NHS National Services Scotland

Scottish Health Technical Memorandum 58

SHTM Building Component Series

Internal Doorsets

Health Facilities Scotland
Property and Capital Planning

December 2006

Contents

1. Introduction

Background

1.1 This is one of a series of Scottish Health Technical Memoranda which provides specifications and design guidance on building components for health buildings.

A Reference Section is provided at the end of this document, including Acts, Regulations and British Standards.

1.2 The numbers and titles of the SHTMs in the series are:

- 54 User manual;
- 55 Windows;
- 56 Partitions;
- 57 Internal glazing;
- 58 Internal doorsets;
- 59 Ironmongery;
- 60 Ceilings;
- 62 Demountable storage system;
- 63 Fitted storage system;
- 64 Sanitary assemblies;
- 66 Cubicle curtain track;
- 67 Laboratory fitting out systems;
- 69 Protection.

Scope and status

1.3 This SHTM offers guidance on the technical design and output specifications of internal doorsets for use in health buildings.

1.4 Its content does not diminish either the manufacturer's responsibility for fitness for purpose of products or the design team's responsibility for selection and application of products to meet project requirements. Design teams are also reminded of their obligations under the Construction, Design and Management (CDM) Regulations 1994 (as amended 2000) to ensure safe construction and of the Disability Discrimination Act 1995.

1.5 Although the guidance in this SHTM is presented in the context of doorsets – that is, a factory assembly of door leaf (or leaves), frame, and supporting

ironmongery, delivered to site as a complete unit – much of it applies equally to door assemblies – that is, door leaf (or leaves), frame, and ironmongery procured separately and assembled on site.

1.6 The range of doorsets presented in this SHTM comprises heavy duty, severe duty, high security duty, fire-resisting and X-ray grades mainly of timber construction.

Relationship to other data

1.7 The main sources of data used in the preparation of this SHTM are listed in the References Section.

1.8 This SHTM was prepared for publication in December 2006. After this date, readers should ensure that they use the latest or new edition of all building legislation, British Standards etc, which may post-date the publication of this document.

1.9 First preference should be given to products and services from sources which have been registered under current BSI Quality Assurance procedures or other certification schemes. Suppliers offering products other than to British Standards should provide evidence to show that their products are at least equal to such Standards.

1.10 This guidance should be used in conjunction with sections of the National Building Specification (NBS) relevant to doors. NBS is a library of standard specification clauses covering most kinds of building work and comprising a wide range of clauses with accompanying guidance notes. All clauses are optional, and their combination into a job specification is left to the specifier. NBS has great flexibility, and it can be adapted to suit the technical needs and preferences of different projects, organisations and specifiers. Specifications go out of date as a result of technical innovation or major review of a key BSI document. As NBS sections become affected by such major changes, they are re-issued to members of the subscription service. Users are advised to ensure that they refer to the current edition. Refer to the NBS website at www.thenbs.com

1.11 Any enquiries regarding the technical content of this SHTM should be sent to enquiries@hfs.scot.nhs.uk.

Terminology

1.12 Throughout this document the following definitions apply:

- Doorset – a manufactured component comprising frame, leaf (or leaves) and ironmongery pre- assembled and delivered as one unit;
- Door assembly – a frame, leaf (or leaves) and ironmongery intended for use as an assembly after fitting together on site;

- Configuration – (of a doorset or door assembly) the number of leaves, their swing pattern, hand, and how they open;
- Grade – the functional duty of a doorset or door assembly;
- Ironmongery – components intended for the functional operation of doorsets (also sometimes referred to as 'architectural ironmongery' and as 'builders hardware').

Dimensions

- Width – the greater horizontal dimension of a doorset and the dimension across the face of a door leaf;
- Height – any vertical dimension;
- Thickness – the smallest dimension of a door leaf or partition, or the lesser horizontal overall dimension of a doorset or frame.

These terms are illustrated in Figure 1:

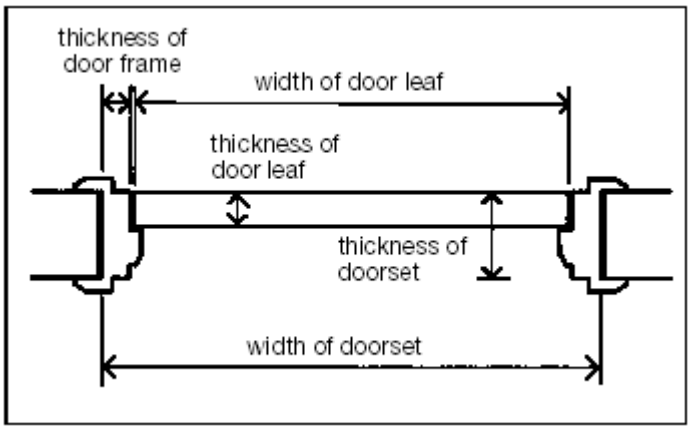

Figure 1

- Basic space – a space bounded by reference planes assigned to receive a building component or assembly including allowance for joints and tolerances;
- Coordinating size – the size given to a basic space;
- Work size – a size of doorset or opening to which its actual size should conform within specified permissible deviations.

