

Guide to

# The accommodation and operating environment for Information Technology (IT) equipment

ICS 35.020

# Committees responsible for this British Standard

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- Association for Payment Clearing Service (APACS)
- British Telecommunications plc
- Chartered Institution of Building Services Engineers
- Electricity Association
- Federation of the Electronics Industry
- HEVAC Association
- IBM United Kingdom Ltd.
- ICL CPS
- Institute of Management
- Institution of Electrical Engineers
- National Physical Laboratory
- Open University
- Society of Environmental Engineers
- Sun Alliance Insurance Group
- Trades Union Congress

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## Foreword

This British Standard has been prepared by Technical Committee IST/22. It supersedes BS 7083 : 1989, which is withdrawn.

This British Standard is designed to aid in the planning, installation and maintenance of IT accommodation and to give guidance to IT users at all levels. It has been written to assist individuals or groups such as those listed below, in their role as clients, users' agents, and others defining users' requirements:

directors, managers, architects, consultants, contractors, designers, engineers,  
IT staff, at all levels of employment in all types of organizations incorporating or making provision for IT equipment.

This standard does not aim to cover the whole subject exhaustively, but to provide a guide to relevant standards, legislation and recommendations from other bodies involved in the installation and maintenance of IT accommodation. Manufacturers or suppliers should be consulted about specific details of IT equipment.

As a guide, this British Standard takes the form of recommendations and general or background information. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Compliance with a British Standard does not of itself confer immunity from legal obligations.





# Guide

## Introduction

This standard provides an executive summary of the principal factors to be considered when planning the accommodation of IT equipment, with cross-references to more detailed information, in the form of:

- a) commentary on the requirements of people and equipment;
- b) commentary on typical classes of accommodation;
- c) recommendations for special environments and circumstances, e.g. clean rooms, anticipated loadings;
- d) guidance on interpretation of recommendations from other bodies.

If used as a 'what to look out for' guide in the context of the specific installation, building or environment concerned, users of this British Standard should find sufficient help to enable them to decide firstly which factors or conditions are appropriate to their particular circumstances and then which of the options are most suitable for them and how they can be implemented to achieve satisfactory solutions.

Users of this standard should understand that this British Standard cannot and does not make a single set of recommendations for the 'ideal' situation, nor composite sets of recommendations for different 'grades' of accommodation or environment. In general, opportunities should be taken to discuss particular problems with the supplier, manufacturer or independent professional advisor.

Consideration of legislation is an essential part of this process. Employers have responsibilities to provide and maintain suitable conditions and it is in their commercial interests to do so. These 'suitable conditions' effectively constitute user requirements and should be included in the client's purchasing brief for the design, construction and maintenance of the workplace.

Legislation is normally structured at three levels:

- i) primary legislation: Acts of Parliament, describing the broad aims;
- ii) secondary legislation: Statutory Instruments and Orders, expanding where considered necessary upon particular aims of Acts, describing what is required;
- iii) tertiary legislation: documents, agreed by consensus, drawn up by recognized national and international standards bodies, and whose subject content is referred to in primary and secondary legislation.

Legislation is frequently expressed in functional terms, rather than prescriptive terms, thereby facilitating the development of innovative systems to achieve the objectives. Standards provide a means at a tertiary level of demonstrating compliance with the objective.

It is essential that owners, procurers and providers of accommodation are aware of such legislation. Much legislation affecting the workplace and buildings is enacted under criminal law.

## 1 Scope

This British Standard gives guidance on the accommodation and operating environment within which Information Technology (IT) equipment and associated services are installed, including advice on:

- a) construction and accessibility;
- b) environmental conditions;
- c) electrical power requirements;
- d) operational safety and security.

It applies to IT equipment, whether portable or fixed, in enclosed or controlled environments typically occupied by people not exposed to dirty or contaminated conditions and it covers, therefore conditions typically found in offices, schools and domestic environments.

This British Standard is intended to give guidance primarily to those concerned in planning and using accommodation for IT equipment, not for equipment manufacturers.

Many of the recommendations are also likely to be applicable to installations exposed to worse conditions, such as in industrial environments, construction sites or laboratories using hazardous materials, or environments that are not stationary. This standard does not include guidance on the additional requirements needed in such circumstances to safeguard individuals or equipment.

Similarly, while many references take account of conditions specific to the UK, the guidance contained in this standard may be applicable outside the UK.

