

Recommendations for

Storage and exhibition of archival documents

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- Bodleian Library
- British Computer Society
- British Library
- British Museum
- British Records Association
- Greater London Record Office
- House of Lords Record Office
- Library Association
- Museums' Association
- National Gallery
- Public Record Office
- Royal Commission on Historical Manuscripts
- Society of Archivists
- Standing Conference of National and University Libraries
- Storage Equipment Manufacturers' Association

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Foreword

This British Standard has been prepared under the direction of the Information and Documentation Standards Policy Committee. It supersedes BS 5454:1977, which is withdrawn.

This revision of BS 5454 has been prepared to take account of the changes in methods of storing archival materials that have taken place since the first edition was published, to give greater emphasis to methods of protecting archival materials from theft and malicious damage, and to include more information about the storage of the newer archival materials such as computer-generated records.

The purpose of these recommendations is to enable an archive repository to be built, or converted, to the highest standards that present limiting factors allow. They are intended for the guidance of archivists, conservators, architects, designers, contractors, engineers and others concerned with the planning, construction, equipment, maintenance and working of an archive repository.

These recommendations are based upon the nature of the records or archives that will form the bulk of the repository's contents, which may be in the traditional media, such as parchment, paper or printed books, or in photographic or electronic media. Their essential characteristics are that they are irreplaceable, are in authorized custody, and are to be preserved permanently. The recommendations are designed to help in creating and maintaining the conditions of storage that these characteristics require.

Although these recommendations have been made as specific and as comprehensive as possible, the committee responsible for drafting them is well aware that some problems require more detailed and specialized advice for their solution, that many questions can be fully answered only in the context of local conditions and that to others no entirely satisfactory answer has yet been found. This British Standard therefore takes the form not of a specification, but of recommendations, based upon wide practical experience and offered with full understanding of the difficulties and limitations that will inevitably influence any individual scheme.

Properly used and understood, these recommendations will help those concerned in any way with the storage of archives to define their tasks more clearly than hitherto; to find the answers to some of their questions; to foresee other questions that are less easily answered; and to arrive at more satisfactory solutions of problems so local and particular that no general rules or advice can entirely cover them.

These recommendations refer to substances and procedures that may be injurious to health unless adequate precautions are taken. Those who follow the advice given in these recommendations need to observe legal obligations relating to health and safety at every stage.

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.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 22, 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.

1 Scope

This British Standard makes recommendations for the storage and exhibition of archival documents.

The recommendations apply to the long-term and temporary storage of archival documents in restricted access and to the display of such documents in exhibitions. Although they do not apply to storage of documents in open access or to short-term storage, e.g. in reception or fumigation rooms or conservation departments, such storage should reach the standards of security recommended for permanent storage.

The recommendations apply to the storage and exhibition of archival documents in the UK and other countries with similar temperate climates. Different conservation practices may be required in countries with non-temperate climates.

Matters of repository management are not included in the scope of this British Standard.

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

2 Definitions

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

2.1 aisle

a subsidiary passageway between runs leading from a gangway and affording access to the shelves for the withdrawal or replacement of documents

2.2 archives

documents preserved permanently by the persons responsible for the transactions of which such documents are the records, or by their successors or appointees, in their own custody, and normally in the arrangement in which the documents were created

2.3 bay

a single-sided or double-sided unit of shelving

NOTE A single-sided bay consists of a number of shelves supported by uprights or upright frames, the whole being accessible from the front face only. A double-sided bay consists of two single-sided bays joined back-to-back, each accessible from its front face.

2.4 custody

the care of a document that remains in its office of origin or in the care of that office's appointee or successor

2.5 document

a combination of a medium and the information recorded on or in it, e.g. single leaves of paper, membranes, maps, plans, working drawings, bound volumes, files, rolls, punched cards, punched tape, magnetic tape, photographic negatives and prints, cinematograph film, microfilm, microfiche, and gramophone and phonograph recordings

2.6 drop-spine box

a single-piece book box with lid and spine-wall hinging away from the base to allow access to the bound volume from the spine side

2.7 fire resistance

the ability of an element of building construction to satisfy, for a stated period, some or all of the criteria specified in the appropriate Part of BS 476, namely resistance to collapse (loadbearing capacity), resistance to flame penetration (integrity) and resistance to excessive temperature rise on the unexposed surface (insulation)

2.8 gangway

the principal route through a storage room for the passage of people and trolleys, providing access to aisles

