falling, and to maintain them within the guides

3.42**safety rope/chain**

auxiliary rope or chain attached either to the car and counterweight, or to the car and a fixed point, for the purpose of tripping a safety gear if the suspension fails

3.43**safety switch**

electrical switch whose contacts are opened by positive mechanical action and, if necessary, by wrenching of the breaking contacts

3.44**sensitive edge**

safety device attached to any edge of the car to protect against crushing

3.45**sensitive surface**

safety device similar in effect to a sensitive edge, but arranged so as to protect a whole surface such as the underside of the lift car

3.46**shut-off valve**

manually operated two-way valve which can permit or prevent flow in either direction

3.47**slack rope/chain safety switch**

switch, or combination of switches, arranged so as to stop the lift if any of the suspension ropes/chains slacken by a predetermined amount

3.48**unlocking zone**

zone, extending above and/or below the lift car's stopping level, within which the car floor has to be positioned to allow the door system to be unlocked

4 Information and requirements to be agreed and documented

The following information obtained from the purchaser shall be fully documented. For compliance with the standard, both the definitive requirements specified throughout the standard and the following documented items shall be satisfied:

- a) the minimum floor area required at each landing to allow the user to reach, enter and exit from the lift (see 5.1d);
- b) the required internal floor area of the lift car (see 10.5);
- c) the type of lift controls required, and their position (see 6.3.3);
- d) the minimum number of journeys per hour that the lift shall be capable of making (see 5.2).

NOTE Items a), b) and c) should take into account the nature of the user's disability and his or her need for personal and mechanical assistance: see B.3. Item c) should also be influenced by whether the user is right- or left-handed or has the use of only one hand.

5 General

NOTE Design considerations necessary to ensure that these requirements can be met are given in annex B.

5.1 Location

The lift shall be installed in a location where:

- the floors can support any loads imposed upon the lift structure or guides, and that the wall can support suitable fixings for the structure, guides and lift well enclosure;
- an aperture of sufficient size to accommodate the lift can be cut through the upper floor without loss of structural integrity;
- there is sufficient headroom at the top floor level to accommodate the lift and to house any winding gear and control equipment.
- the space in front of the lift entrances at each landing served is sufficient to meet the requirement documented in accordance with 4a

NOTE The actual area provided at each landing should allow for the nature of the user's disability and their need for personal and mechanical assistance: see B.3.

5.2 Journeys per hour

The lift shall be capable of making the number of journeys documented in accordance with 4d.

5.3 Motor and gearbox

The thermal time ratings of the motor and gearbox shall be not less 25 %. The gearbox wear rating shall ensure a minimum life of 100 000 starts and 2 500 h at full load.

5.4 Protection against hazards

Protection designed to minimize risk of the following shall be incorporated:

- shearing, crushing, trapping and abrading;
- falling;
- physical shock;
- electrical shock;
- fire, attributable to use of the lift.

5.5 Safety factor

Unless otherwise stated in this standard, the safety factor for all parts of the equipment shall be not less than 3.

5.6 Design and materials

Components shall be designed to take account of all static and dynamic loads and forces.

NOTE 1 Components should be of sound mechanical and electrical construction, using materials that are free from obvious defects and that are of adequate strength and suitable quality. The design and materials should ensure that the dimensions specified in this standard will be maintained despite wear. The transmission of noise and vibration to any surrounding walls and other supporting structures should be minimized.

NOTE 2 The lift should not be made of materials likely to become dangerous through flammability or through the nature and quantity of gas and fumes they may generate on combustion.

5.7 Electrical supply

The lift shall be powered from a single-phase electrical supply with effective earth connection in accordance with BS 7671:1992, or from a three-phase supply with neutral.

The supply shall be dedicated to the lift, and shall originate at the household consumer unit and terminate at a double-pole fused spur conforming to BS 7671:1992.

NOTE The supplier should advise the purchaser concerning suitable positioning of the spur.

The electrical supply for the lift shall not include a pre-payment meter.

6 Electrical equipment

6.1 General

The electrical specification and construction of the lift shall conform to BS 3456-101:1987 and BS 3456-201:1990, as appropriate.

6.2 Radio disturbance characteristics

The radio disturbance characteristics of the electric motor, contact devices and control devices shall conform to BS EN 55014-1:1997. Suppression components shall not be used in any part of the circuit where their failure might cause an unsafe condition.