This British Standard does not encompass all the provisions needed in the placement of contracts or provision of tenders associated with any desired accommodation or environment, although some guidance is given.

## 2 References

### 2.1 Normative references

This British Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are made at the appropriate places in the text and the cited publications are listed on page 33. For dated references, only the edition cited applies; any subsequent amendments to or revisions of the cited publication apply to this British Standard only when incorporated in the reference by amendment or revision. For undated references, the latest edition of the cited publication applies, together with any amendments.

### 2.2 Informative references

This British Standard refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on pages 33-39, but reference should be made to the latest editions.

## 3 Definitions

For the purposes of this British Standard, the definitions given in BS ISO/IEC 2382-1 for IT terms and in BS 6100 : Part 0 for building and civil engineering terms apply together with the following.

### 3.1 Information Technology (IT)

Technology of recording, storing, transmitting, processing and displaying of data, also referred to as Information and Communication Technology (ICT).

### 3.2 IT equipment

Physical equipment used for the recording, storing, transmitting, processing and displaying of data.

### 3.3 fresh air

Air taken from outside a building, which is likely to be free of any impurity which could be offensive, contaminate or cause ill health.

### 3.4 air conditioning

System which fully controls the environmental conditions, i.e. temperature and humidity, in an enclosed space. Such a system may also include control of particulate contamination, in terms of size and concentration.

### 3.5 class 1 equipment

IT equipment in which protection against electric shock does not rely on basic insulation only, but which includes means for the connection of exposed conductive parts to a protective conductor in the fixed wiring of the installation.

### 3.6 hold up characteristics

Ability of the IT equipment to continue working through short term voltage reduction.

### 3.7 hold up time

Time in minutes in which IT equipment can continue working through short term voltage reductions or loss of the electricity supply.

### 3.8 bunded area

Area surrounded by walls of appropriate height to retain water or other liquid.

### 3.9 design maintained illuminance

Minimum illuminance which has to be maintained throughout the life of the lighting installation.

### 3.10 motor alternator

Motor, driven by the incoming mains supply, and mechanically coupled to a controlled alternator.

### 3.11 competent

In possession of the necessary technical expertise, training and experience to carry out the job in hand safely, with due regard to good working practice.

### 3.12 teleworking

Activity where people spend a significant part of their working time using IT equipment whilst working from a designated working area in their home premises or in remote locations, which has been agreed with the employer.

### 3.13 foot-print topology

Outline of equipment indicating its shape and space requirements.

NOTE. Commonly referred to as plan views.

### 3.14 failure mode

Situation caused by cessation of normal operations, e.g. the failure of the equipment, network or power supply.

### 3.15 barrier box

Box with a fusible link and other components as required to prevent transmission of lightning surges or other induced voltage from damaging equipment or personnel.

### 3.16 as built drawings

Record drawings, showing construction and installation work, used for the maintenance or future modification of the building and its services.

## 4 Planning and implementation

### 4.1 General

The foundation for successful implementation of any IT project depends on its planning and the identification of business objectives.

An integral part of the plan for the project should be the preparation of accommodation and operating environment for the equipment.

The following considerations are central to the development of the plan:

- a) activities to be implemented;
- b) rationale behind decisions;
- c) location and macro-economic considerations;
- d) timing and phasing;
- e) key personnel and interested parties;
- f) project methodology.

The stages of planning and implementation are covered in 4.2 to 4.5. For further information on project management, see BS 6079.

## 4.2 Project inception

### 4.2.1 Initial brief

It is important to establish the objectives for the project as early as possible. This should include consideration of the requirements of all interested parties.

A statement of the operating environment for the IT equipment should be set out in clear terms, identifying any requirements for future modifications, upgrade or maintenance procedures.

NOTE. See Technical Memorandum TM 17: Maintenance Management for Building Services - CIBSE [10].

Each IT equipment option imposes specific environmental requirements on the IT equipment, and any resolution may impact on future equipment changes. Therefore user requirements including the projected life of the equipment, safety and business continuity should be identified at the inception stage of the project.

NOTE. The DISC BuyIT Guidelines give guidance to organizations on improving the way that they specify, acquire and benefit from IT equipment.

### 4.2.2 Feasibility study and development of brief

All potential solutions for the accommodation and operating environment should be assessed in terms of practicability and cost. The fullest possible use of this standard and all referenced documents should be made in acquiring this information before any decisions are made.

