

Scottish Health Technical Memorandum 61

SHTM Building Component Series Flooring



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National Services Scotland

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Disclaimer

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1. Introduction

Background

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

A full Reference Section is provided at the end of this document, including Acts and Regulations, NHS Resources 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 Scottish Health Technical Memorandum (SHTM) offers guidance on the technical design and output specification of flooring.
- 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 2007 to ensure safe construction, and of the need to meet the requirements of the Disability Discrimination Acts 1995 and 2005.

Application

1.5 There has been a growing emphasis on 'designing out' the potential for slips and trips in the built environment over recent years and this, together with the profile of Healthcare Associated Infection (HAI), has a significant impact over the design layout and specification of floor finishes.

> Due to the wide-ranging considerations necessary for successful selection, specification, installation, and use of flooring, this SHTM must be made available to project teams, design teams and those responsible for construction, commissioning and maintenance of health buildings, including health and safety teams, as well as all parties involved in risk management. Project teams must also refer to the requirements of the current version of Scottish Health Facilities Note (SHFN) 30: 'Infection Control in the Built Environment: Design and Planning' and 'Healthcare Associated Infection System for Controlling Risk In the Built Environment' (HAI-SCRIBE) when designing and specifying floor finishes.

1.6 This SHTM is applicable to the supply and laying of all new flooring materials, both during new building work and when renewing flooring in existing buildings.

Relationship to other data

- 1.7 The main sources of data used in the preparation of this Scottish Health Technical Memorandum are listed in the References Section.
- 1.8 This SHTM was prepared for publication in October 2008. 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 Suppliers or manufacturers of goods with BS EN ISO 9000 certification. Suppliers offering products other than to British or relevant European standards should provide evidence to show that their products are at least equal to such standards.
- 1.10 The Activity Data Base (ADB) is often utilised to provide core briefing as it interfaces with Department of Health (DoH) produced guidance. Its use in the briefing process is recommended, but should be used in conjunction with the material Floor Finish Selection Matrix, which forms part of this SHTM, to fully determine the flooring performance characteristics of individual rooms and zones of a building.

Other forms of database are also commonly used in health projects and these generally interface with ADB referencing and data ranges. Project teams should ensure that data incorporated in non-ADB databases are in line with their relevant project requirements.

1.11 This guidance should be used in conjunction with sections of the National Building Specification (NBS) relevant to flooring. The 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 British Standards Institute (BSI)/Conformite Europeene (CE) 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 http://www.thenbs.com/.

1.12 Any enquiries regarding the slip resistance of flooring may be directed to slips@hsl.gov.uk or the HSE Information line: 0845 345 0055.

Terminology

- 1.13 The following terms are used throughout this SHTM. Others are defined in the sections in which they are used.
- 1.14 Flooring system – the combination of one or more of the following:
 - underlay material laid on or applied to a base or screed to render it • suitable to accept the selected finish;
 - screed a well-compacted mixture of sand and cement laid in-situ onto a ٠ base and suitably finished to receive the final flooring;
 - **bed** a layer of cement and sand to enable rigid tiles and slabs to be levelled and fixed in position;
 - finish the uppermost layer;
 - any applied coating (that is, polishes or sealants);
 - accessories skirtings, stair treads etc;
 - **base** material that supports the flooring system;
 - separating layer a layer of material isolating the base from the screed or bed;
 - **damp-proof membrane** a layer or sheet of material within a floor to prevent the passage of moisture;
 - **insulation** material that may be incorporated in the overall floor build up for either envelope or acoustic insulation purposes.

Sustainability

1.15 The protection of the environment is important to NHSScotland and ongoing national initiatives are fully supported to ensure that projects and their component parts are developed to be truly sustainable.

Project teams should pay due respect to current and relevant legislation and

guidance when considering the impact of materials specified for incorporation in the built environment.

The use of BREEAM Health is now advocated for both new build and refurbishment projects in the NHS and this should be used during the development of all relevant projects.