6.3 Control and alarm system

6.3.1 All control circuits shall be designed to fail safe.

NOTE Although the exclusive use of wired control circuits provides a very high degree of safety, it may be necessary to resort to the use of remote control devices, specially adapted switches and sensors. Recommendations are given in annex C.

6.3.2 Movement of the car shall be controlled by devices located within the car and at both landing levels. The control station in the car shall consist of the floor-selection control devices, a "stop" safety switch and an "alarm" control device. The control station at each landing shall consist of a device to call the car.

NOTE 1 If required, one or more devices may be provided at the landing to despatch the car to the other floor.

NOTE 2 Control devices should take into account any special needs of the user. See A.3.3.4 and A.8.1.

NOTE 3 Consideration should be given to the provision of an on/off tumbler-operated key switch to restrict the use of the lift to the intended user (see A.3.3.4d).

Means shall be provided at each landing to control the car illumination.

6.3.3 The type and position of controls which are to be operated by the user shall conform to the requirement documented in accordance with 4c.

6.3.4 Directional signals shall be self-maintained during travel. It shall not be possible to interfere with the lift during travel by the use of any manual control except the "stop" safety switch.

6.3.5 Lifts having a drum drive or chain suspension shall be provided with a slack rope/chain safety switch in accordance with 14.2.



6.3.6 No push-button or switch that can render the door lock circuit ineffective shall be fitted.

6.3.7 Electrical circuits and live components, whether mounted in or on the lift car or in the lift well, shall be enclosed.

6.4 Control circuits

6.4.1 The motor shall be protected by:

a) in the case of electromechanical drives, a cut-out that operates within 10 s of the motor stalling. This cut-out shall be of the manual reset type;

b) in the case of electro-hydraulic drives, a device that offers equivalent protection to a), e.g. a journey timer or winding thermistor.

6.4.2 The control circuit voltage shall not exceed 55 V r.m.s. and shall be derived from the secondary winding of an isolating transformer conforming to BS 3535-1:1990 and BS 3535-2:1990.

One pole of the control circuit voltage supply shall be earthed and the other pole shall be fused as illustrated in Figure 1a for an a.c. supply, or Figure 1b, 1c, or 1d, for a d.c. supply.

NOTE Graphical symbols in accordance with BS 3939.