The advice of professionally qualified experts, equipment manufacturers and users should be sought, where appropriate.

A statement of requirements for accommodation and operating environment for the selected IT system, possibly including some alternative solutions, should be produced at this stage.

Consideration should also be given to security in the location of the IT equipment at this stage.

In some cases, a list of requirements suitable for more than one IT system may be possible. However, since the cost of changes from the original estimates increases in an exponential fashion as they are introduced through the design and construction stages, it is preferable that the requirements are exactly the same for the different IT systems.

Where the project is concerned with the accommodation and operating environment for unknown IT equipment, it should meet the requirements of a typical equipment loading, whether structural, environmental or electrical, e.g. in terms of uniform distribution or areas of high localized loads. The possibilities for different IT systems should not be limited by the choice of design and operating parameters.

Where existing buildings are to be modified, refurbished or updated, the removal of any existing services made redundant by the project should be considered in the feasibility study, to facilitate maintenance and future modifications to the services or IT systems. The items considered for removal should include equipment, pipework, ductwork and especially power and data cables.

The options considered for this accommodation and operating environment should include:

- methods of procurement;
- life cycle operating costs;
- maintainability;
- expansion;
- integration.

As soon as a firm decision has been made to proceed with the project, a Planning Supervisor should be appointed, and an outline brief for design should be produced.

NOTE. Attention is drawn to the Construction (Design and Management) Regulations [16] at this stage. The definition of 'construction' under these regulations is extremely wide, and the advice of a health and safety professional should be sought in case of uncertainty.

## 4.3 Design development

### 4.3.1 Conceptual design

In the conceptual design stage the brief for design should be developed into a firm proposal for the project which should fully explore all the options for meeting the requirements.

A design team and its leader should be appointed at the start of this stage. Care should be taken to ensure that this team has the appropriate experience to cater for the requirements of the IT system. It is particularly important that the design team leader is familiar with projects for the accommodation and operating environment for IT systems. The constituents of the design team will vary with the complexity of the project.

At this stage firm decisions on the method of procurement of the accommodation and operating environment should be made. The guidance of appropriate construction professionals is invaluable in making this decision.

#### 4.3.2 Detail design

Development of the detail design should be combined and coordinated with all other project activities.

A cost effective and timely project should be managed with care and any changes to the requirements controlled by an agreed process. Without this control costs can escalate and may easily exceed the budget both for the design and the construction.

A firm agreed design for the provision of the accommodation and operating environment for the IT system should be produced at this stage.

#### 4.3.3 Construction information

The project design should form the basis of the documentation necessary for the project construction and for awarding of the contract for the work.

When work is done in-house or when a design and build solution is sought, there is often a perception that costs will be reduced by limiting the detail given to tradespeople to that produced in the design stage. Whilst this method of working can be successful for a simple project, it is probable that costs and time-scales will escalate if the details and coordinations of the various operations are not planned. Where doubt exists, it is far better to develop the design in detail, as this will assist in the management of cost, particularly that associated with uncontrolled changes.

A developed design which includes adequate information for construction, installation and testing to be carried out without further design input should be produced at this stage.

### 4.4 Procurement and implementation

#### 4.4.1 Tender and contract documentation

The type and extent of documentation needed varies with the size and complexity of the project and with the selected method of procurement. Accurate and complete documentation facilitates the preparation of cost estimates and prices.

The advice of construction professionals should therefore be obtained before the preparation of the documents.

If competitive tenders for the work are to be sought from potential contractors, care should be taken to follow accepted fair procedures.

NOTE 1. Attention is drawn to the Construction (Design and Management) Regulations [16]. The appointed Planning Supervisor should consult the Managing Construction for Health and Safety Approved Code of Practice (ACOP) [49] for the regulations at this stage.

NOTE 2. Some organizations are required to adhere to set procedures in the tendering process, e.g. under the Utilities Supply and Works (Contracts) Regulations [43].

The minimum documentation needed before work commences should be as follows:

- design drawings;
- specification of the work;
- Health and Safety Plan;
- where contractors are employed, the agreed contract, including price information as well as the items listed above.

#### 4.4.2 Installation, testing and commissioning

Construction should be in accordance with the design specification, with close supervision and careful attention to coordinate the various operations.

It is essential that changes are minimized and strictly controlled in order to complete the project within budget and schedule.