These terms are illustrated in Figure 2.

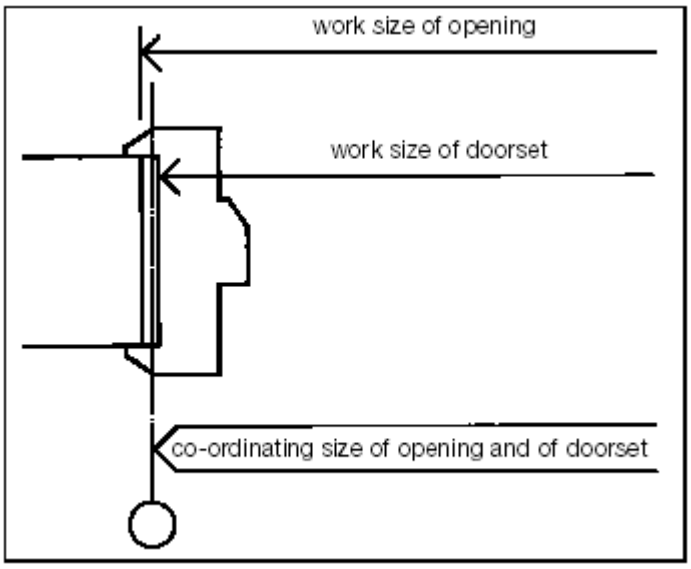

Figure 2

2. User requirements

General

2.1 All doorsets for health buildings should comply with the guidance and performance standards described in this SHTM. The standards are based on extensive research and evaluation of doorsets in use and are the minimum required to ensure satisfactory performance.

2.2 Research has shown that the functional requirements for doorsets in health buildings can be met by a limited range of options, and their selection should be based upon consideration of the following key characteristics:

- size;
- configuration and handing;
- grade;
- glazing;
- leaf finish;
- frame finish;
- special features, for example air transfer grilles;
- fire rating and smoke detection requirements;
- acoustic requirements.

Doorsets

2.3 The high performance standards required of door leaves, frames and ironmongery in health buildings can best be met when these components are accurately fitted and matched in a factory and delivered to site as a complete unit.

Frames

2.4 Different frame constructions are available to suit any thickness of partition or wall, and variations in frame width do not affect other key characteristics of a doorset.

2.5 Doorsets with a traditional one-piece frame are usually provided with loose architraves for fitting on-site. Alternative designs use a split frame which includes integral architraves (see Figure 3). Designers should notice the different plane of door leaf in these two alternatives.

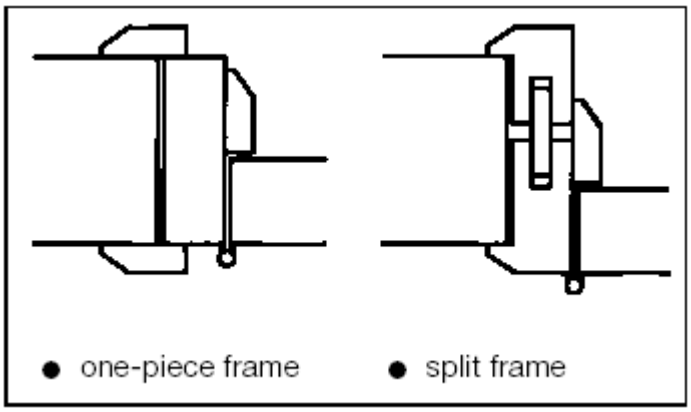

Figure 3

Dimensions

General

2.6 Work sizes of doorsets are subject to the permissible deviations stated in BS 4787-1:1980.

2.7 Doorsets and glazed screens should form part of a co-ordinated interior design proposal.

Height

2.8 All internal doorsets should have a co-ordinating structural opening height of 2100 mm unless specifically required to be different. Doorsets without transoms or overpanels meet most health building requirements, are economical, and simplify the selection and fitting of ironmongery.