2.9 lift car

the part of a lift that carries passengers and other loads

2.10 membrane

a single skin of parchment or vellum

2.11 munsell value

the estimated lightness of any surface colour on a scale of 10 equal sensation intervals extending from ideal black (value = 0) to ideal white (value = 10) as specified objectively for values from 1 to 9 in the Munsell Atlas (see BS 4727-4:Group 02)

2.12 records

documents generated in the course of a transaction and forming part of that transaction

2.13 repository

a place of storage for documents, so constructed and maintained as to prevent damage, decay and unauthorized access, and to furnish, for archival documents, proper conditions of custody

2.14 run

two or more connected bays of single-sided or double-sided shelving joined end-to-end

3 Site of building

3.1 General

The repository should be sited on ground not liable to subsidence or flooding, whether of natural or man-made origin, e.g. burst water mains. The site should be readily accessible (see also 6.4).

3.2 Size

The site should be large enough to accommodate foreseeable extensions.

3.3 Security

The repository should be on an island site with free access round the whole perimeter, which should be clearly lighted in the hours of darkness. The curtilage should be fenced.

4 Structure and material of building

4.1 General

Expert advice should be sought when the design of the repository is planned. The repository and associated offices¹⁾ should preferably be in a purpose-built detached building or, if they form part of a larger building, in a self contained unit. Basement accommodation is not recommended but, if circumstances dictate its use, the accepted and traditional forms of waterproofing should be used to prevent the ingress of water, and water-borne services passing through the repository should be reduced to the minimum. Gas and oil services should not pass through the repository. The design of buildings is regulated by legislation. The recommendations given in 4.2 to 4.9 deal only with the special requirements of repositories and are subordinate to legal requirements. For structural fire precautions see clause 6.

4.2 Load distribution

The mass and distribution of the potential load of documents and of static or mobile shelving should be taken into account in the design of the repository. Mobile shelving can impose particularly high floor-loading. Evenly distributed loads exerting a force of 11 kN/m² are normal, but when these loads are transferred via wheels to floor tracks they create much greater point loads. Manufacturers' advice should be sought in the early stages of planning if mobile shelving is considered.

4.3 Drainage

Although open, untrapped or unsealed drainage within the repository is unacceptable, provision should be made for controlled rapid egress of water that may accumulate in the repository during fire-fighting.

4.4 Floors

Floors should be hard-wearing and should neither cause dust nor be easily chipped; they should be easy to clean, non-slippery, light-coloured (see 8.4), and of a material that deadens sound. They should be level and uninterrupted by steps, door sills, heating grilles or mats, in order to allow easy passage of trolleys. Where a change in floor level is unavoidable, ramps should be provided.

4.5 Doors

4.5.1 Width. Doors should be not less than 900 mm wide, to allow adequate space for the passage of loaded trolleys.

4.5.2 Structure. Doors should be close-fitting, but without a sill that would impede the passage of trolleys. The structure and fittings of doors should be resistant to unauthorized access.

4.5.3 Locks. Doors leading out of the closed-access area should be fitted with locks that may be opened from the inside without a key but can be opened from the outside only with a key (see also 5.3.5).

4.5.4 Self-closing doors. Doors should be self-closing but capable of being kept open to allow uninterrupted passage when necessary. Smoke-control doors should never be fixed in the open position. An automatic closing device should be fitted (see also 6.5.2 and 7.5).

4.6 Air conditioning

The repository should be designed to provide for accurate and constant control of its internal environment. It should be of thermally insulated construction and designed to accommodate the air-distribution ductwork connected to the air-conditioning plant, which should be situated outside the repository (see clause 7).

Electrostatic copiers should not be installed or used within the repository area.

¹⁾ Offices provided for processing, repair, study and exhibition of documents, and for administrative work and repository staff.

4.7 Storage space

The shape and dimensions of the rooms in the repository should be determined by the need to provide maximum storage space, subject to fire regulations and ease of withdrawal and replacement of documents. Wherever possible, areas should be free from obstructions such as columns and buttresses, to allow the best possible use of the space, especially if high-density mobile shelving is to be used.

4.8 Ceilings

The minimum ceiling height of the storage area, and landings, galleries and similar structures overhanging it, should be 2 600 mm. Ceilings should be impervious to water.

4.9 Galleries

4.9.1 General. Elevated galleries should not normally be added to existing repositories or exhibition areas, or incorporated in new repository buildings. The following recommendations apply when the use of galleries is unavoidable.

4.9.2 Access. Straight-flight staircases only should be provided to give access to galleries; spiral staircases should be avoided. Gangways etc. should be wide enough to allow the largest items stored to be removed and replaced without difficulty.

4.9.3 Visibility. All storage areas, entrances and exits in galleries should be visible from lower levels in the repository.