Where changes are unavoidable, the impact on schedule or costs should be built into a revised plan and promulgated.

After installation, systems providing the operating environment for IT equipment should be tested and commissioned.

The programme for testing and commissioning, in accordance with the design specification, should be carefully integrated with the construction work.

The provision, testing and commissioning of the accommodation and operating environment should be correctly demonstrated, documented and recorded.

Documentation should include the following:

- as built drawings;
- testing and commissioning reports;
- operating and maintenance recommendations and procedures.

#### 4.5 Completion

On completion of the project, all appropriate contract documentation should be made available to the client, the building operator and the building maintainer. This will include the following minimum documentation:

- a) operation and maintenance literature;
- b) as fitted drawings;
- c) specification and tender documents;
- d) variations and design changes during construction.

The records should also be delivered by the Planning Supervisor to the client as part of the Health and Safety File for the building.

When arranging any contract it is prudent to include within the terms of the contract a period after completion in which the contractor, at no extra cost, is responsible for correcting any defects.

NOTE. Where mechanical and electrical systems are included in the contract a period of 12 months after completion is normally considered adequate. Where a contract only includes building work a period of six months is commonly used for this purpose.

## 5 Construction

### 5.1 General

IT equipment of increasing capability and variety is used in most offices, schools, colleges and hospitals, with the majority of the workforce in these environments having access to IT equipment of some sort. A personal computer or terminal installed at each work position is not unusual, and within a short period is likely to become the norm. Many homes have IT equipment and with the increase in teleworking, the distinction between workplace and dwelling place is breaking down. The small office/home office (SOHO) is a large sector of the IT industry's market.

Thus every workplace and the majority of dwellings require the facilities to install and operate IT equipment satisfactorily. In general a building that is suitable for occupation and use by people will also be suitable for the IT equipment used at the work positions. Providing proper provision is made for the operator's physical comfort, i.e. regarding work station layout and visual environment, no additional facilities should be required, other than for bringing power and data cables to the work station.

NOTE 1. See Workplace (Health, Safety and Welfare) Regulations, 1992 [17].

However, where the use of IT equipment is very high, consideration should be given to removing any excess heat either by increased natural ventilation (see BS 5925 for recommendations) or by any suitable form of mechanical ventilation or air conditioning to maintain occupant comfort and productivity and prevent overheating of equipment.

Where the personal computer density is high, professional building designers and building services engineers should be consulted as to whether suitable working conditions can be maintained.

NOTE 2. For working in comfort, the Chartered Institution of Building Services Engineers (CIBSE) Guide Volume A, Section A1 [9] recommends a range from 13 °C for heavy work to 20 °C for sedentary work. The World Health Organization (WHO) recommends 24 °C as the maximum temperature. Beyond this dehydration, heat stress and ultimately heat stroke can occur. Cold temperatures affect dexterity and mobility and may increase physical and visual strain, with added problems for people with muscular pain, arthritis and heart conditions. (Source: London Hazards Centre Factsheet The Daily Hazard No. 47 June 1995 [56].)

Buildings are designed and constructed to have a lifespan of many years. IT systems, even the largest installations, have a comparatively short life. Thus during the life of a building the IT installations within it can be changed many times.

Whilst detailed changes to IT equipment cannot be foreseen, where possible buildings should be designed so as to be flexible in use to facilitate these changes without the need for alterations to the building or its structure. See BS 6266 for recommendations on fire precautions for large mainframe installations.

### 5.2 Space planning - work station layout

Regulations issued under the Health and Safety at Work Act 1974 [18] govern the layout and use of work stations. The Schedule to the Health and Safety (Display Screen Equipment) Regulations 1992 [19] sets out minimum requirements. Work station layouts and their relationship to the building should be in accordance with BS EN 29241 : Part 1.

NOTE 1. BS EN 29241 : Part 1 gives recommendations for work stations which meet and sometimes exceed the regulations cited above.

NOTE 2. Recommendations for the layout of workstations in schools and colleges are given in Computer Rooms - Scottish Council for Educational Technology [71].

A desk based IT system may take up 20 % to 50 % of the desk surface depending on its intended use. Large screens, e.g. in a CAD system, may occupy the whole of a desk where paper or reference material is not used. A telephone sales point using computing likewise will not need to provide much space other than that required for the workstation equipment (see figure 1).