Width

2.9 Doorset widths should relate to functional requirements after allowing for the thickness of frame, stop, leaf thickness and projecting ironmongery when the leaf is in the open position. These allowances can reduce the clear opening width by 300 mm. The effective clear width through a doorway should comply with the recommendations of BS 8300:2001 ‘Design of buildings and their approaches to meet the needs of disabled people’.

2.10 Width requirements can be specified as follows:

Room/space	Co-ordinating width of doorset (mm)
Ducts, small cupboards	600
WCs, bathrooms, bedrooms, small offices	800
Larger offices, areas subject to frequent pedestrian movement, minimum width for wheelchairs	900
Areas subject to frequent movement of wheelchairs, trolleys and mobile equipment	1000
Minimum width for single bedrooms as assisted bathrooms	1300
Preferred width for assisted bathroom, single bedrooms and minimum for multi-bed areas	1500
Corridors, multi-bed areas and treatment areas	1700
Heavily trafficked corridors, preferred width of bed areas and treatment areas	1900
(See also HBN 40: Common activity spaces – Volume 4 for additional information about access for wheelchairs)	

Thickness

2.11 Doorsets should be capable of accommodating permissible deviations in partition or wall thickness of ±5 mm.

Description

Grades of doorset

2.12 There is an established need for the following grades of doorset in health buildings:

- heavy duty;
- severe duty;
- fire-resisting;
- fire-resisting with smoke containment;
- smoke containment;
- X-ray resisting.

2.13 The grade of doorset should relate to functional requirements, bearing in mind the distinction between a heavily used doorway and a heavily used door. Doors, which are normally held open, for example, will be used only lightly however much traffic passes through the opening.

2.14 Sensible economies can be achieved by carefully matching the characteristics of doorsets to the demands placed upon them.

2.15 Examples of use for those grades are:

- heavy duty – frequent and very frequent use. Used by the general public and by people with little incentive to exercise care. Frequent passage of heavy trolleys, beds, or other bulky items;
- severe duty – subject to frequent violent usage – doors of stockroom, opened by driving trolleys against them;
- fire-resisting – used in designated positions to limit the spread of fire and to protect escape routes;
- fire-resisting with smoke containment – for use where fire doors are required to contain smoke at ambient temperature;
- smoke containment – for use where heavy duty doors are required to contain smoke at ambient temperature;
- X-ray resisting – used to contain scatter from X-ray equipment.

2.16 In certain applications, such as residential accommodation, light or medium duty grades may be appropriate, but such doorsets are not dealt with in this SHTM (refer to BS 4787-1:1980 and DD 171:1987)

2.17 ‘High security’ duty grades of doorset may occasionally be required, for example in mental health wards or drug stores. Consult individual doorset manufacturers for their range/type of ‘high security’ duty grade doorset.

Thresholds

2.18 Raised thresholds are not normally specified in health buildings as they tend to inhibit free movement of trolleys and to limit the use of floor-cleaning machinery.

2.19 However, on large doorsets the incorporation of a permanent threshold ensures its overall shape by securing the feet of the frame and, where the door is set on floor springs, allows them to be fitted at the joinery works. Such thresholds should be set flush with the floor screed and covered by the floor finish.

Glazing

2.20 Section 4 of the Building (Scotland) Regulations 2004 lays down certain criteria (including visibility) relating to access for disabled users.

2.21 The selection of glazing in doors should be based on considerations of observation and of safety, for example the need to avoid collision between users approaching the door from opposite sides, bearing in mind that users may be adults or children, ambulant or in wheelchairs, and in the case of staff, may be carrying objects or pushing or pulling mobile equipment. These needs can be met by the provision of vision panels or glazing as illustrated in Figure 4. Security glazing may be required in areas such as mental health accommodation. Laminated or plastic glazing types should be specified to prevent breakage.

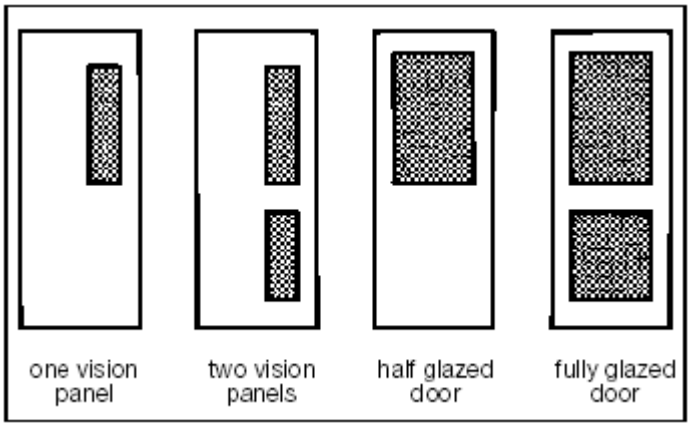

Figure 4

2.22 Consideration should be given to providing a lower panel of glazing which may increase visibility in busy areas or where children are present.