5 Custody and security

5.1 Documents in custody

Because documents stored in archive repositories are irreplaceable and their authenticity can often be established only by proof of unbroken custody, they should be given maximum protection against theft, vandalism, unauthorized alteration, and casual damage or disturbance caused by inexpert or careless handling.

5.2 Storage

All documents in custody should at all times be stored as recommended in this standard. They should not be left, even temporarily, on floors, chairs, stools etc. A repository should be used only for the storage of documents, and its equipment should be limited to what is essential for that purpose. Documents accepted for storage should not be brought into the repository until they have been checked for insect or fungal infection and treated if necessary (see BS 4971-1).

5.3 Access

5.3.1 Supervision. In order to maintain unbroken custody of archives, unauthorized and unsupervised access to any room in which they are stored should be forbidden.

5.3.2 Entrances. All means of access to a repository, such as doors, lifts, staircases, windows, ventilating shafts, should be designed to exclude the possibility of entry by unauthorized persons and to ensure that even the normal maintenance staff of the building can enter only under proper supervision. No part of the building in which archives are permanently or temporarily stored should be used as a corridor or emergency exit.

5.3.3 Services. All services directly related to the repository should be isolated. Control installations for air-conditioning, ventilation, heating, electricity, water supplies or drainage, including rainwater pipes, should be situated outside the repository and not in a position that is accessible only through it. Other services, e.g. gas, oil, sewage, should not pass through the repository but if this cannot be avoided, they should be controllable from outside the repository.

5.3.4 Windows. Ideally, a repository should have no windows. However, if the storage area is large and documents are constantly being moved, windows may be provided for the benefit of staff. In the interests of security, these windows should be small, unopenable, barred and glazed with strengthened glass. Non-transparent glass may be used if necessary to prevent people looking into the repository. To protect the environment in the repository, the windows should be double-glazed with glass designed to minimize solar gain (see also 8.7). Roof lights should never be installed in a repository.

5.3.5 Doors. All doors should be strongly constructed and equipped with thief-resistant locks (see BS 3621) of a type for which the issue of keys can be strictly controlled. No door of the repository should normally be used as an external door of the building or open into any part of the building to which the public has normal access. Doors of emergency exits should be designed to open only from inside and should open on to an escape route. (See also 4.5 and 6.5.2.)

5.4 Intruder alarm

The provision of an intruder alarm system is strongly recommended (see BS 4737-1).

6 Fire precautions

6.1 Legislation

Fire precautions, including limitations on distance of travel for means of escape, are the subject of national legislation and local by-laws.

The design and construction of new buildings, and of alterations of existing buildings, are controlled by the following statutory provisions, collectively referred to as “the building regulations” in these recommendations.

England and Wales	The Building Regulations
Scotland	The Building Standards (Scotland) Regulations
Northern Ireland	The Building Regulations (Northern Ireland)

The building regulations, for example, define the limits of floor area, the height and cubic capacity of fire compartments and the fire resistance of walls and doors. Fire precautions should be discussed with the fire authority and fire insurers. Experts such as fire engineers and fire consultants should be asked to advise about particular problems.

6.2 Protection of contents

Repositories do not usually offer a high risk of fire but, because of their irreplaceable contents, fire precautions should be more stringent than those for other buildings having a similar level of risk. Fire precautions should be designed to protect the contents and structure of the repository from damage caused by fire-fighting operations, as well as to ensure the safety of staff and to limit the fire to its source.

6.3 Smoking

Smoking in the repository should be prohibited at all times.

6.4 Site

The possibility of fires or explosions in adjacent buildings, or in adjacent parts of the same building, and the risk of damage from water or chemicals used to deal with such fires or explosions should be taken into account when the site of the repository is chosen. The repository should be within a short attendance time of a fire brigade (see also clause 3).

6.5 Structure

6.5.1 Design. The repository, which should preferably be a detached building (see 4.1), should be so designed that a fire can be limited to its source. Expert advice should be sought about the appropriate fire resistance for all walls, door and shutter assemblies, glazing, floors, ceilings, roof and supporting columns of the repository, whether they are required to be fire resisting or not, and about the provision of automatic fire-detection and automatic fire-extinguishing systems. All internal surfaces of the structure should conform to the specification for class 0 of the building regulations.

6.5.2 Doors. All openings in walls should be protected by self-closing doors or shutter assemblies of the same fire resistance as the walls that contain them. No door should have a grille or other opening that would allow the passage of air.