Reference should be made to:

- Environmental Management Policy for NHSScotland. HDL(2006)21 Scottish Executive Health Department, Directorate of Finance (2006) http://www.sehd.scot.nhs.uk/mels/hdl2006_21.pdf
- CEL(2009)15 Sustainable development strategy for NHSScotland. Scottish Executive Health Department, Directorate of Finance (2009)
- A Sustainable Development Strategy for NHSScotland. HFS 2009.
- Corporate GREENCODE (Version 1.0). Health Facilities Scotland, 2004 (currently being updated).
- Choosing Our Future: Scotland's Sustainable Development Strategy Scottish Government (2005) http://www.scotland.gov.uk/Publications/2005/12/1493902/39032
- BREEAM Healthcare. Building Research Establishment (2008) http://www.breeam.org/page.jsp?id=109
- NHSScotland environmental management policy action plan. HFS 2008. This and other miscellaneous environment publications can be found on the HFS website (http://www.hfs.scot.nhs.uk/).

2. User requirements

Categories of performance of finishes

- 2.1 HTM 61 was set up on the basis of six categories of performance which had been established as a means of relating user requirements for floor finishes to the physical and performance characteristics of floor finishes available on the market. These categories have historically been used as a convenient method of stating user requirements on the schedule of activity spaces for relevant areas and in Activity Data Base.
- 2.2 This new SHTM has had the benefit of further input from the Health and Safety Laboratory (HSL) and NHS Boards in Scotland and has, therefore, been reconfigured to place the emphasis on a more first principles approach to the specification and selection of floor finishes through the use of a selection matrix and associated risk assessment methodology. A risk assessment approach is one we would advocate on the basis of areas of a building being assessed on how they will perform in day-to-day situations and under specified cleaning regimes. Risk assessments are also a pre-requisite in the development of health and safety information to be developed for projects under the provisions of the Construction (Design and Management) Regulations 2007.

Material characteristics

Hard finishes

- 2.3 Hard finishes are generally specified in healthcare projects. A hard finish is a homogeneous material formed from one or more of the following:
 - thermoplastics;
 - natural stone;
 - clay;
 - sand;
 - wood;
 - thermosetting resins.
- 2.4 The physical and performance characteristics of hard finishes, as indicated in the Material Characteristics columns of the Floor Finish Selection Matrix, may be defined as:
 - impervious able to resist the penetration of liquids;



- jointless without joints or having joints which are sealed by materials and methods which make the whole surface impervious and prevent the collection of dirt and bacteria in the joint;
- smooth smooth to the touch, without pronounced texturing of the face exposed to traffic. This does not relate to surface microroughness or slip potential;
- slip-resistant this column should be checked/marked to indicate that a requirement for slip resistance has been considered. The details considered and the outcome of the assessment should be documented in the 'comments' section. Sources of information and points to consider when conducting an assessment are covered in the slip resistance section in paragraphs 2.13 2.26.

Note: Consideration should be given to the likely use of an area and potential contamination which may be present. If it is reasonably foreseeable that an area will be routinely contaminated, it may be advisable to specify an anti-slip surface. For more information about the slip resistance of flooring see the Health and Safety Executive's (2007) 'Assessing the slip resistance of flooring'. The Workplace (Health, Safety and Welfare) Regulations 1992 have several requirements for floors. There is also an important duty in these Regulations to keep floors free from substances that could cause slipping 'so far as is reasonably practicable'. See also the Health & Safety Executive's information sheet 'Slips and trips in the health services'

Soft finishes

- 2.5 A soft finish is a textile material, woven, stitched or otherwise formed from natural or man-made fibres or both.
- 2.6 The physical and performance characteristics of soft finishes may be defined as:
 - impervious constructed with an impervious backing to resist the passage of liquids;
 - low liquid absorption does not readily absorb liquids;
 - low radius of ignition the determination of flammability as defined in BS 5287:1988 when tested in accordance with BS 4790:1987 (the hot metal nut method);
 - low dirt retention has a pile that is cut or otherwise formed so that it does not easily retain dirt;
 - jointless without joints, or with minimum jointing.