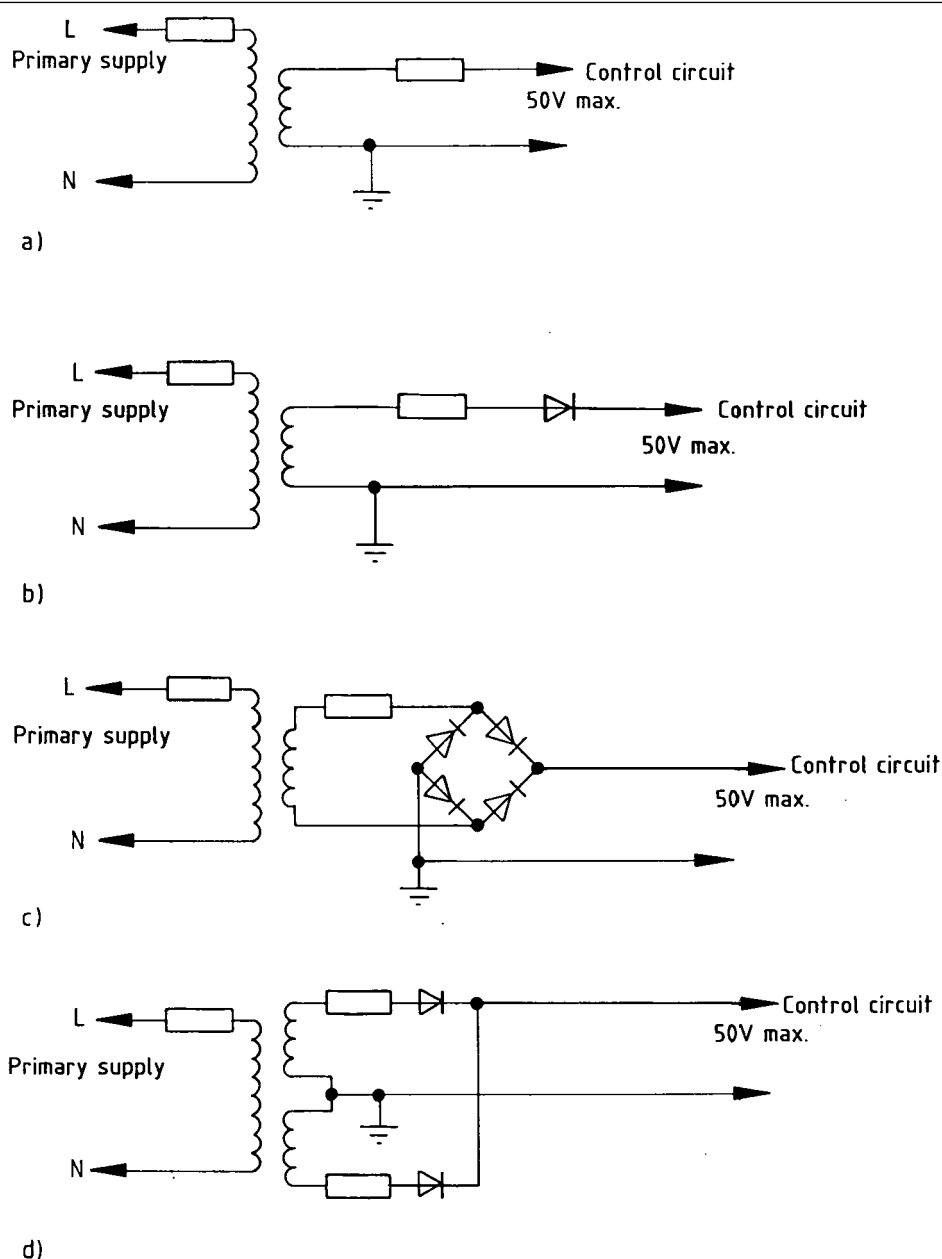


Figure 1 — Control circuit supply circuit (see 6.4.2)

6.4.3 A trailing cable or winding drum carrying a voltage greater than 55 V above earth shall be protected by a residual current device (RCD) conforming to either BS 4293:1983 or BS 7071:1992, as appropriate. The maximum rated tripping current shall be 30 mA. The maximum trip time at rated tripping current shall be 200 ms. The maximum trip time at 5 times the rated tripping current shall be 40 ms. This RCD shall protect all parts of the installation which are at 240 V. The testing of this RCD shall not cause spurious tripping of any other RCD fitted to the mains supply circuit.

6.4.4 The main motor and brake control circuit shall have at least two independently operated contacts in series. The circuit shall be designed so that the failure of one of the contacts prevents operation of the lift not later than the next change of direction.

6.4.5 Isolation of the electrical supply to stop the drive motor and apply the brake shall not depend upon the closing or maintenance of an electrical control circuit.

6.4.6 There shall be a delay of at least 3 s between the stopping of the lift car and its being restarted in either direction.

6.4.7 An earth fault, an open circuit or the discharge or failure of a capacitor shall not give rise to an unsafe condition.

6.5 Relays and contactors

6.5.1 All fixed and moving contacts shall be easy to replace.

6.5.2 Where a pivoted joint of a contactor or relay forms part of the circuit, such joints shall be bypassed with a flexible connection having sufficient current capacity.

6.5.3 Contactors having main contacts in juxtaposition shall be separated by an insulating barrier.

6.5.4 Contactors for reversing the direction of travel shall be electrically interlocked.

6.5.5 All contacts on any contactor used for direct control of the electrical supply to the main driving motor shall be linked so that they open or close together, so that, if one contact becomes welded, all are retained in the same position and no contact can make in the opposite sense.

6.6 Limit safety switches

6.6.1 Floor-stopping switches and final limit safety switches shall be provided and shall be fully enclosed. These switches shall control at least two separate and independent contactors, both of which shall be operated to complete the motor and brake circuit for each direction of travel. The opening of the final limit safety switch shall prevent further movement under power of the lift car in both directions of travel until the lift has been correctly repositioned manually and recommissioned.

NOTE Repositioning and recommissioning should only be undertaken by an authorized person.

6.6.2 The floor-stopping switches and final limit safety switches shall be securely mounted so that operation of the switches is not affected by normal lateral movement of the car. The operating cams for these switches shall be of rigid and durable material and of sufficient length to maintain the switch in the operated position when the lift car reaches the upper or lower limit of its travel.

6.6.3 The floor-stopping switches shall stop the lift automatically, from any speed attained in normal operation, within ± 12 mm of the floor level at each floor served, independently of the final limit safety switch and buffers.

6.7 Controller construction

6.7.1 Controller enclosures containing live parts, including any access cover forming part of that enclosure, shall be capable of withstanding a force of 300 N, applied perpendicular to the surface and evenly distributed over any square or circular area of 2 500 mm².

