

Lifts and service lifts —

Part 6: Code of practice for selection and installation

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- British Railways Board
- British Retailers' Association
- Chartered Institution of Building Services Engineers
- Consumer Standards Advisory Committee of BSI
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- Electrical, Electronic, Telecommunications and Plumbing Union
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- Lloyds Register of Shipping
- London Underground Ltd.
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- National Health Services
- Post Office
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- Scottish Development Department

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Contents

	Page
Committees responsible	Inside front cover
Foreword	iii
Section 1. General	
1.1 Scope	1
1.2 Statutory regulations	1
1.3 Definitions	2
Section 2. Guidance to contracting parties	
2.1 Exchange of information	3
2.2 Lift enquiry or invitation to tender	3
2.3 Acceptance of tender and subsequent procedure	5
2.4 Co-ordination of site work	6
2.5 Procedure following test, including inspection and maintenance	7
Section 3. Building construction	
3.1 General	9
3.2 Dimensional tolerances	9
3.3 Lift well construction	10
3.4 Machine room construction	13
3.5 Pulley rooms	15
3.6 Safety signs and warning notices	16
Section 4. Electric lifts for passengers and goods	
4.1 Preliminary design	19
4.2 Power and control systems	25
4.3 Electrical installation	30
4.4 Conditions for optimum practice	32
Section 5. Hydraulic lifts for passengers and goods	
5.1 General	38
5.2 Power and control systems	38
5.3 Electrical installations	40
5.4 Conditions for optimum practice	40
Section 6. Observation lifts	
6.1 General	42
6.2 Description	42
6.3 Technical features	42
6.4 Car layout	42
6.5 Outdoor installations	42
Appendix A Summary of guarding requirements	43
Appendix B British Standards for lifting devices	45
Appendix C Guidance for the design and installation of observation lifts	45
Index	47
Figure 1 — Structural limits of accuracy	11
Figure 2 — Typical examples of safety signs and warning notices on outside of doors giving access to the lift well	17
Figure 3 — Typical examples of safety signs and warning notices on outside of machine room and pulley room doors and traps	18
Figure 4 — Typical examples of safety signs and warning notices associated with trap-doors	18
Figure 5 — Grouping of lifts	24

	Page
Table 1 — Limits of accuracy of well plumb dimensions	9
Table 2 — Recommended rated speed in relation to lift travel	20
Table 3 — Passenger lifts performance data for 6 to 9 floors served	21
Table 4 — Passenger lifts performance data for 10 to 18 floors served	23
Table 5 — Power systems and related standard speeds	27
Table 6 — Examples of diversity factors	30
Table 7 — Lift functional time periods	37
Table 8 — Minimum valve systems and related standard speeds	39
Table 9 — Peak period motor starts	39
Publications referred to	50

Foreword

This Part of BS 5655, prepared under the direction of the Mechanical Handling Standards Committee, revises and supersedes CP 407:1972 and BS 2655-2:1959 which have been withdrawn. This edition introduces editorial and technical changes to bring the standard up-to-date and incorporates amendment numbers 1 and 2 (AMD 5226 and AMD 5624) and also draft amendment number 3; it does not reflect a full review of the standard which will be undertaken in due course. This edition supersedes the 1985 edition which is withdrawn. It is the sixth Part of a British Standard relating to lifts and service lifts, which will be progressively published to supersede portions of relevant Parts of BS 2655. The standard comprises the following Parts.

- *Part 1: Safety rules for the construction and installation of electric lifts (implementing EN 81/1), together with PD 6500 "Explanatory supplement to BS 5655-1";*
- *Part 2: Safety rules for the construction and installation of hydraulic lifts, (implementing EN 81/2);*
- *Part 3: Specification for electric service lifts;*
- *Part 4: (reserved for future publications);*
- *Part 5: Specifications for dimensions of standard lift arrangements, (implementing ISO 4190/1 and ISO 4190/2);*
- *Part 6: Code of practice for selection and installation;*
- *Part 7: Specification for manual control devices, indicators and additional fittings (implementing ISO 4190/5);*
- *Part 8: Specification for eyebolts for lift suspension;*
- *Part 9: Specification for guide rails (implementing ISO 7465);*
- *Part 10: Specification for testing and inspecting electric and hydraulic lifts;*
- *Part 11: Recommendations for the installation of new, and the modernization of, electric lifts in existing buildings;*
- *Part 12: Recommendations for the installation of new, and the modernization of, hydraulic lifts in existing buildings.*

Further Parts are anticipated.

In addition the following Draft for Development is in preparation.

DD ... Code of practice for vandal resistant lifts.

The scope of this code of practice, besides updating the recommendations given in CP 407 to take cognizance of BS 5655-1 (EN 81/1), has been extended to include much of the associated building requirements (also suitably updated) specified in BS 2655-6, and to include in Appendix A the guidance on the guarding of equipment formerly given in BS 2655-10.