2.23 The inclusion of a vision panel in fire-resisting doorsets is recommended as it will facilitate early warning and assessment of a fire.

2.24 Any vision panels in X-ray resisting doorsets should be restricted to the smallest practicable size.

2.25 There is often a conflict of interest between nursing staff's need for supervision and the patient's expectations of privacy. The provision of glazing in doors should be very carefully considered in this context. It may be suitable to fit curtains or to use 'venetian mirrored' glass; proprietary devices are also available to allow controlled observation by staff. Panels should be glazed in accordance with BS 6262:1982.

Special features

Buffer strips

2.26 Noise from the closing of doors can be a considerable nuisance in health buildings. This problem can be reduced by the inclusion of a continuous buffer strip to the frame. These are available in the form of self-adhesive foam, V sections or P sections.

2.27 Buffer strips, by contributing to a snug fit between door and frame, may also contribute to fire resistance, smoke containment, sound insulation and sound deadening.

2.28 Door-protection systems are available to protect against trapping of fingers in the hinged reveal of the door frame. This is particularly beneficial to children, disabled people, people with mental health disorders and older people.

Air transfer grilles

2.29 Air transfer grilles in doorsets should be avoided wherever possible as they will materially affect the performance of the doorset in terms of sound insulation and impact resistance.

2.30 If it is required to balance air pressure across a door opening, alternative solutions should be adopted. For example, if the door is in frequent use or normally held open, either a grille will not be required or it may be fitted into the partition near the door opening. Alternatively it may be sufficient to cut short the door leaf if sound insulation, fire resistance or smoke containment is not required.

2.31 There may be occasions when placing the transfer grille in an adjacent partition may not be a suitable solution, and in order to ensure a satisfactory air movement pattern it will be necessary to mount a transfer grille at low level in a door. Applications could include WC/en-suite doors in isolation rooms, internal doors between rooms in an operating suite, and some laboratory situations. Also in some of these applications the use of buffer strips and other seals may prevent a satisfactory flow of air and result in excessive door closure pressures and wind noise.

Ironmongery

2.32 Selection and correct fitting of appropriate ironmongery are essential to the correct functioning of any doorset. The specifier should refer to SHTM 59 – 'Ironmongery' and select and specify ironmongery as an integral part of each doorset.

2.33 All ironmongery attached to the doorset should be factory-fitted by the doorset manufacturer. For convenience of packaging and transport, the specifier may wish to agree with the doorset supplier that projecting items, such as handles, be factory-fitted and then removed and packaged separately for delivery. Those items will then be refixed to the prepared housings/positions by site labour.

Fire precautions

2.34 Fire-resisting doorsets in health buildings must meet the requirements of the Building (Scotland) Regulations 2004 and guidance specifically concerned with fire precautions in Firecode. The most common requirement is for half-hour and

one-hour grades referred to as FD30 and FD60. A suffix(s) indicates that the doors are fitted with a flexible neoprene or nylon brush smoke seal e.g. FD30(s) and FD60(s). Fire-resisting doorsets complete with ironmongery, when tested in accordance with BS 476-20:1987, BS 476-22:1987 and BS EN 1634-1:2000, must achieve the following performance:

	Designated Period	
	½ hour FR	1 hour FR
Integrity	30 minutes	60 minutes
Insulation	No requirement	No requirement

2.35 Fire-resisting doors are normally required to be self-closing and may only stand open if controlled by 'fail-safe' mechanisms linked to an automatic fire alarm and detection system. However, exceptions do occur, for example with hospital accommodation for older people (see HBN 37: 'In-patient accommodation for older people').

2.36 Doors provided solely for means of escape in case of fire are not necessarily required to be fire-resisting.

2.37 Any perforations, such as grilles, or undercutting a door to facilitate air transfer, will invalidate the fire resistance of the doorset, and an alternative method of air transfer should be used, such as ducting and a fire damper located in the partition.

2.38 When the use of an air transfer grille in a fire/ smoke-containing doorset is unavoidable, it is important to specify an appropriate grade of grille (see SHTM 59: 'Ironmongery').

Note: Site fitting of an air transfer grille may invalidate the fire performance standard to which the door originally complied. Where such a grille is required, it is recommended that the door is replaced by one manufactured and approval tested to the standard required.