6.7.2 Removable covers shall be retained by captive devices that can only be removed by use of a tool. (See also **6.7.10**).

6.7.3 Materials used in the construction of the control equipment shall not support combustion.

6.7.4 Where electrical and control cables are subjected to a mechanical loading, they shall be securely clamped at each end to prevent them from pulling from their terminations.

6.7.5 The conductors in electrical cables shall have a cross-sectional area compatible with the maximum current to be carried in accordance with BS EN 60335-1:1995, Table 9.

6.7.6 All terminals throughout the system shall be marked and conductors shall be terminated by soldering, clamping or crimping in such a way that the conductors and the insulation are not damaged. Terminals for site wiring to the controller shall not be soldered.

6.7.7 The insulation of the controller wiring shall be of flame-retardant type.

6.7.8 Earth continuity conductors shall be of copper and shall have a current-carrying capacity equal to or greater than that of the largest current-carrying conductor in the associated circuit.

6.7.9 It shall not be possible to expose to touch any wiring and components at a potential exceeding 15 V without first obtaining access through the use of a tool (see also **6.7.2**).

6.7.10 Any nut or screw used for clamping a conductor shall not be used for clamping any other component.

6.7.11 Mains input terminals shall be conveniently accessible within the equipment and shall be identified to indicate the correct polarity, i.e. “L” for live and “N” for neutral. The main earth terminal shall be located conveniently near the mains input

and shall be identified by “E” or  .

6.7.12 Earthing terminals shall maintain electrical continuity, shall be of the stud type and shall be not smaller than M5. They shall not be used for securing any component, nor shall it be possible to loosen the connection without the use of a tool. All earth conductors shall be terminated by crimping or soldering.

6.8 Installation

6.8.1 If an electrical supply is required to operate an alarm bell or signal (see **A.8.1**) and/or emergency lighting (see **A.8.2**), it shall be taken from a battery or other permanently available independent source.

6.8.2 All wiring for the power, control and safety circuits shall be routed so as to avoid the possibility of mechanical damage, or shall be protected against mechanical damage. Power circuits shall have a minimum cross-section of 0.75 mm².

6.8.3 All exposed metalwork, other than conductors, liable to become electrically charged shall be earth-bonded (see **17.1.3**).

6.8.4 Travelling cables between the lift well and lift car terminal box shall be clamped to the lift car and lift well in such a way as to prevent chafing and misuse.

6.8.5 The travelling cable shall conform to BS 6977:1991.

7 Liftway protection

7.1 The underside of the car platform shall be fully protected by a sensitive surface, to prevent trapping between the under surface of the car and the lower floor level. (See Figure 2).

When measured in two diagonally opposite corners and at the centre point of the sensitive surface, the mean force required to actuate this device shall not exceed:

- a) 35 N for surfaces with an area equal to or less than 0.5 m²;
- b) 50 N for surfaces with an area greater than 0.5 m².

If the sensitive surface projects more than 5 mm on any side of the car platform, it shall be actuated in both compression and tension.

7.2 A half-hour fire resistance capability between the lower and upper levels shall be given by the provision of a suitable fire seal.

NOTE 1 The design and position of the seal should take account of the type of lifting mechanism and its use. A method of test for a particular type of seal is given in annex D.

NOTE 2 Consideration should be given to the provision of a smoke detector/alarm powered from a battery back-up unit which has a minimum capacity of 1 h and is automatically rechargeable from the mains supply. A suitable location would be adjacent to the lift shaft.

7.3 The upper edges of the lift car shall be fitted with sensitive edges, to prevent trapping between the top of the car and the underside of the ceiling at the opening of the liftway (see Figure 2). The mean force required to actuate these devices shall not exceed 30 N when measured at each end and at the mid-point.

7.4 While the lift car is at the lower level, the upper-floor aperture shall be closed off by means of an infill capable of supporting a load of at least 150 kg spread evenly over its area (see Figure 2). This infill shall create a level surface and shall not be removable without the use of special tools.

7.5 A device that will sense an obstruction on the upper side of the infill shall be provided. It shall function in the manner specified in **7.8**, but shall stop the lift car in the upward direction only.