In addition, guidance is given on the design and use of micro-processor control equipment.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations. In particular attention is drawn to the statutory regulations, etc., listed in 1.2 and Appendix A.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 50, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Section 1. General

1.1 Scope

This Part of BS 5655 gives recommendations for the selection and installation of electric and hydraulic lifts for passengers, goods and service that are manufactured to comply with BS 5655.

NOTE 1 This code of practice paraphrases many of the requirements specified in, and should be read in conjunction with, all other Parts of BS 5655. It indicates the information that should be exchanged between the interested parties and the sequence of events from the preliminary planning stage to the handing over of the installation.

General guidance is given in section 2 on the procedure to be adopted in obtaining a lift installation that is satisfactory from the aspects of operation, safety and maintenance, and also on the exchange of information between the lift contractor and other trades in providing various service facilities.

Lifts selected in accordance with these recommendations are generally suitable for use by disabled persons; it may, however, be necessary to specify additional features to suit certain disabilities (see BS 5810 and BS 5619).

The building requirements for the equipment covered by BS 5655-1 and BS 5655-2 have been brought together in section 3 because of their interest to the architect or other person responsible for specifying the details of building construction, this last-mentioned function not being the prime responsibility of the lift contractor. Additional building work requirements (such as fixings, cutting away for switches and making good) are not covered by BS 5655-1 and BS 5655-2; reference should be made to the drawings supplied by the manufacturer of the equipment.

Electric lifts are dealt with in section 4 and hydraulic lifts in section 5.

Section 6 provides guidance on the use and installation of observation lifts, which are increasingly being installed in modern buildings. Since specific requirements for this type of lift are not included in the current editions of BS 5655-1 and BS 5655-2, Appendix C has been included to provide guidance in the design and installation of observation lifts.

The code is not applicable to homelifts, stairlifts, lifting platforms, etc. for the disabled; scissor lifts; builders' hoists; lifts in ships (specific requirements for which are specified in ISO 8383), mines or quarries; paternosters; rack and pinion hoists; screw-driven lifts; theatrical lifts; lifts with automatic loading; skips; platforms for exploration or drilling at sea; construction and maintenance appliances; order pickers; and vehicle tail lifts. Some of the standards covering these types of lifts are listed in Appendix B.

NOTE 2 The titles of the publications referred to in this standard are listed on the inside back cover.

1.2 Statutory regulations

NOTE See also A.2.

Compliance with this code does not confer immunity from legal obligations. Attention is drawn to the following examples of statutory regulations that may be applicable to lifts, depending upon their location:

- a) the Factories Act¹⁾;
- b) the Factories Act (Northern Ireland)¹⁾;
- c) the Offices, Shops and Railway Premises (Hoists and Lifts) Regulations (Statutory Instrument 849)¹⁾;
- d) the Health and Safety at Work, etc. Act¹⁾.

It is the responsibility of the manufacturer, purchaser, and all other parties involved to comply with statutory requirements. Advice should be sought where necessary from the Health and Safety Executive or the Environmental Health Office of the relevant local authority, as appropriate.

Where reference is made in this code to the Building Regulations this means compliance with the latest editions of:

- 1) the Building Regulations (applicable in England and Wales, except inner London);
- 2) the Building Regulations (Northern Ireland);
- 3) the London Building Acts, and Construction byelaws in force thereunder;
- 4) the Building Standards (Scotland) Regulations.

¹⁾ Obtainable from HMSO

1.3 Definitions

For the purposes of this Part of BS 5655 the following definitions apply.

1.3.1 control system

that which controls the manner in which the lift and doors operate

1.3.2 entrance

a complete landing door assembly together with its surround

1.3.3 fire-fighting lift

a lift designated to have additional protection, with controls that enable it to be used under the direct control of the fire brigade in fighting a fire

1.3.4 fireman's lift (obsolescent)

a lift provided with controls that enable it to be used under direct control for emergency purposes but without the additional protection required for fire-fighting lifts

1.3.5 group of lifts

a number of lifts that are electrically inter-connected

1.3.6 lift contractor

the party who contracts to supply and install the lift(s)

1.3.7 observation lift

a lift that is designed to provide a panoramic outlook for passengers and that is an architectural feature of a building. The well for such a lift may be partially unenclosed

1.3.8 power system

that which provides power for directly controlling the motion of the lift

1.3.9 service lift

a permanent lifting equipment serving defined landing levels, comprising a car, the interior of which is inaccessible to persons on account of its dimensions and means of construction, running at least partially between rigid vertical guides or guides whose inclination to the vertical is less than 15°

to ensure *inaccessibility to persons*, the car of such lifts comprises one or more compartments each having a floor area not exceeding 1.25 m², an interior height, depth and width not exceeding 1.4 m and a total rated load of all compartments not exceeding 500 kg

NOTE The dimensions given in this definition follow those given in BS 2655-9 and are at variance with the definitions of service lift given in EN 81/1 (i.e. BS 5655-1) and ISO 4190/3, the latter not being approved by the UK.