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Recovery from indentation

2.7 This relates to the resilience properties of the finish material and its ability to reform following footfall, trolley tracking and anything which may have impacted on the surface with point loading i.e. furniture. Special grades of finish can also give additional resistance to indentation.

Electrostatic properties

- 2.8 In the various standards which apply, the electrostatic properties required in different environments are classed as:
 - conductive floor systems;
 - dissipative floor systems;
 - systems with a low potential for generating electrostatic charges.

However, the specific project requirements may be much more varied. The following criteria also need to be considered:

- mechanical loads caused by traffic and the use of machinery;
- chemical exposure resulting from the use of the room or area and also from cleaning and maintenance;
- temperature conditions;
- cleanability.

Specialist advice should be sought via manufacturers and suppliers when briefing and specifying relevant projects.

Resistance to chemicals

2.9 Flooring used in laboratory facilities, for example, should be able to withstand minor spillages of chemicals, including the more benign alkali and acidic substances.

At briefing stage, particular requirements should be identified and specialist advice sought via manufacturers and suppliers as relevant.

Operational requirements

Hygiene and cleaning

2.10 Control and Prevention of Healthcare Associated Infection (HAI) is a priority issue for NHSScotland, both in respect of the safety and wellbeing of patients and staff and also the resources consumed by potentially avoidable infections.

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.

Project teams must ensure that relevant infection control personnel and healthcare cleaning professionals are involved in the development of projects at all stages and that they contribute to the risk assessment process for floor finish selection.

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.

It is imperative that user requirements for cleaning are considered fully in the selection of appropriate floor finishes. Cleaning regimes in healthcare premises are particularly onerous generally and not more so than for floors. There are requirements for frequency of cleaning which may impact on the use of rooms, circulation and waiting areas at various times of the day. It is particularly important to consider the impact of cleaning on the slip resistance of floors.

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 including the latest technical requirements are embodied in the following documents:

- SHFN 30 Version 3: Infection Control in the built environment: Design and Planning;
- HAI-SCRIBE Version 2 (Healthcare Associated Infection System for Controlling Risk in the Built Environment);
- The NHSScotland National Cleaning Services Specification: SEHD/CMO;
- NHS Quality Improvement, Scotland Healthcare Associated Infection (HAI) Cleaning Services Standards: CSBS / NHSQIS;
- The NHSScotland Code of Practice for the Local Management of Hygiene and Healthcare Associated Infection: Healthcare Associated Task Force CMO (2004) 09.

- 2.11 All types of flooring should be cleaned following the methods advised in these specifications.
- 2.12 For other relevant information on cleaning, manufacturers guidance must be considered, in addition see:
 - The Tile Association's (2000) 'The cleaning of ceramic tiles.' BS 5385-3:2007: Design and installation of internal and external ceramic and mosaic floor tiling in normal conditions – Code of practice;
 - The Health and Safety Executive's (2005) 'Slips and trips: the importance of floor cleaning'.