Identification

2.39 Fire-resisting doorsets must be supplied with an identification plate on the door leaf showing the name of the manufacturer and the date of manufacture. In addition, each fire-resisting doorset must be identified as shown in Figure 5. The functional performance of all fire resisting doorsets should be in conformity with an accredited test and/or certification method:

- an independent test;
- a UKAS accredited test laboratory;

- a third party certification scheme such as TRADA Q Monk product certification.

Specifiers should ensure that fire doors, as installed, meet an appropriate performance standard i.e. BS476 Part 22, BS EN1634-1, BS476 Part 23, ISO 3008.

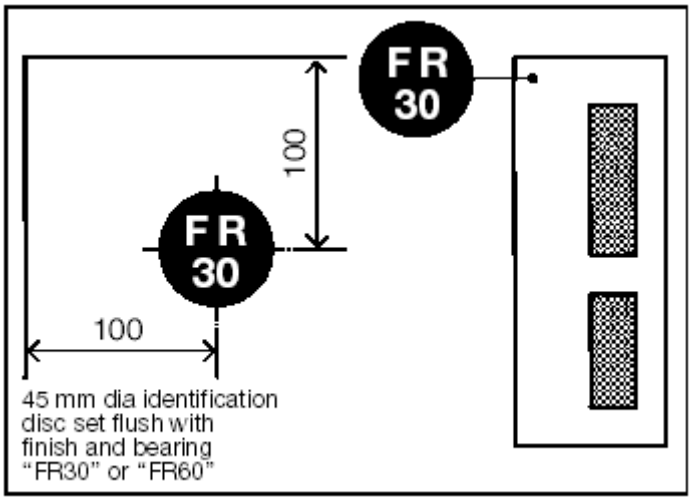

Figure 5

Smoke containment

2.40 Section 2 of the Building (Scotland) Regulations 2004 highlights requirements in respect of smoke containment. Doorset provision include:

- doors in a compartment wall;
- doors that are part of the enclosure of a:
  - (i) protected stairway;
  - (ii) protected lobby approach to a stairway; or
  - (iii) protected corridor;
- doors sub-dividing corridors connecting alternative exits;
- doors separating a dead-end from a corridor;
- doors forming part of the enclosure to a communal area in sheltered housing.

2.41 Unless pressurisation techniques complying with BS 5588-4:1998 are used, smoke-containing doorsets should have a leakage rate not exceeding $3m^3$ m–1 hr–1 (head and jambs only) when tested at 25 Pa under BS 476: Section 31.1. Suitable tested fire-resisting smoke-containing doorsets are available from doorset suppliers; to ensure proper performance it is essential to seal the junction between frame and partition. Regulations do not require the threshold to be smoke sealed; in some situations, however (for example where there is a

requirement for rooms or areas to be pressurised), complete sealing may be required. Suitable threshold seals can be obtained from manufacturers.

2.42 The edge seals fitted to smoke-containing doorsets are commonly of the 'wiper blade' type; they may be combined with intumescent seals. The tolerances on such seals are very fine, and doors are likely to bind if not accurately fitted; doors which do not close properly offer little resistance to smoke.

Careful installation and regular maintenance are of paramount importance if smoke containment is to be assured.

The gap between the door leaf edge and the frame should not exceed 4mm. A longer gap is acceptable between the bottom of the door and the threshold. No specific size is specified in the standard and a larger gap may often be necessary to accommodate floor finishes such as carpets. 10mm is generally accepted as a reasonable maximum between the bottom of the leaf and finished floor covering (BS 8214: 1990 refers).

2.43 Refer to SHTM 59: 'Ironmongery' for advice on selection of closers for use on smoke-containing doorsets.

2.44 BS8214: 1990, Code of Practice for fire door assemblies with non-metallic leavers provides comprehensive guidance on the specification, design, construction, installation and maintenance of fire door assemblies.

Sound insulation

2.44 Any perforation in a partition will reduce the overall sound insulation performance of the partition as a whole, and sound transmission through a doorset will invariably be greater than that through the partition in which it is fixed. Guidance on levels of sound insulation that can be achieved with internal partitions is given in SHTM 56: 'Partitions'.

Hygrothermal performance

2.45 Hygrothermal conditions can affect the performance of doorsets.

2.46 Normal conditions likely to be met in health buildings are:

- 25% to 65% relative humidity over a temperature range of 10°C to 25°C.

2.47 In areas of high humidity, such as laundries and shower rooms, the conditions would be:

- 25% to 100% relative humidity over a temperature range of 10°C to 30°C.