1.4 Safe working on lifts

The provisions for safe working on lifts recommended in BS 7255, which are additional to the features recommended in this Code of Practice, should be adopted when installing, examining, inspecting, testing, servicing, repairing, dismantling and demolishing permanent lift installations.

Section 2. Guidance to contracting parties

2.1 Exchange of information

If the projected installation is one of the arrangements described in 4.1, the following guidance will enable the preliminary scheme for the installation to be established.

Although the recommended outline for the various classes of lift is given in BS 5655-5, 4.1 and 5.1 of this code enable the general planning details to be determined by the architect. These should be finally settled at the earliest possible stage by detailed investigation, with the purchaser's representative reaching agreement with the lift contractor, where necessary, before an order is finalized. This will enable a check to be made and information to be exchanged on such essential matters as:

- a) the number, capacity, speed and disposition of the lifts necessary to give adequate lift service in the projected building;
- b) the special requirements of local authorities and other requirements set out in the planning permit;
- c) relevant statutory regulations;
- d) the provision of safe and convenient access to the machine room;
- e) the loads that the lift will impose on the building structure, the holes to be left in the machine room floor and the cut-outs for wall boxes for push-buttons and signals;
- f) the necessity for and type of isolation to minimize the transmission of vibration and noise to other parts of the building;
- g) machine room heating and ventilation;
- h) the need for the builder to maintain accuracy of building in relation to dimensions and vertical alignment (see 3.2);
- i) the time required for preparation and approval of relevant details and drawings for the manufacture and the installation of the lift equipment;
- j) the requirements for fixing guide brackets to the building structure;
- k) the time at which electric power will be required before completion of the lift contract;
- l) the requirements for electrical supply, feeders, associated switchgear, etc.;
- m) the requirements for scaffolding in the lift well and protection of the lift well prior to and during installation and testing of equipment;
- n) delivery and storage of equipment.

2.2 Lift enquiry or invitation to tender

2.2.1 General

A period of 4 weeks is normally sufficient for return of tenders. This should be extended if large numbers of lifts or special requirements are involved. The enquiry documents should be kept to the essential minimum and should be strictly confined to material relevant to the lift work and to the particular project concerned. The enquiry should state that the equipment is to comply with the relevant Parts of BS 5655 and other related British Standards. Extracts from such standards should not be repeated in the enquiry.

The following a) to n) is an example of the basic data needed by the lift contractor for each lift; this list is not exhaustive.

- a) Customer's identification of lift.
- b) Installation arrangement (see BS 5655-5).
- c) Rated load and speed (see BS 5655-5).
- d) Lift travel and floor-to-floor heights.
- e) Location and designation of levels served.
- f) Installation arrangement of multiple lift installation.
- g) Electricity supply (voltage, etc.).
- h) Power system and duty cycle (see 4.2.2, 4.2.3 and 5.2).
- i) Control system and indicators (see 4.2.4, 4.3.5 and 5.2).
- j) Additional items (see 2.2.2).
- k) Finishes (see 2.2.3).
- l) Inclusions and exclusions (see 2.2.4).
- m) Site programme (see 2.2.5).
- n) Capacity and availability of craneage facilities.

When building restrictions, or special types of load, preclude the use of lifts complying with particular requirements of BS 5655, data additional to that listed in a) to n) will be needed according to the particular circumstances.

2.2.2 Additional items

The enquiry should specify any additional items beyond those required by BS 5655-1 and BS 5655-2, such as dismantling of existing lift, vision panels, forced ventilation, landing architrave, telephone, level of fire resistance, special controls (see 4.2.5 and 5.2.5) and fire-fighting lift designations (see 4.2.4.5).

Lifts to be installed in adverse conditions, such as chemical works; lifts used with power trucks; and lifts used in vandal-prone situations and similar specialized applications require individual consideration according to the circumstances.

2.2.3 Finishes

Finishes should be specified at the enquiry stage or an allowance should be taken into account in the initial costing.

Finishes to be considered may include:

- a) lift car enclosure;
- b) lift car ceiling;
- c) lift car floor;
- d) lift car light fitting;
- e) lift car trims;
- f) lift car and landing doors;
- g) landing architraves;
- h) push-button and indicator fittings in lift car and at landings.

2.2.4 Inclusions and exclusions

A number of peripheral items are associated with a lift installation, of which some should always be provided by the building contractor and some are best included by the lift contractor. The requirements vary to some extent with the type of installation. It is important that the limits of responsibility are clearly understood, and the enquiry documents should be specific in this respect.