Slip resistance

- 2.13 The Health and Safety Executive's (2007) 'Assessing the slip resistance of flooring' concerns the classification of floor surface slip resistance. The document describes accepted test methods widely used and referenced in British Standards. This document is available free of charge from the HSE slips pages at http://www.hse.gov.uk. Good practice guidance on all aspects of slips can be found in 'Safer surfaces to walk on Reducing the risk of slipping', a document produced by the Construction Industry Research and Information Association (CIRIA) and sponsored by the Health and Safety Executive, the Department of Health, London Underground Rail Safety and Standards Board and others. This document is aimed at architects/designers, specifiers and health and safety professionals and is available to download from the HSE slips pages at http://www.hse.gov.uk.
- 2.14 Surfaces with low levels of microroughness (such as traditional vinyl or smooth natural stone) are unlikely to provide satisfactory levels of slip resistance in wet conditions. This is likely to be the case under even extremely low levels of wet contamination. It should be noted that dry contamination (e.g. talcum powder, dust) will also reduce the level of available friction, in many cases having a similar effect to the presence of water.
- 2.15 Research has suggested that the surface microroughness contributes more to the slip-resistant properties of the floor than the presence of visible patterning or texturing on the surface of either hard or soft flooring. Floors such as metal chequer plate, studded rubber, textured vinyl and profiled ceramic may be slippery when wet and will be more difficult to keep clean than a smooth surface with an equivalent surface microroughness.
- 2.16 The requirement to leave potentially slippery floor surfaces dry after the use of wet cleaning regimes is one that is often neglected. The presence of very low levels of wet contamination after the use of wet cleaning regimes (such as the slight dampness left after the use of a well wrung mop) can be more than sufficient to result in a pedestrian slip.
- 2.17 Pedestrian access to areas of flooring which have recently been cleaned should therefore be restricted for a short time using physical barriers to allow

evaporation of residual wetness. Cleaning during low traffic periods (e.g. overnight) will reduce the risk to pedestrians, however, the use of barriers during these periods is still recommended. Alternatively, specialist proprietary methods can be used to simply remove residual contamination before pedestrians use the flooring. Special thought will be required for areas which will be used continuously 24 hours a day 7 days a week.

- 2.18 Project teams should endeavour to ensure that at briefing stage, relevant operational requirements for cleaning are set down and that the functional content of the building incorporates sufficient storage space for barriers and cleaning equipment. Consideration should also be given to building-in provision for cleaning and maintenance barrier fixings/locations in the detail design.
- 2.19 The effectiveness of traditional floor cleaning methods is highly reliant not only on the use of the correct type of cleaning solution (detergent choice etc) but also on concentration. It is a common misconception that a more highly concentrated cleaning solution than that recommended will be more effective for removal of contamination. The contact time between a detergent and the surface is critical. Even 30 seconds contact time can make a big difference in cleaning efficiency. It is also important that cleaning solutions are removed effectively and not merely allowed to dry following cleaning. If solutions are not adequately removed, any grease and detergent will be deposited back on the floor as the water evaporates. For guidance on floor cleaning see the National Cleaning Services Specification, the Health and Safety Executive's (2005) 'Slips and trips: the importance of floor cleaning' and manufacturer's data sheets.
- 2.20 It is recommended that flooring manufacturers and/or suppliers be consulted during the specification process and that reliable slip resistance data, based on 'Pendulum' data as described in BS 7976 parts one and three and obtained in accordance with the current issue of the United Kingdom Slip Resistance Group guidelines, be supplied. It should be noted that, while useful for monitoring surface characteristics, surface roughness measurements should not be used to specify flooring. Specifiers must make themselves aware of potential differences in the slip-resistance properties of 'ex-factory' flooring materials and floors in use. Also the effect of installation processes and applied finishes on them. Where necessary slip testing should be carried out immediately following installation to assess the performance of the floor in situ.
- 2.21 The performance of floor surface materials may change significantly during installation and throughout their lifetime; slip resistance is critically dependent on the level and type of contamination, treatment, maintenance and effective cleaning subsequent to installation. Once floors have been installed, it is recommended that their slip resistance levels be monitored throughout their service life, at intervals appropriate to the level of risk determined, to identify any changes. This is particularly important if any significant change occurs in the use or maintenance of the area or if the floor is modified in any way. Further risk assessments must also be carried out to determine any consequential changes required to material installations or maintenance regimes.