NOTE 3. See Display Screen Equipment at Work Guidance on regulations [48].

### 5.3 Space planning - general and dedicated IT rooms

In addition to the work station layouts the planning of office space where IT equipment is used should also take into account the ancillary and peripheral equipment needed for the systems, particularly communications and network electronics.

Where the system specification to be installed is known, full details of the equipment and its requirements should be obtained from the supplier or installer and the space requirements should be planned in detail.

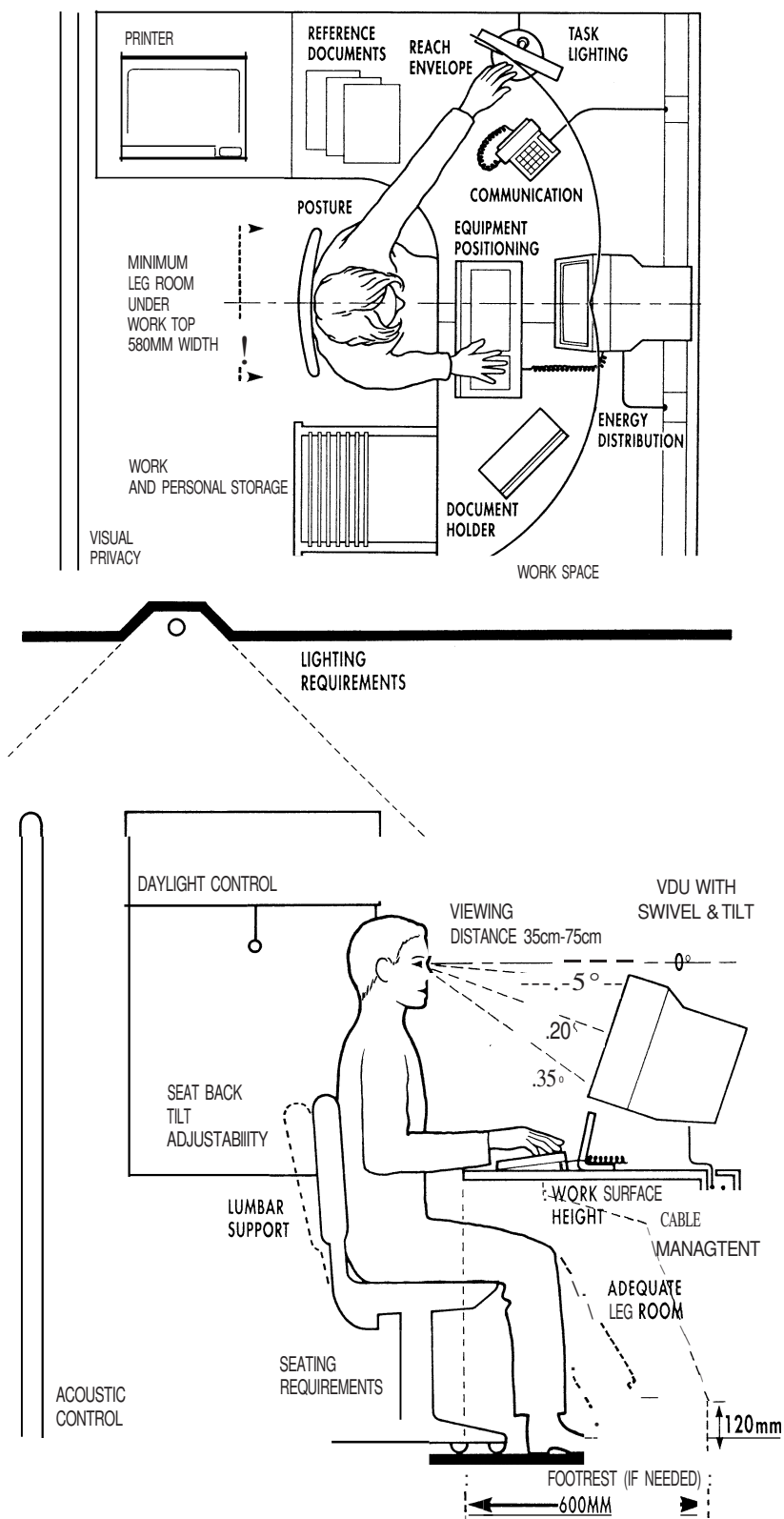
Where the IT system has not yet been decided upon, space allowance for this ancillary and peripheral equipment should be made proportional to the usable area.