The lift contractor will normally supply such items as:

- a) guide brackets;
- b) buffers and metal stools for the buffers (where applicable);
- c) pit screen for counterweight;
- d) machine and pulley subframes (in cast iron or fabricated steel);
- e) sound and vibration isolation for the machine, where this is required;
- f) sill support member (with toe guard and/or facias) for all except goods lifts;
- g) interlocks for access, inspection and emergency doors;
- h) power supply for emergency lighting and alarm signals;
- i) electrical wiring and cables for the lift itself, terminating in the main switch in the machine room furnished by the purchaser;
- j) alarm push-button and bell or other intercommunication system (which may be limited to that part of the system contained within the well);
- k) lifting tackle and small electric tools for use during the actual installation;
- l) services of erection staff to install and wire;

m) services of testing engineer, and provision of the necessary instruments and test weights;

The lift contractor does not normally:

- 1) carry out builders' work, such as forming the lift well, pit and machine room or building in wall inserts;
- 2) cut away and make good;
- 3) form the machine room floor, including any reinforcement necessary for load bearing;
- 4) supply or fix lifting beams in machine room, including proof testing, certifying and marking;
- 5) supply or fix structural steelwork for machine and buffer supports;
- 6) provide safe and adequate access to the machine room and lift well;
- 7) supply or fix steel surrounds for vertical bi-parting sliding doors;
- 8) supply or fix sill support members (with toe guards) for general purpose goods lifts;
- 9) carry out any necessary tanking, lining or reinforcement of the pit;
- 10) supply or fix dividing beams for multiple wells and inter-well screens;
- 11) supply or fix access doors to machine room, pit and pulley room, emergency doors and inspection doors and their locks;
- 12) supply or fix temporary guarding of openings;
- 13) provide temporary protection (over and above the additional protective skin) of finished lift equipment on landings, and if necessary in the car;
- 14) supply or fix scaffolding, planks and ladders;
- 15) off-load and store in a protected area the lift materials and equipment that he has delivered;
- 16) paint site steelwork supplied by other parties;
- 17) supply or install any electrical wiring external to the well and machine room;
- 18) supply or install working lights, temporary and permanent electricity supplies, etc. (see 2.3.7, 3.3.10 and 4.3.3);
- 19) provide a three-phase electrical supply for a mobile platform or hoist fitted in well, if required;
- 20) provide messrooms, sanitary accommodation and welfare facilities for his personnel;
- 21) bore the hole and provide the liner for the jack on hydraulic lifts;
- 22) provide craneage facilities;
- 23) supply and fix permanent access ladders, steps and guard rails.

For more detailed discussion of the requirements for site preparation and work by other trades, reference should be made to **2.4** and other clauses, such as **4.3**. The provision of architraves, or finish surround to doors, should be the subject of agreement between the lift contractor and the customer.

2.2.5 Inserts

According to the construction methods adopted, inserts for attaching equipment may be required. The primary responsibility for the supply of inserts should be with the builder and where possible the type of insert specified should be in agreement with the lift contractor. Due allowance should be made in the builder's bill of quantities.

2.2.6 Site programme

The enquiry should indicate as accurately as possible the contract programme as it affects the lift maker, in particular the target date for lift completion, the date when the lift site will be prepared and the availability of a crane.

2.3 Acceptance of tender and subsequent procedure

2.3.1 General

The procedure indicated in **2.3.2** to **2.3.7** particularly relates to the most usual case, where the lift maker is a subcontractor.

2.3.2 Order

The main contractor is instructed to place an order with the selected lift maker. If alternative schemes have been offered, the order should clearly indicate which has been accepted.

2.3.3 Programme

As noted in **2.2.6**, the programme should have been indicated as accurately as possible at the time of enquiry. At the time of order, the programme for manufacture and installation of the lift should be agreed. The programme should cover each lift separately, including dates such as:

- a) the order date;
- b) the date when the lift site will be ready;
- c) the date for provision of lift electricity supplies;
- d) the lift completion date.

The period between order and delivery of materials falls into two stages; first the finalizing of details and secondly the actual production of the equipment, which depends on the first stage. Within the first stage, other dates may need to be considered, such as when:

- 1) all relevant building information will be available;
- 2) builders' drawings prepared by the lift contractor will be available;
- 3) the layout drawings will be approved;
- 4) the finishes will be finally accepted.

Information relevant to programming the site work can be found in other clauses such as **2.4** and **2.5**.

2.3.4 Drawings

After the order has been placed the lift contractor should supply drawings showing builders' work required and the point loadings. To enable these to be prepared, the purchaser's representative should furnish the relevant detail building drawings.

2.3.5 Approval of drawings

The purchaser's representative should give written approval of the drawings referred to in **2.3.4** submitted by the lift contractor (after modification if necessary and within the limitations of the information provided), and at the same time ask for such additional copies (normally up to five of each drawing) required for distribution to other parties concerned.