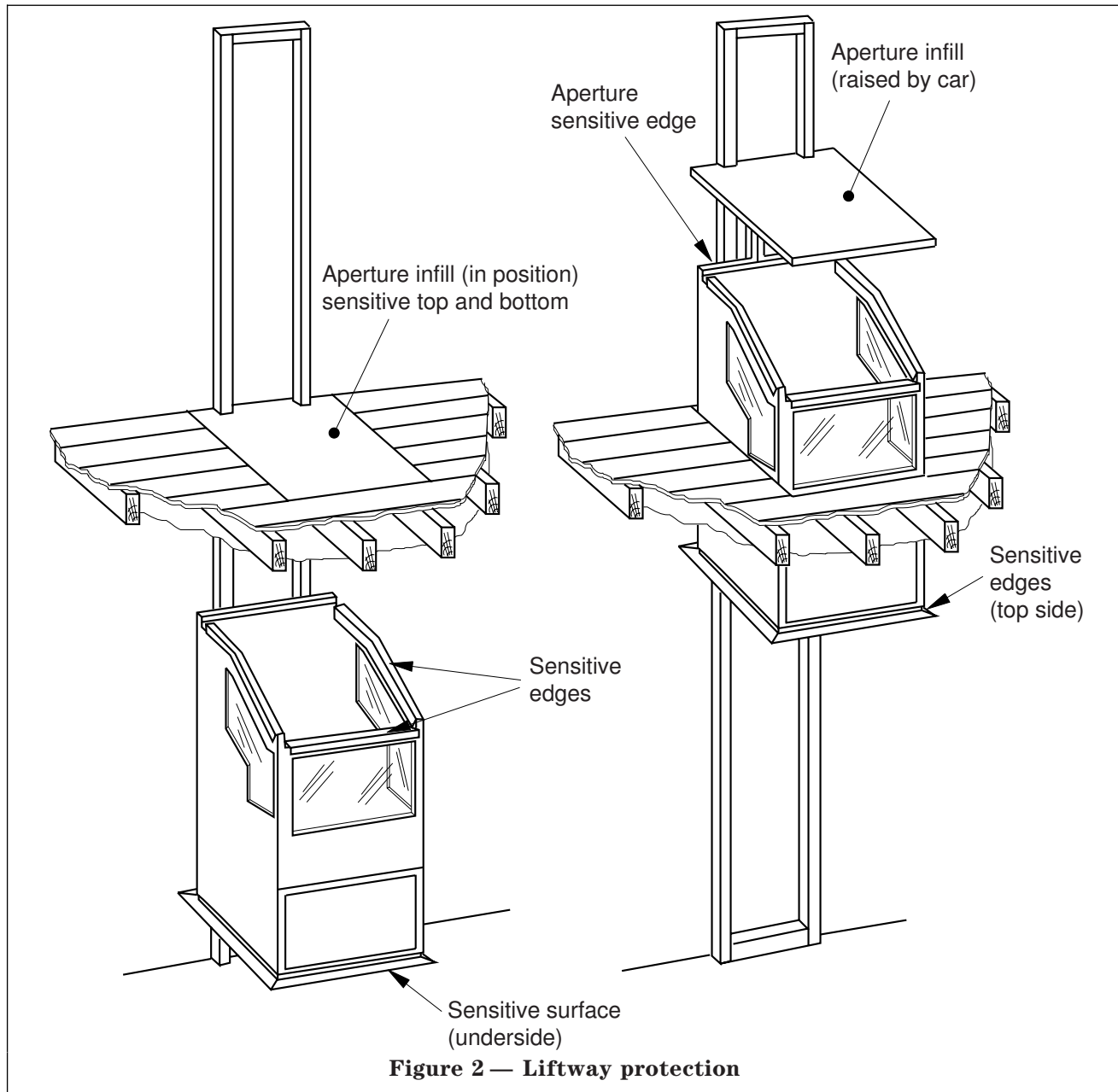
7.6 If a travelling infill is used, a device shall be fitted which stops the car if the infill becomes detached from it at any point above the upper-floor aperture. This device shall operate in the manner specified in **7.8** to stop the car when it is travelling downwards. The device shall remain effective until the infill is correctly located in the aperture.

For other infill systems, equivalent protection shall be provided to stop downward motion of the car if the infill fails to be reinstated completely in the aperture.

7.7 The opening between the top side of the upper floor and the underside of the infill shall be fully protected by safety devices to prevent trapping.

7.8 Operation of the sensitive surfaces, sensitive edges and safety devices shall actuate a safety switch (or switches) which breaks the electrical supply to the motor and brake, stops the car in the direction of travel and prevents any further movement of the car towards the obstruction. It shall be possible, after a delay of 3 s (see **6.4.6**), to drive the car away in the opposite direction to clear the obstruction.

7.9 The sensitive edges specified in **7.3** shall function in the manner specified in **7.8**, but shall stop the lift car in the upward direction only.