6.5.3 Vertical openings. All stairways, lift shafts and other vertical openings that might act as flues for fire, smoke or toxic gases should be enclosed by walls and doors of non-combustible material with an appropriate fire resistance.

6.6 Air conditioning

6.6.1 Planning. The air-conditioning plant should be installed in accordance with the recommendations of BS 5720 and BS 5588-9.

NOTE Guidance on the selection and positioning of air terminal devices is given in the HEVAC Association’s *Air diffusion guide*.

6.6.2 Other premises. The air-conditioning system for the repository should not at any point communicate with air-conditioning ducts serving premises outside the repository, nor should ducts serving other premises pass through the repository.

6.6.3 Ducts. All air-conditioning ducts, including insulation and lining, should be of non-combustible materials.

6.6.4 Dampers. Combination fire and smoke dampers should be installed in the ductwork wherever it passes through fire-compartment walls or floors. An automatic fire detector of the smoke-sensitive type should be installed at the outlet side of the fan. The operation of this detector should immediately shut down the air-conditioning system and actuate a combination fire and smoke damper in the duct so that smoke from a fire outside the repository is prevented from entering the enclosure.

6.7 Electrical system

6.7.1 Installation and inspection. All electrical installations in the repository should comply with the current edition of *Regulations for the Electrical Equipment of Buildings* issued by the Institution of Electrical Engineers. The electrical system of the repository should be regularly maintained and thoroughly inspected and tested at least once every three years (see clauses 7 and 8 and appendix D). Electric circuits should not pass through the repository unless they serve it.

For the protection of electronic data processing equipment from fire, see BS 6266.

6.7.2 Cable. Cable insulation should be flame retardant (see BS 4066-1).

6.7.3 Master switches. There should be a master switch or switches outside the repository to control all electric circuits except those providing fire detection and protection.

6.7.4 Fluorescent lamp ballast units. All fluorescent lamp ballast units should be individually fused.

6.7.5 Electrical fittings. Electrical fittings should be of totally enclosed metal-clad patterns.

6.8 Fire detection

6.8.1 General precautions. The repository should be inspected at regular intervals, day and night, by a properly instructed patrol. It should also be protected by an automatic fire-detection and alarm system.

6.8.2 Fire-detection and alarm system. A type P1 automatic fire-detection and alarm system should be installed and maintained in accordance with BS 5839-1, which gives detailed guidance on the design, installation, inspection, testing and servicing of such systems. The fire authority will advise about legislation that applies to the building. Fire insurers may also be consulted.

If a fire is detected the system should:

- a) sound the fire alarm;
- b) indicate the location of the fire;
- c) automatically transmit an alarm to the fire authority;
- d) shut down the air-conditioning system and operate dampers in ducts to prevent the spread of smoke;
- e) close fire shutters or doors (see 6.5.2).

6.9 Fire extinction

6.9.1 General. The design, installation and maintenance of means for extinguishing fire should be approved by the fire authority. Automatic fire-detection and automatic fire extinguishing systems should normally be consolidated into one continuous system that detects a fire, sounds an alarm, allows a set time for people to check whether the alarm is genuine and to leave the repository, and then sets off automatic extinguishers.

6.9.2 Automatic fire-extinguishing systems. For maximum protection the repository should have an automatic fire-extinguishing system that complies with the appropriate Part of BS 5306 and is approved by the fire authority.

6.9.3 Portable fire extinguishers. Suitable non-aqueous portable fire extinguishers, complying with BS 5423, should be provided, as recommended in BS 5306-3, and should be installed at various conspicuous points within the repository and preferably just inside each exit door. Portable fire extinguishers should be provided even if an automatic fire-extinguishing system is installed.

6.9.4 Water. Fire-fighting equipment using water should be available outside the repository. Portable fire extinguishers (see BS 5423) should be provided, as recommended in BS 5306-3. Wall-mounted fire hose reels, which should comply with BS 5274, should also be provided and installed as recommended in BS 5306-1. No part of the outside of the repository should be more than 6 m from the nozzle of a fully extended fire-hose reel.

6.10 Other precautions

6.10.1 Fire drill. The repository staff should know the location of fire-fighting appliances and should be instructed in their use. A fire drill, drawn up in collaboration with the local fire authority, should be practised regularly.

6.10.2 Guidance to fire brigade. Standing instructions, drawn up in collaboration with the local fire authority and fire insurers for the fire brigade, should include a warning that use of water may cause serious damage to documents.

6.10.3 Combustible material. Loose documents and other combustible material should not be left out of their containers for longer than is necessary.

6.10.4 Cellulose nitrate film. It is essential that cellulose nitrate film be stored in a separate repository (see 11.6).