2.3.6 Selection of finishes

Where the contract provides for the purchaser's choice of architrave styling, decorative features, finishes, colours, etc., the decisions should be communicated by the purchaser's representative as early as possible and preferably not later than the time of approving the drawings. Decision delays can adversely affect the completion of the contract.

2.3.7 Electricity supplies to lift

Whilst a temporary electricity supply may be provided (see **4.3.3**), final testing and setting up should be carried out with the permanent supply connected. For this reason, the timely provision of the permanent supplies is important, and if not available when required, it may necessitate additional work.

2.4 Co-ordination of site work

2.4.1 Preparatory work on site

It is customary for the lift contractor to make periodic visits to the site before his starting date to check progress on the lift well construction and discuss relevant matters with the building contractor. The lift contractor should assure himself that all building work has been carried out in accordance with his requirements. Immediately before the time for lift installation to commence, the lift contractor should check that site conditions are fit to permit installation to proceed. The building work which should be completed before lift installation starts includes that listed in a) to i) below.

- a) Pit to be dry and watertight, including tanking if necessary, and clear of rubbish.
 - b) Well complete and watertight and equipped with well lighting (permanent if possible).
 - c) Machine room complete and watertight, with full lighting, cleared of rubbish, dustproofed (see 3.4.2) and with access secure against unauthorized entry, including temporary warning notices and lock, with key available exclusively to authorized personnel.
- NOTE In certain system buildings and buildings of over 10 floors, it may be necessary, by prior agreement, to start erection before the top portion of the lift well has been constructed, in which case the general contractor should temporarily deck out and waterproof.
- d) Preparation for lift fixings in pit, lift well and machine room complete. If built-in wall inserts are used, these should be placed accurately and slots thoroughly cleaned out.
 - e) Steel work items (e.g. lift well trimmers and machine beams) finally grouted or otherwise fixed in position after checking for correct position by the lift contractor.
 - f) Scaffolding in position, as agreed with the lift contractor; lift well, etc., properly fenced and guarded in accordance with current statutory regulations.
 - g) Entrance preparations completed, including preparations for door frames, push button boxes and indicators. In many cases progress can be facilitated by omitting the front walls of the lift well until the lift car, doors, etc., are installed.
 - h) Datum-line (in elevation) established at each floor to enable the lift constructor to set metal sills and frames in relation to finished floor levels.
 - i) Plan dimensions in accordance with 3.2.

2.4.2 Delivery of material

The lift contractor should advise the building contractor when equipment is ready for despatch, so that the latter can make arrangements on site to receive and unload with appropriate hoisting tackle, slings and supports, as near as possible to the lift well.

2.4.3 Storage

Adequate provision should be made by the building contractor for storing, protecting and preserving against loss, deterioration or damage, all material on the site.

NOTE Attention is drawn to the adverse effect of damp conditions on electrical equipment and on steel wire ropes.

2.4.4 Site meetings

For the successful progress of the work, full cooperation between all parties is essential, and on large sites it will be found that regular meetings of such parties are beneficial. Programmes for the constructional work in that part of the building containing the lift should be made in consultation between all parties concerned.

2.4.5 Services of other trades

The lift contractor will require the services of joiners, bricklayers and other trades as the work proceeds, and it is essential that the lift contractor should give due notice to the building contractor of the demands to be made on other trades, so that he can plan accordingly.

2.4.6 Scaffolding, fencing, etc.

Scaffolding, timbers, rollers and similar plant required for the unloading and installation of the lift and also for the proper guarding and close fencing of the lift well should be provided, erected and maintained by the building contractor.

The lift well should not be used as a means of disposal for rubbish from the upper floors. Such practice is dangerous. The lift well and machine room should be handed over to the lift contractor complete, and no other trades should be allowed to work in them during the whole time of installation of the lift, except by arrangement with the lift contractor.

2.4.7 System building sites

If the building programme allows insufficient time for lift installation in conventional fashion after the well is completely built, special procedures are needed. This applies particularly to industrialized multi-storey buildings. Methods differ in detail. In most cases, however, the building contractor's crane is used to lower and position pre-assembled batches of lift equipment into the progressively rising top of the lift well. The building contractor should provide a suitable portable cover for the completed portion of the lift well in order to protect the lift erectors working below against the weather and falling objects. When the top of the well has been reached, it is normal practice to cap it immediately with a pre-cast load-bearing floor slab on to which is lowered the pre-assembled machine room equipment. It then remains for the building contractor to complete and weatherproof the machine room as swiftly as possible. On all such projects as these the closest cooperation between the building contractor and the lift contractor is essential.

2.4.8 Connecting to power supply

The lift contractor should give prior warning to the building contractor of the date the power supply to the lift is required, so that suitable arrangements for connection can be made (see 4.3.3 and 4.3.4).