- 2.22 From experience, it is clear that at project hand-over, floor finishes may not meet their specified performance requirements. At hand-over, therefore, representative samples of floor finishes should be tested accordingly it is recommended that this should be carried out by a suitably qualified and competent person with contract documentation stating this requirement as appropriate to project size and complexity.
- 2.23 When conducting a risk assessment for a new floor or replacement floor, the following elements must be considered:
 - substrate;
 - environment;
 - contamination;
 - slip potential;
 - use and users;
 - the suitability of cleaning regimes should be considered as an operational activity in line with the guidance in paragraph 2.10.
- 2.24 The choice of flooring for areas that may become wet or contaminated needs careful consideration. The choice of flooring will be influenced by the likelihood of the floor becoming wet or contaminated and other factors such as the use of, and levels of, pedestrian traffic in the area. In certain areas such as operating theatres, where hygiene is paramount, this is especially important. Other options to control slip risk such as spillage procedures, more frequent cleaning and slip resistant footwear should also be considered.
- 2.25 The flooring is just one, albeit important element, in the slip potential model and in areas where contamination occurs only occasionally, it may be more appropriate to control the risk through enhanced cleaning and management regimes.
- 2.26 One significant factor in the initiation of a slip is moving between areas of flooring which offer different levels of friction e.g. moving from a wet bathroom with specialist anti-slip flooring to a smooth vinyl corridor. Consideration must be given to the interfaces between different areas within a building and it should be noted that any contamination is likely to be spread on pedestrian footwear, trolley wheels etc. Some floors, such as power floated concrete or epoxy surfaces with aggregate inclusions, may have local differences in finish and stepping from a rough patch on to a smooth patch within the same floor surface may have a similar effect. Care must be taken during the installation of these types of surfaces to ensure a consistent finish.

Traffic

2.27 The traffic likely to use floor finishes should be identified as part of the specification process. This can range from only periodic footfall in some areas to frequent use by motorised and relatively heavy tugs in others. It is important



that any wheeled and heavy traffic loads are identified in order to inform the specification of the overall floor build up and floor finish in any area.

The Operational requirements section of the materials selection matrix sets down three criteria:

- light traffic: generally pedestrian only;
- medium traffic: includes beds and patient trolleys and lighter FM trolley traffic;
- heavy traffic: includes heavy FM trolleys and motorised tugs.

Repair and replacement

2.28 Floor finishes require ongoing routine maintenance, repair and replacement, this must be considered when risk assessments are being carried out and specifications are being finalised. Patch repairing and replacement of finishes should be carried out in line with the relevant provisions of this document, as they relate to both new build installations and existing facilities.

> The Life Cycle of the floor finish should be considered in the selection process and must take into consideration relevant manufacturer's data, including the environmental impact of both production and future recycling of the material.

Maintenance manual

- 2.29 An operation and maintenance manual must be compiled for the project and should be handed to the maintenance staff immediately following the practical completion of the contract. This flooring manual will form part of the building file required by the CDM Regulations.
- 2.30 The manual will at least include the following information:
 - names of floor materials or systems and manufacturer or proprietor;
 - any adhesives used, if known;
 - screeds;
 - damp-proof membrane;
 - structural floor base;
 - instructions on cleaning and maintenance;
 - operator training;
 - equipment specification.
- 2.31 Between completion of areas of floor and prior to practical completion of the project, relevant areas should be suitably protected and any cleaning must be carried out strictly in accordance with the manufacturers or suppliers



recommendations. From experience, floors are often cleaned at hand-over to the detriment of their finish and performance.

Cleaning

2.32 Guidance on cleaning routines is set out above. Reference should also be made to the Health and Safety Executive's (2005) 'Slips and trips: the importance of floor cleaning'.

The NHSScotland National Cleaning Services Specification (currently 2004 edition) identifies various cleaning specification codes. These are indicated in the the document.

The views of the healthcare cleaning professionals should also be sought when discussing potential flooring materials in relation to cleaning regimes.

These factors must be considered during the briefing stage and the completion of the cleaning section of the Selection Matrix will also provide a useful link for incorporation into the Maintenance Manual.

Design guidance 3.