2.48 The selected doorsets must be able to withstand these conditions without loss of performance or appearance.

X-ray protection

2.49 Doors to rooms containing X-ray equipment will be required to provide resistance to X-rays. The National Radiological Protection Board (now subsumed under the Health Protection Agency) establishes and advises on shielding requirements, and specifiers should discuss project requirements with the local Radiological Protection Adviser.

2.50 In most circumstances, sufficient shielding will be provided by 1.5 to 2.5 mm of lead sheet.

2.51 The shielding must be continuous across leaf and frame, and gaps at meeting stiles should be masked by an overlapping shielded cover-mould. The optimum solution may well be to adopt sliding doors if space is available.

2.52 Vision panels must be restricted in size and should be glazed in accordance with BS 6262:1982 using X-ray resistant glass to give shielding equal to that provided by the door.

2.53 Depending upon layout and fire containment requirements, X-ray doorsets may additionally be required to provide fire resistance. Although such doorsets are available, it would be advisable to avoid using X-ray resisting doorsets in fire-rated walls.

2.54 Any perforations, such as grilles, or undercutting a door to facilitate air transfer, may nullify the X-ray resistance of a doorset.

3. Design guidance and specification

Partition and frame thickness

3.1 The first item to be considered when selecting and specifying doorsets is the construction and overall finished thickness of the partitions or walls into which they are to be fitted.

3.2 The designer may also wish to decide between one-piece and split frames at an early stage. Different manufacturers offer different frame constructions, but all can be co-ordinated with partition details.

3.3 Internal partitions for health buildings are described in SHTM 56: 'Partitions'. Many will be formed of plasterboard on metal studs to an overall thickness of 100mm.

3.4 However, it is essential to pay close attention to the interface between partition and doorset and to the details of fixing. For partitions of up to 150mm thick, the one-piece frame is usually made to match the partition; beyond that thickness, it is usual to add an extension lining (see Figure 6).

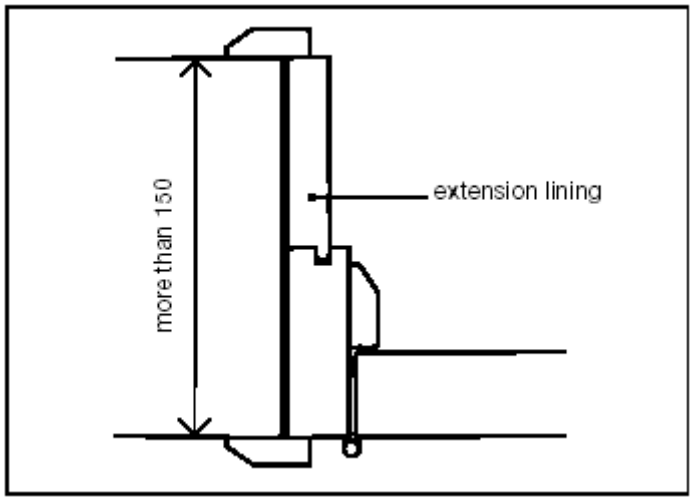

Figure 6

3.5 The split frame is normally made to suit 100mm partitions but can be extended to suit thicker partitions by inclusion of a make-up piece (see Figure 7).

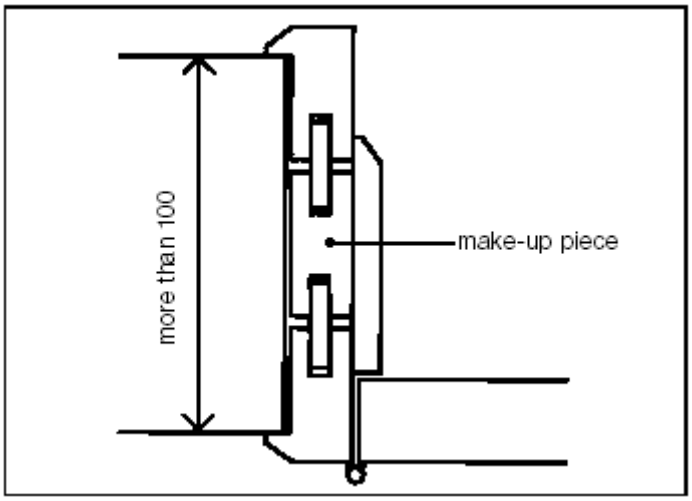

Figure 7

Layout and planning

3.6 The location of door openings will be largely determined by reference to room layouts, and it is important to allow a nib of not less than 50 mm in order to accommodate fixing, full architraves and projecting items of ironmongery (see Figure 8).