NOTE 1. With regard to space allowance, although no precise measurements can be given, it is recommended that such space allowance be made in proportion to the usable area. In modern PC based systems the majority of the peripheral equipment is within the area of the workstations and as little as 1 % of the usable area could be required for other IT and communications equipment.

However if it is envisaged that other intelligent office equipment is to be used, such as copying and facsimile machines and large format printers or plotters, this allowance may need to be increased to 5 %. It should be noted that this allowance does not include the space occupied by the office machinery itself for which, if the details are not known, a further 5 % of the usable space should be allowed.

The areas or rooms set aside for the IT system ancillary and peripheral equipment should be planned using the same criteria set out in 5.8 for dedicated IT rooms.

NOTE 2. Useful guidance on the design of such equipment rooms is given in Applications Manual AM 7: Information Technology and Buildings - CIBSE [4].



Source: VDU Workstations - Keys to Usability - FEI (EEA) [14]

Figure 1. Workstation design

#### 5.4 Power and data cable distribution

Large amounts of cabling are associated with even a single small personal IT installation. Where numbers of such units are installed in the same building, particularly where they are connected in a network, the quantity of such cabling becomes an important factor in the design of the structure as well as being of overriding importance in the layout of the work stations.

The design and installation of cabling within work stations should be in accordance with BS 6396.

The installation of cabling particularly in restricted spaces such as trunking or ducts should be carefully considered as such cabling will need to be moved, removed or replaced from time to time and inspected for functional and safety reasons.

NOTE. Guidance on the structural requirements for cabling within buildings and the various methods of distributing cabled services to work stations and ancillary and peripheral equipment can be found in Applications Manual AM 7: Information Technology and Buildings - CIBSE [4].

#### 5.5 Structural design of buildings

The normal floor loadings as given in BS 6399 : Part 1 are appropriate for the majority of buildings in which IT equipment and associated ancillary storage are to be installed.

However, in some large installations, certain heavy equipment is necessary, e.g. mainframe computers and standby power systems. It may also be necessary in these systems to store data safes and to store and handle large quantities of paper. In these cases the floor loading for the equipment and stores should be checked by a professional structural engineer.

Areas used for installation access for equipment with high point loads should be capable of withstanding floor loading at least equal to that in the area in which the equipment is to be installed. Where point loads are high, load spreading techniques should be used to reduce the loadings. These should be in accordance with the normal limits for the type of building defined in BS 6399 : Part 1, and the problems of maintenance and removal of such equipment should also be considered.

#### 5.6 Surface finishes

Finishes should be smooth and resistant to dust collection. Surfaces beneath raised floors and above suspended ceilings should be sealed with resin or other suitable sealant to aid cleaning and reduce the amount of dust and flaking of building material. See BS 5295 : Part 2.

#### 5.7 Raised access floor

A raised access floor provides an under floor void for the containment of power and data cables, piped services (e.g. cooling water, air conditioning ducting). It may also be used as a plenum for air distribution (see 6.2.2.2).

An access floor is considered to be essential in accommodation for mainframe computers and ancillary equipment and should provide a void of at least 400 mm high.

NOTE 1. Where heavy power cables run on trays and ducting is required, the void should be suitable to meet any special requirements, e.g. for bending radius.

It is also current practice to provide raised access floors in general office accommodation and dealer rooms where power and data cables are required to work stations. The minimum void should be 150 mm high.

NOTE 2. In refurbishment of existing buildings where the floor to ceiling height is restricted, this might not be possible.

An access floor generally consists of 600 mm X 600 mm interchangeable load bearing panels supported on a similar grid of adjustable pedestals. Systems required to support heavy loads may be fitted with stringers between pedestals. These will also provide additional lateral stability, but can restrict access.

NOTE 3. Lateral stability can be a problem where panels are missed out under equipment to provide access unless bracing is installed.

The sub floor should provide lateral distribution of concentrated loads. In addition, the concrete sub floor should be designed to cater for the concentrated loads imposed by machines through the raised floor panel and pedestals. The structural engineer needs to know the pedestal grid configuration and the pedestal base size to assess the sub floor load capacity.

Raised access floor systems can be supplied to meet various structural requirements and four grades are currently available:

- a) extra heavy grade for heavy computer and ancillary equipment accommodation;
- b) heavy grade for general computer and ancillary equipment accommodation;
- c) medium grade for office accommodation and dealer rooms;
- d) light grade for office accommodation where only light equipment is to be installed and where pedestrian activity is expected to be minimal. This grade is not recommended for major commercial operations.