Floor finish selection matrix

- 3.1 The Floor Finish Selection Matrix in Appendix 1 is broken into two worksheets.
 - Performance requirements this worksheet indicates the characteristics of • materials most usually specified for flooring in health buildings and also relevant operational requirements. This section should be used by those responsible for briefing from both a clinical and facilities management perspective. Each type of room or space is listed and the list can be edited electronically to include only the rooms and spaces applicable to a particular project;
 - Material selection using this worksheet, the required performance criteria • can then be used to support the selection of types of materials that satisfy the relevant material characteristics and operational requirements. The selection process should involve the appointed design team, members of the project team and manufacturers and suppliers.

A worked example using the worksheets is included for reference. Use the appropriate link in Appendix 1.

3.2 A risk assessment pro-forma is also included in Appendix 2. This should be used for assessing existing installations and also provides a suitable basis for design and risk assessment in line with the requirements of the CDM Regulations.

Types of material

Thin flexible finishes

- 3.3 Thin flexible materials (2.0mm; 2.5mm; 3.2mm; 4.5mm) are normally laid on a screed and it is essential that this should be of adequate strength, well compacted and with a smooth surface. Any blemishes, trowel marks and minor defects in the surface of the screed will show through the thinnest of these materials. To overcome this problem, smoothing/levelling compounds are now used in new, remedial and refurbishment work.
- 3.4 Experience also shows that, provided careful preparation of screed or power floated slab is carried out and/or the requirements of a smoothing/levelling compound and the adhesive have been carefully followed, consideration can be given to the use of 2.0mm thick flexible materials. A satisfactory surface finish to receive vinyl sheet or tiles must be dry, level and smooth, with consistent porosity, and be free from surface aggregates which might be released during the adhesive application. Compression and tensile strengths of all components



below the finish should be equal to, or greater than, the minimum requirement specified.

- 3.5 See BS 8203: 2001 'Code of practice for installation of resilient floor coverings'.
- 3.6 Refer to manufacturer's product literature for details of materials available on the market. It is recommended that relevant manufacturers are contacted during the specification and selection process in order that the latest market products are assessed for suitability.
- 3.7 If underfloor heating is used, care must be taken to ensure compatibility of adhesives and to avoid polymer migration.

Clay tiles and cementitious finishes

- 3.8 These are normally supplied and laid using traditional materials and skills. The publications listed in the References Section give specification and installation guidance, but the following are particularly relevant:
 - BS 8204: Parts 1-7 'Screeds, bases and in-situ flooring Code of practice';
 - The National Federation of Terrazzo, Marble and Mosaic Specialists: 'Specification sheet for precast and in-situ terrazzo and mosaic'.

Resin-based finishes

- 3.9 These are supplied and laid by specialists employing new and continuously evolving materials and techniques.
- 3.10 Specification, mix, workmanship and environmental conditions during laying and protection of the finished floor must be carefully controlled.
- 3.11 Refer to manufacturer's/installer's product literature for details of materials and laying instructions, which should be strictly adhered to. Refer also to the Federation of Resin Flooring Formulators and Applicators http://www.ferfa.org.uk.

Textile – Carpet - floor coverings

3.12 Carpets must be avoided in all clinical areas (Scottish Health Facilities Note 30: 'Infection control in the built environment').

It is acknowledged that in specific areas it may be considered more important to create a more 'domestic' environment. When considering the specification of finishes in such areas, an appropriate risk assessment will be required to fully assess the design.

3.13 Refer to manufacturer's product literature for details of textile floor coverings. Recommendations for their installation and advice on the selection of materials and their properties are contained in BS 5325: 2001 'Installation of textile floor coverings - Code of Practice'.