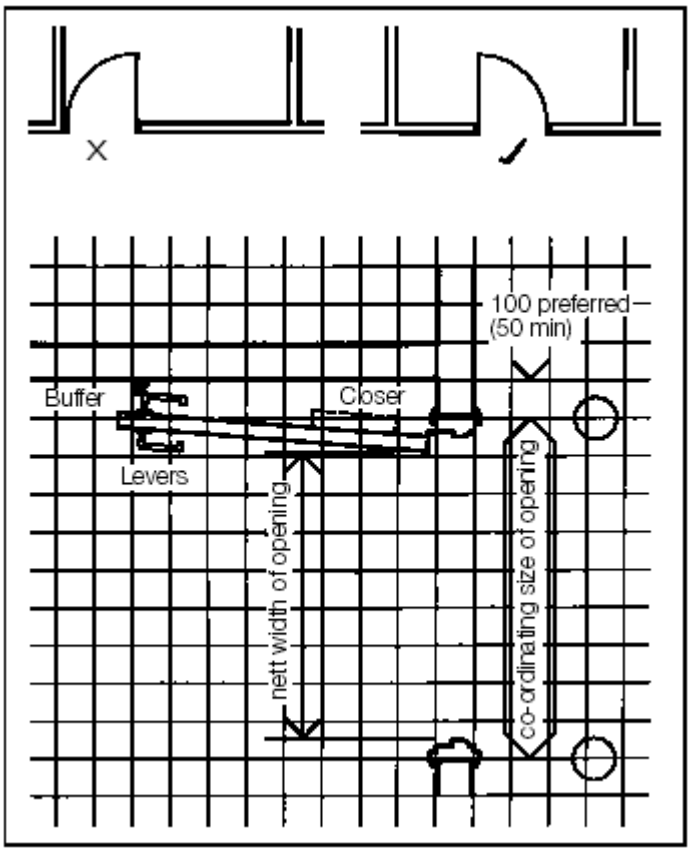

Figure 8

3.7 Consider the interrelationship between door swing and such items as light switches and power points and the positions of furniture and fittings. It may well be advantageous to open a door outwards rather than into a small room or restricted space. Section 3.12 of the Building (Scotland) Regulations indicates relevant layout requirements for WC provision.

Emergency access to patients

3.8 Where access to patients may be required in an emergency, for example in WCs and bathrooms, door leaves with the facility to open outwards should be provided. This may be achieved with:

- outward-opening, single-swing door leaves;
- single-swing door leaves normally opening inwards but with the facility to open outwards by the removal of the stops;
- special ironmongery which allows a catch stop to be removed or depressed.

Maintenance manual

3.9 An operation and maintenance manual should be compiled and should be handed to the maintenance staff immediately following the practical completion of the contract.

3.10 Ironmongery correctly selected and fitted requires very little maintenance (see SHTM 59: 'Ironmongery').

3.11 Broken or damaged glass in doorsets should be replaced without delay, particularly in the case of fire- resisting doorsets, where the performance of the doorset must be maintained at all times. Intumescent strips on fire-resisting doorsets should be inspected regularly and replaced if damaged.

Hygiene and cleaning

3.12 Control and Prevention of Healthcare Associated Infection (HAI) is a priority issue for NHSScotland – both in respect of the safety and well being of patients and staff and also the resources consumed by potentially unavoidable infections.

Healthcare Associated Infection (HAI) is a complex issue involving the many different elements of patient care and provision. Due to its multi-factorial nature there is a need to develop a holistic approach to combating the spread of infection within the built environment.

It is imperative that those involved in the design and planning, construction and refurbishment and on-going maintenance of the healthcare facility have a sound knowledge of prevention and control of infection in the built environment.

SHFN 30 and HAI-SCRIBE aim to provide information on the prevention and control of infection, and on the prevention of cross-infection and cross contamination in healthcare facilities, to those responsible for the planning, design and maintenance of such facilities.

Cleaning is an essential part of the multi-disciplinary approach in improving patient, staff and public safety. Safe clinical care is supported through ensuring high standards of hygiene and related measures to tackle HAI in the healthcare environment.

Cleaning regimes including frequency of cleaning should be addressed in line with current national guidance together with any additional local management requirements.