Access floor installations should be manufactured, tested and installed to meet the specified requirements.

NOTE. Further information is contained in the Access Flooring Association document, MOB PF 2 PS/SPU (March 1992): Platform Floors (Raised Access Floors): Performance Specification [1].

The load bearing characteristics of a concrete sub floor cannot be compared with that of a raised access floor which consists of separately supported panels. These panels only distribute concentrated loads over the area of each panel. The critical design consideration is the concentrated ( $25 \text{ mm}^2$ ) load and deflection (max. 2.4 mm over 24 h) of each panel in the system. Panels designed for a specific concentrated load are generally capable of supporting a uniformly distributed load (UDL) much greater than that required for the concrete sub floor.

The design criteria heavy and extra heavy (see items a and b above) require a UDL of  $12 \text{ kN/m}^2$  but it is not necessary to provide a sub floor to this rating. See BS 6399 : Part 1.

NOTE. Because of the differing characteristics it is not necessary to provide a sub floor to the UDL rating of the access floor, e.g. the design criteria of a heavy or extra heavy access floor are capable of supporting UDL of  $12 \text{ kN/m}^2$ , but the sub floor need not be to this capacity.

For recommendations on fire precautions for raised access floors see BS 6266.

### 5.8 Equipment rooms and dedicated IT rooms

The approach to the design for the building should be similar whatever the size of the equipment room. The primary consideration should be space allocation for equipment. In this calculation the probability of system expansion should be taken into account.

Access to equipment should be provided for maintenance, with passageways in front and behind of the following dimensions:

- a) where access is required to the rear, not less than 900 mm wide for a single row of equipment;
- b) between two rows of equipment, a minimum of 1350 mm, but manufacturers' installation and maintenance guidelines should also be consulted.

General floor to ceiling heights should be a minimum of 2400 mm, although a height of 2600 mm is preferred.

Passageway heights should be a minimum of 2100 mm.

The shape of equipment rooms should be dictated by the foot-print topology of the equipment to be installed. A rectangular area without obstructions such as structural columns is usually preferred.

Where practical, equipment should be of a consistent construction, so that economic space allocation can be achieved. See BS 5954 for recommendations.

When planning the layout of such areas, equipment should be located in such a way as to avoid short-circuiting any conditioned air supply, e.g. the exhaust outlet of one equipment should not be adjacent to the inlet of another.

Adequate provision should be made to bring cabled and piped services, e.g. power, data and possibly cooling media to the equipment.

For large systems a raised floor is the most convenient way and a floor void of a minimum height of 400 mm, preferably 600 mm, should be provided. If a raised floor is used its structure should allow unrestricted access to the void. For smaller systems alternative methods of cable distribution may be necessary.

NOTE. Guidance on the alternatives is given in Applications Manual AM 7: Information Technology and Buildings - CIBSE [4].

Only services required by the IT equipment should be brought into the equipment room. If it is unavoidable, other pipework should be in the floor void and cables should be as far as possible away from the equipment in order to avoid conflict with air flows, hardware access and other services.

Services related to the room, rather than the equipment, e.g. luminaries and associated cabling, should be at high level either in a ceiling void or surface mounted to a structural ceiling.

Equipment and cabling related to fire detection or protection and other security systems may be installed within a floor void or at high level in the ceiling void or surface mounted. Fire extinguishing systems may require the location of distribution pipework and discharge heads in the ceiling and floor voids in addition to coverage of the occupied spaces. See BS 6266 for recommendations of fire precautions.

Consideration should be given to the installation of a water detection system in the floor void, together with a bunded area in the location of the final connection points for water services to the IT equipment.

Where air distribution provides any necessary cooling of the IT equipment, floor and ceiling voids may be used as supply or return air plenums. The direction of air flow should be arranged to suit the equipment. Where ceiling voids are used as air plenums they should have a minimum size similar to floor voids, that is at least 400 mm of relatively unrestricted clearance.

Finishes in equipment and dedicated IT rooms should be easy to clean and should not produce dust. The use of loose fibre carpets or carpet tiles should be avoided.

Where clean room standards are required for the equipment room, finishes should be in accordance with BS 5295 : Part 2.