2.5 Procedure following test, including inspection and maintenance

2.5.1 Acceptance

The purchaser should make timely arrangements for accepting the lift on completion of test and for subsequent insurance cover (if required). Special arrangements (see 2.5.4) are necessary if there is to be an interval before the lift goes into normal service.

2.5.2 Guarantee and servicing

Any guarantee provided by the lift contractor should be conditional upon the lift receiving regular and adequate servicing and should cover the free replacement of parts that prove defective through reasons of faulty materials or workmanship during the guarantee period, which is generally 12 months. To ensure the continuance of satisfactory and safe operation, the purchaser (or building occupier) should arrange for the completed lift to receive regular servicing by competent persons at such intervals as the type of equipment and intensity of operation demand. Such service can be secured under a service contract. It is essential and normal for the lift contractor to be entrusted with the servicing during the guarantee period of a new lift. The scope of a service contract may be extended to cover not only regular servicing but also intermediate service calls, repairs and replacement of worn parts.

In the interests of safety and operating efficiency it is important that the building occupier should ensure that the equipment is not misused and that unauthorized persons are not permitted to enter the lift well or machine rooms. Attention should be paid to methods of ensuring that lifts are not overloaded, particularly when they are used in connection with furniture and equipment removals, internal redecoration and other similar activities which may be undertaken within the building.

2.5.3 Statutory examinations

Lifts in certain premises are required by statutory regulations to be examined at intervals, for example within every period of 6 months, by a competent person who is required to report on a prescribed form. Such reports should normally be kept in a register by the building owner or occupier. Statutory examinations are not a substitute for servicing; the provision of statutory reports may be specially included in a service contract, or may be arranged separately.

2.5.4 Lift not in immediate use (caretaker maintenance)

When conditions do not permit a lift to be taken into normal service immediately following completion and acceptance, it should be immobilized. The main contractor should take effective precautions against damage, especially damage to finishes or damage to equipment from dampness and builders' debris, until such time as the lift is required. A separate service contract should be made with the lift contractor to make regular visits during this period, to inspect, lubricate and report on the condition of the lift. During the inspection it is desirable that the lift should be moved under power. A date should also be agreed with the lift contractor from which the guarantee period will commence.

2.5.5 Temporary use of lifts

If the purchaser intends to permit temporary use of a lift by some other party, such as the building contractor, before taking it into normal service, so that it is not immobilized, then the responsibilities of those concerned should be clearly defined and agreed. In addition to the precautions noted in **2.5.4** it may be necessary to arrange temporary insurance cover. If temporary use of lifts is envisaged, it should preferably be given consideration at an early stage, having regard to the conditions under which it is likely to take place.

2.5.6 Cleaning down

Acceptance following test should include checking the condition of decorative finishes, before the lift contractor leaves the site. After a caretaker (or temporary service) period, the lift may require a further general cleaning down immediately before taking into normal service. The lift contractor should be instructed accordingly to undertake this work and, if any damage has occurred, to repair this at the same time. Both these items should be the subject of extra costs.

NOTE Deterioration of decorative finishes may occur owing to adverse site conditions both before and after completion of the installation.

Section 3. Building construction

3.1 General

As explained in 1.1, this section of this code describes essential details of building construction for electric and hydraulic lifts, the full requirements for which are specified in BS 5655-1 and BS 5655-2; the majority of the details described have been extracted and paraphrased from those standards.

It is important to make early planning for the access route into and through the building for introducing large or heavy components, e.g. hydraulic jack, pre-assembled car, and lift machine. If, owing to building restrictions, hydraulic jacks cannot be accommodated in a single length, special arrangements may be necessary and the lift contractor should be consulted.

3.2 Dimensional tolerances

3.2.1 Lift well dimensions

Owing to lifts having to move vertically through a building and the lift car and landing door equipment having to interconnect, the plumbness of the well and the alignment of the landing openings are of paramount importance.

BS 5606 is a code of practice for accuracy in building and indicates expected qualities of building accuracy for different types of construction; however, plan dimensions of lift wells given by the lift contractor represent minimum clear plumb sizes whatever type of construction is used. The purchaser's representative, in conjunction with the builder, should ensure that adequate tolerances are included in the building design so that the plumb dimensions specified by the lift contractor in accordance with this code are obtained in the finished work. Dimensions in excess of these specified minimum plumb dimensions for lift wells and openings (but not less) can be accommodated by the lift contractor up to certain maximum values, i.e. those given in Table 1 (see 3.2.3), beyond which changes in design may be necessary involving additional expense or work by the builder. The purchaser's representative should take these factors into account when specifying the lift well structural dimensions on the basis of the constructional tolerance appropriate to the building technique.