7.10 The safety devices specified in 7.7 shall function in the manner specified in 7.8, but shall stop the lift car in the downward direction only. These devices may be overridden when the closing edge of the infill is within 20 mm of the surface of the upper floor.

7.11 When caused to stop by the operation of the sensitive surface or edges, the lift car shall come to rest no more than 25 mm from the point at which it first made contact with the obstacle. There shall be sufficient follow-through of the sensitive surface or edges to prevent injury.

7.12 Means shall be provided to avoid the hazards of trapping caused by the movement of sensitive edges and surfaces.

8 Guides and fixings

8.1 Rigid guides shall be used for guiding the lift car, and the counterweight (where fitted), throughout its travel.

The guides shall be of sufficient length to prevent any of the car or counterweight shoes from running off them.

The deflection of the guides under normal lift operation shall not exceed 3 mm.

8.2 The guide bracket fixings shall withstand the loads imposed when the car, with its rated load, or the counterweight, is stopped by operation of the safety gear.

The guide fixings and guide bracket fixings shall be designed so that the guide is not released by any rotary movement of the guide clips.

9 Car top clearance

The car top clearance from the nearest striking point for a lift without counterweight shall be not less than 50 mm.

The car top clearance from the nearest striking point for a lift with counterweight shall be not less than 75 mm.

10 Lift car

10.1 Car frame

The car enclosure shall either have an integral metal frame or be carried on a separate metal frame. When supporting the rated load, evenly distributed over its platform, the frame shall withstand the operation of the safety gear without permanent deformation.

The car frame shall be provided with at least four renewable guide shoes, or guide shoes with renewable linings, or with at least four sets of guide rollers, two at the top and two at the bottom of the frame.

10.2 Car enclosure

10.2.1 The car enclosure shall be imperforate and shall withstand a force of 300 N, applied perpendicular to the surface and evenly distributed over any square or circular area of 2 500 mm², without permanent deformation and without elastic distortion greater than 10 mm.

10.2.2 The external surface of the car enclosure shall have no recess or projection exceeding 5 mm.

NOTE This requirement is intended to prevent the possibility of children climbing onto the outside of the car or having fingers in the openings when the lift is operated.

10.2.3 The height of each side of the car enclosure, excluding entrances, shall be not less than 1.875 m above the car floor, unless the lift is to be used solely by a seated person or by a person in a wheelchair, in which case the height of each side of the car enclosure shall be not less than 1.22 m.

10.3 Car entrance

10.3.1 Dimensions

The clear width of the car entrance shall be not less than:

- a) 650 mm, for a car capable of carrying a person within a wheelchair; or
- b) 500 mm, for a car capable only of carrying a sitting or standing user.

NOTE If practicable, the clear width of the car entrance should be 800 mm, as recommended in BS 5619:1978.

The clear height of the car entrance shall be not less than 1.875 m.

10.3.2 Car entrance protection

10.3.2.1 The car entrance shall be protected by a sliding, folding or hinged door, or by a door-and-ramp system, that extends to the full height and width of the entrance. The height of the door, or the combined height of the door and ramp, shall not be less than 1.22 m. If a ramp is fitted, its maximum approach gradient when lowered shall not exceed 1:8.

10.3.2.2 The upper edge of the door system shall be fully protected by a sensitive edge (see Figure 2). The mean force required to actuate the sensitive edge shall not exceed 30 N when measured at each end and at the mid-point.

10.3.2.3 The operation of the sensitive edges shall actuate a safety switch (or switches) which breaks the electrical supply to the motor and brake, stops the car and prevents any further movement of the car towards the obstruction. It shall be possible after a delay of 3 s (see 6.4.6) to drive the car away in the opposite direction to clear the obstruction.

10.3.3 Construction of door system

10.3.3.1 The door system shall be imperforate and shall withstand a force of 300 N, applied perpendicular to the surface and evenly distributed over any square or circular area of 2 500 mm², without permanent deformation and without elastic distortion greater than 10 mm.

10.3.3.2 Sliding or folding doors shall be guided at the top and bottom to prevent twisting. The guide blocks or rollers shall be easily renewable.

10.3.3.3 The door system and the surrounds shall be designed to minimize the risk of trapping that could cause injury.

10.3.3.4 Where there is a risk of shearing, accessible hollows on the faces of the door system shall have a depth of no more than 3 mm, and accessible projections shall project from the face of the door system by no more than 3 mm. The edges of such hollows and projections shall be chamfered.