- 3.14 General to all carpets:
 - carpets must be avoided in all clinical areas (Scottish Health Facilities Note 30: 'Infection control in the built environment ');
 - carpets offer greater comfort and in some areas can create a 'domestic' atmosphere;
 - carpets will normally provide good slip resistance, however careful installation and appropriate maintenance will be needed to avoid carpets lifting and presenting a trip hazard;
 - care should be taken to ensure that carpets do not hide changes in level which may result in a trip. Changes in level should be clearly marked e.g. by using colour contrast;
 - carpets provide high sound absorption and elimination of noise from footsteps;
 - despite their softness, a risk of injury in the form of 'friction burns' is possible to some degree with some types of carpet;
 - certain synthetic piles, if not properly treated, can cause static electricity problems (see SHGN: 'Static discharges');
 - all carpets can suffer from cigarette burns but the synthetic piles are prone to char much more than wool;
 - carpets are not suitable for areas prone to frequent wet spillage and soiling;
 - deeper pile carpets are not suitable for areas subject to wheeled traffic.
- 3.15 BS EN 1307: 2008 'Textile floor coverings: Classification of pile carpets' gives four ratings (only three apply in healthcare settings) of performance based on level of use class and intensity. The ratings indicated in Table 1 are suitable for health buildings:

Rating	Description	Application
4	Extra heavy use	Heavy contract location where very high wear standards are required.
3	Heavy use	Heavy domestic use and general contract areas.
2	General use	Normal domestic use.

Table 1: Ratings suitable for health buildings

Skirtings

- 3.16 The junction of wall and floor must recognise the cleaning regime required for each situation.
- 3.17 Integral coved skirtings or set-in skirtings are essential where wet cleaning processes are necessary; PVC sit-on skirtings, timber laminate or metal finishes



could be used. In refurbishment works, sit-on coving (if not fitted correctly) carries the risk of providing dirt traps, therefore it is safer to specify set-in skirting.

- 3.18 Clay tiles:
 - skirting tile to match the floor finish.
- 3.19 Cementitious materials:
 - coved skirting formed in-situ from floor material;
 - generally no skirting is necessary where utilitarian materials abut masonry.
- 3.20 Resin materials:
 - coved skirting formed in-situ from floor material.
- 3.21 Textile floor coverings:
 - wood, wood laminate, metal and PVC skirting;
 - alternatively the textile covering may be taken up the wall, backed by a suitable cove former.
- 3.22 Wood or wood laminate:
 - timber or proprietary laminate skirtings.

Integrity of finishes and junctions

- 3.23 The continuity and integrity of surfaces is important in all areas and particularly in wet and more clinically sensitive locations. Surfaces must be easily cleaned and finished to avoid potential dirt trapping points.
- 3.24 In wet areas such as shower rooms with level access floors it is important to avoid tripping hazards such as floor gulley surrounds and lippings to contain water.
- 3.25 Floor gulleys, gratings and associated finishes must be integrated within the overall floor build up in accordance with relevant manufacturer's recommendations and to achieve tight and continuous sealing to minimise potential for dirt traps.

Access and inspection points for services which are located on floors must be double sealed units and should be capable of incorporating floor finishes with smooth, sealed junctions to achieve easily cleaned surfaces.

Guide to specification and selection of materials Screeds

General

3.26 There is a relatively high level of screed failure on construction projects and it is therefore of paramount importance to address the issues relating to specification and installation at the appropriate times in the design and procurement process. For example, the specification of some modern beds and theatre trolleys can have a profound impact on the both the choice of floor finish and the overall floor build up, particularly screed specification.

A satisfactory screed will only be achieved as a result of careful attention to the following:

- specification of the appropriate thickness, design mix, materials and workmanship;
- preparation of the base;
- mixing, laying and compacting;
- finishing, curing and protecting;
- slump testing during laying and testing the installed screed.
- 3.27 This can be achieved only by a high standard of site supervision in addition to appropriate design and specification.
- 3.28 Reference must be made to BS 8204-1:2003 and also BS 8203:2001 for screed guidance in design, thickness and laying etc. This indicates, for instance, that the minimum thickness for bonded screeds is 25mm and suggests that a design thickness of 40mm would be likely to achieve this.
- 3.29 With bonded screeds over 40mm thick there will be an increased risk of loss of adhesion with the base.
- 3.30 Screeds should be laid in as large an area as possible in one operation to minimise the number of joints.
- 3.31 BS 8204-2:2003 recommends 100mm minimum thickness for unbonded concrete toppings to minimise the risk of curling, as does BS 8204-1: 2003 for unbonded or floating screeds. There are many proprietary screeds that achieve lesser dimensions than those quoted in BS 8204.
- 3.32 The thickness of a screed will be the minimum construction thickness required plus an allowance for the permissible deviation of the base. Different thicknesses of floor material may require different thicknesses of screed. Where a flooring system is thicker than the common dimension, a decision must be made as to how it will be accommodated, for example by adjusting the levels of the base.