Relevant provisions of current guidance, standards and Codes of Practice for cleaning of healthcare premises and including the latest technical requirements are embodied in the following documents:

- Scottish Health Facilities Note (SHFN 30): 'Infection Control in the built environment: Design and Planning';
- HAI-Scribe (Healthcare Associated Infection System for Controlling Risk in the Built Environment);
- The NHSScotland National Cleaning Services Specification;
- NHS Quality Improvement, Scotland – Healthcare Associated Infection (HAI) Cleaning Services Standards;
- The NHSScotland Code of Practice for the Local Management of Hygiene and Healthcare Associated Infection;
- Clinical Standards Board for Scotland Healthcare Associated Infection (HAI) Infection Control Standards

3.13 Doorsets should be cleaned and disinfected in accordance with the above specifications.

References

Acts and regulations

(The) Building (Scotland) Regulations 2004: ISBN 0954 6292 3 x Ref: Scottish Building Standards Agency

Disability Discrimination Act 1995. HMSO, 1995. http://www.opsi.gov.uk/acts/acts1995/1995050.htm

Construction (Design and Management) [CDM] Regulations 1994, SI 1994 No 3140. HMSO, 2000. http://www.hmso.gov.uk/si/si1994/Uksi_19943140_en_1.ht

Construction (Design and Management) (Amendment) Regulations 2000, SI 2000 No 2380. HMSO, 2000. http://www.opsi.gov.uk/si/si2000/20002380.htm

Activity DataBase http://adb.dh.gov.uk/

NHSScotland Publications

SHTM 56: 'Partitions': Health Facilities Scotland, 2006.

SHTM 59: 'Ironmongery': Health Facilities Scotland, 2006.

SHFN 30: 'Infection Control in the built environment: Design and Planning' Health Facilities Scotland ,2007

HAI-Scribe (Healthcare Associated Infection System for Controlling Risk in the Built Environment): Health Facilities Scotland, 2007-03-13

The NHSScotland National Cleaning Services Specification: SEHD / CMO (2004) 8

NHS Quality Improvement, Scotland – Healthcare Associated Infection (HAI) Cleaning Services Standards: CSBS / NHSQIS. 2002 ISBN 1 903766 12 5

The NHSScotland Code of Practice for the Local Management of Hygiene and Healthcare Associated Infection: Healthcare Associated Task Force CMO (2004) 09

Clinical Standards Board for Scotland Healthcare Associated Infection (HAI) Infection Control Standards: December 2001 CSBS 2001 ISBN 1-903766-12-5

Health Building Notes

HBN 37: 'In-patient accommodation for older people' The Stationery Office (forthcoming).

HBN 40: 'Common activity spaces – Volume 4' The Stationery Office, 1995.

Miscellaneous

National Standards of Cleanliness
http://patientexperience.nhsestates.gov.uk/clean_hospitals/ch_content/home/home.asp

NHS Cleaning Manual:
http://patientexperience.nhsestates.gov.uk/clean_hospitals/ch_content/home/home.asp

British Standards

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

BS 476-22:1987 Fire tests on building materials and structures. Methods for determination of the fire resistance of non-loadbearing elements of construction. British Standards Institution, 1987.

BS 476-31.1:1983 Fire tests on building materials and structures. Methods for measuring smoke penetration through doorsets and shutter assemblies. Method of measurement under ambient temperature conditions. British Standards Institution, 1983.

BS 1186-2:1988 Timber for and workmanship in joinery. Specification for workmanship. British Standards Institution, 1988.

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BS 1210:1963 Specification for wood screws. British Standards Institution, 1963.

BS 3757:1978 Specification for rigid PVC sheet. British Standards Institution, 1978.

BS 3962-5:1980 Methods of test for finishes for wooden furniture. Assessment of surface resistance to cold oils and fats. British Standards Institution, 1980.

BS 3962-6:1980 Methods of test for finishes for wooden furniture. Assessment of resistance to mechanical damage. British Standards Institution, 1980.

BS 4071:1966 Specification for polyvinyl acetate (PVA) emulsion adhesives for wood. British Standards Institution, 1966.

BS 4322:1968 Recommendations for buffering on hospital vehicles such as trolleys. British Standards Institution, 1968.

BS 4787-1:1980 Internal and external wood doorsets, door leaves and frames. Specification for dimensional requirements. British Standards Institution, 1980.

BS 5277:1976, BS EN 24:1975 Doors. Measurement of defects of general flatness of door leaves. British Standards Institution, 1975/76.

BS 5278:1976, BS EN 25:1975 Doors. Measurement of dimensions and of defects of squareness of door leaves. British Standards Institution, 1975/76.

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Trade Associations

The Guild of Architectural Ironmongers, 8 Stepney Green, London E1 3JU
www.gai.org.uk

British Hardware and Housewares Manufacturers' Association
www.bhhma.co.uk