Where architraves are to be supplied by the lift contractor, it is particularly important to ensure there is true alignment with the landing along the front line of the well. This sill line should serve as the datum-line for the well dimensions.

3.2.2 Landing door openings

It is essential that finished landing openings should be accurate to design size and vertically aligned one above the other for the full travel of the lift. In constructing the structural openings in concrete walls to lift wells it is often not possible to achieve a degree of accuracy vertically that will allow doors and frames to be inserted in the openings without some form of masking or packing to overcome inaccuracies. Provisions should therefore be made in design by increasing the nominal height from design finished floor level and width of openings to each jamb and head.

In addition, the alignment of the landing face of the front wall of the lift well is of importance when architraves of fixed dimensions are called for, and in this case the alignment of the landing face from floor to floor should not vary to a greater extent than can be accommodated by the subsequent front wall finish, the architraves being set accurately plumb. Where architraves are to be supplied by the lift contractor in conjunction with multiple wells, lateral alignment is especially important and necessary for visual acceptance.

To facilitate accurate alignment of landing sills, it is common practice to provide at each landing an independent threshold, the position of which can be adjusted. To prevent water draining into the well from cleaning or sprinkler operation, a slight fall away from the lift entrance is recommended.

3.2.3 Structural limits of accuracy for lift wells at any level

Figure 1 illustrates the structural limits of accuracy pertaining to single and multiple well arrangements.

If the net well dimensions W_w and W_d and the nominal structural entrance opening dimensions C and D are defined by plumb lines, it is essential that the actual wall should not encroach upon the space bounded by those dimensions. Dimension K in Figure 1 which is the limit of accuracy of dimensions W_w and W_d should not exceed the value given in Table 1 according to well height.

Table 1 — Limits of accuracy of well plumb dimensions

Well height	Limit of accuracy K
m	
≤ 30	+ 25, – 0 mm
$> 30 \leq 60$	+ 35, – 0 mm
$> 60 \leq 90$	+ 50, – 0 mm

In the case of multiple wells, dimension K is not applicable to the space between the plumb wells. BS 5655-5 specifies a minimum of 200 mm for this space.

When architraves are to be supplied by the lift contractor, dimension L in Figure 1, which is the limit of accuracy of dimensions C and D , pit depth P_h and headroom S_h , should not exceed 25 mm. The distance from plumb well to the outer face of the front wall, dimension M in Figure 1, should not vary to an extent greater than can be accommodated by the subsequent front wall finish, the architraves being set accurately plumb.

When the entrance linings are supplied by the building contractor, corresponding provision should be made for the finished openings to be accurately plumb one above the other for the full travel of the lift and to design size.

3.3 Lift well construction

3.3.1 General provision

It is essential that the counterweight of a lift should be contained within the same well as the car.

3.3.2 Exclusive use of the lift well

The well should be exclusively for the lift and not contain cables or devices, etc., other than for the lift.

NOTE The well may contain heating equipment for the lift well excluding hot water or steam heating; however, any control and adjustment devices are to be located outside the well.

3.3.3 Ventilation of the well

It is necessary that the well be suitably ventilated and not used to provide ventilation of rooms other than those for the service of the lifts. Provision should be made, at the top of the well, for ventilation openings, with a minimum area of 1 % of the horizontal cross section of the well to the outside either directly or via the machine or pulley rooms. When the well is ventilated via the machine or pulley rooms, through trunking should be used. For lifts whose speed exceeds 2.50 m/s, the vents should be not less than 0.30 m² in free area for each lift well.

NOTE The London Building Acts or other local regulations may require larger vent areas under certain circumstances.

A common lift well for two or three lifts whose speed exceeds 2.50 m/s will require a minimum vent area of 0.30 m². If the number of lifts is four, five or six, a minimum vent area of 0.40 m², 0.50 m² or 0.60 m² respectively should be used.

The vents should be louvred or otherwise protected to prevent rain, snow or birds entering the lift well.

3.3.4 Well containing cars or counterweights belonging to several lifts or service lifts

In the lower part of the well a partition should be erected between the moving parts (car or counterweight) of different lifts or service lifts. This partition extends from 0.3 m above the pit floor to a height of at least 2.5 m above the pit floor.

If the horizontal distance between the edge of the car roof and moving part (car or counterweight) of an adjacent lift or service lift is less than 0.3 m, the partition should be extended through the full height of the well and over the effective width; this width should be at least equal to that of the moving part (or part of this) that is to be guarded, plus 0.1 m on each side. Although not specified in BS 5655-1 it is strongly recommended that the partition should in every instance extend the full height of the well.

3.3.5 Well enclosure

It is essential that each well be totally enclosed by a solid wall, floor and ceiling, as described in 3.3.6.

The only permissible openings are:

- a) landing doors;
- b) inspection and emergency doors to the well and inspection traps;
- c) vent openings for escape of gases and smoke in the event of fire;
- d) ventilation openings;
- e) permanent openings between the well and the machine or pulley rooms.

3.3.6 Walls, floor and ceiling of the well

The building structure has to be able to support at least the loads that may be applied by the machine, by the guides at the moment of safety gear operation, by the action of the buffers, in the case of off-centring of the load in the car or by the anti-rebound device. To assist the early planning, the guidance of the lift contractor or purchaser's representative should be sought on the load imposed by the lift on the building structure.

It is essential that the walls, floor and ceiling of the well should be:

- a) made of non-combustible durable materials and treated to prevent the creation of dust; these materials need to comply with the relevant building regulations (see 4.4.11.1 and 4.4.11.2); and
- b) of sufficient mechanical strength.

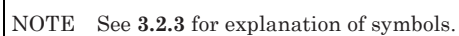


Figure 1 — Structural limits of accuracy

3.3.7 Fire resistance

3.3.7.1 Only non-combustible construction materials are to be used and they should be such that toxic fumes and smoke are not given off in the case of fire. Where there is a statutory regulation for fire resistance of lift well enclosures and doors, attention is drawn to the requirements of the current issue of the building regulations and to any relevant approved documents to which they refer. The requirements specified by a fire officer/adviser as to the degree of fire resistance for the lift well structure and landing entrances should be followed.

NOTE Tests for the various fire resistance ratings referred to in the following clauses are specified in BS 476-8.

3.3.7.2 When fire resistance is required and the entrances having access to the lift well have doors that automatically close, the degrees of fire resistance of the entrances should be at least half that required for the enclosure. Thus for lift well enclosures the fire resistance of which is not greater than 1 h, the fire resistance of the entrance should be 30 min. If the required fire resistance of the lift well enclosure is required to be greater than 1 h but not more than 2 h, the required fire resistance of the entrance should be 1 h.

3.3.7.3 When the entrances having access to the lift well have doors that are manually closed, it is essential that the degrees of fire resistance of the entrances should be not less than that required for the enclosure. Thus for lift well enclosures, the fire resistance of which is required to be no greater than 30 min, the fire resistance of the entrance should be 30 min. If the required fire resistance of the lift well enclosure is required to be greater than 30 min but not more than 1 h, the fire resistance of the entrance should be 1 h.

3.3.7.4 If specifically required, the lift contractor can provide landing doors and frames having a fire resistance rated at 2 h. Any requirement in excess of 2 h should be provided by protection that is additional to the landing door. This protection, which is not supplied by the lift maker, may be in the form of a roller shutter with a fusible link.

3.3.7.5 Automatic or self-closing lift doors are not smoke-proof or smoke-tight, particularly in the case of sliding doors. Accordingly, if it is required that entrance to lift wells be substantially smoke-tight, auxiliary protective means should be provided in addition to the doors normally provided by the lift contractor.

3.3.8 Lift well inner surface

As far as is practicable, the inner surfaces of the lift well enclosure facing any car entrance should form a smooth continuous flush surface without projection or recesses. Where any projections or recesses cannot be made flush, they should be bevelled to an angle of 75° from the horizontal above and below the projection by means of metal plates, concrete or other similar non-combustible material. Where practicable, all other inner surfaces of the lift well enclosure should form a continuous flush surface without projections or recesses.

3.3.9 Clearances

To prevent persons falling down the well or into the gap between the car door and well, the horizontal distance between the wall of the well and the sill or entrance frame of the car or door (or extreme edge of the doors in the case of sliding doors) should not exceed 0.15 m.

3.3.10 Lighting of the well

NOTE See also 4.3.2 and 4.4.11.3.

Permanent electric lighting is required in the well for each lift, allowing it to be lit during repairs or servicing, even when all doors are closed. This lighting should comprise one lamp positioned at most 0.5 m from the highest and lowest points in the well with intermediate lamps at 7 m maximum spacing. In addition, these lamps should be either 100 W incandescent lamps or equivalent fluorescent tubes.

3.3.11 Entrances

Access to the lift car, provided by entrance in the lift well enclosure, should not be in the path of the counterweight.

3.3.12 Inspection doors, emergency doors and inspection traps

Inspection doors, emergency doors and inspection traps to the well should only be provided for the evacuation of passengers or to provide access for servicing.

Inspection doors should have a minimum height of 1.4 m with a minimum width of 0.60 m, emergency doors a minimum height of 1.8 m with a minimum width of 0.35 m and inspection traps a maximum height of 0.5 m with a maximum width of 0.35 m.

Where the lift well extends for some distance without a landing door, means of evacuating passengers should be provided at intervals not exceeding 11 m. The lift contractor should provide such details to suit the conditions of particular building and lift installation. The fire resistance of each inspection and emergency door or trap should be not less than that specified for the enclosure.