Types of construction

3.33 The following types of screed construction are in general use:

- monolithic the screed is laid as a topping to the base concrete while it is still green, that is, within three hours of being placed (or lesser time in hot weather). This type of construction ensures complete adhesion of the screed, reducing problems of differential shrinkage. Difficulties can arise from the need to protect the screed for long periods during construction;
- bonded the screed is laid on a hardened concrete base. A cement slurry
 or proprietary agent may be used to adhere the screed to the base, which
 must be properly prepared by mechanical or other means to obtain
 maximum adhesion;
- unbonded the screed is separated from the base, for example by the presence of a damp- proof membrane, and therefore cannot adhere to it. This type of screed will usually be much thicker than those of monolithic or bonded construction, with the exception of asphalt. Precautions will need to be taken to reduce the risk of 'curling' along joints. The introduction of insulation layers between floor slabs and screeds should be carefully considered as they can often contribute to the failure of screeds.

Self-levelling and smoothing compounds

- 3.34 The use of self-levelling and smoothing compounds on screeds and concrete slabs is now more common. The quality of such compounds now available and acceptable for use has improved substantially, but it is important that the correct choice of underlay is used:
 - to suit the traffic conditions;
 - to suit the type of sub-floor;
 - to be compatible with the adhesive for laying the material;
 - of a type which does not promote or sustain the growth of bacteria or fungi.
- 3.35 Self-levelling and smoothing compounds can be used in remedial and refurbishment work.
- 3.36 The smoothing compound may be latex-based, acrylic-based or water-based, the choice depending on the hardness of surface required and the type of subbase. In most cases a solid base construction is required:
 - acrylic-based compounds provide a hard surface, but generally cannot be pumped;
 - latex compounds have different grades of hardness and, being more flexible, may be considered to be suitable for timber-flooring structures;
 - water-based compounds are mainly self- levelling compounds requiring the minimum of trowelling, and provide a smooth and hard surface. Some can be pumped for speed of application.

3.37 It is important to seek the recommendations of all manufacturers in determining the correct levelling/smoothing compound and to check its compatibility with the sub-base surface treatment.

Self-levelling screeds

- 3.38 These high-strength, cement-based screeds are available without protein content so that they do not promote or sustain the growth of bacteria or fungi. Such screeds range from 4mm to 50mm in thickness, usually with a designed thickness range of 8–10mm on a concrete-floated slab. Upper floors require a minimum thickness of preferably 5mm at the top of the chamber to concrete planks in pre-stressed construction.
- 3.39 This type of self-levelling screed is widely available and can afford a fast and easy application covering a large area in a short space of time. Some proprietary systems include fibre reinforcement and glass-fibre mesh, enabling them to be laid down on a variety of bases, including overlaying existing floor materials for rapid refurbishment programmes.
- 3.40 Self-levelling screeds are generally fast-setting, allowing light foot traffic after only a few hours, and allow laying of floor materials following a drying period from one day to about four weeks.
- 3.41 These screeds can be laid down very late in the construction programme giving less potential for damage to the finished surface by following trades.

Areas with special requirements

3.42 The list of areas outlined in the following paragraphs 3.43–3.79 is not exhaustive, but is only intended to give examples of specific requirements of certain areas in the healthcare environment.

Operating theatres

- 3.43 Floors can be subjected to severe static and dynamic loading. Progressive failure of a flooring system can stem from initial small faults in the jointing of the material or from insufficient bearing strength or poor workmanship in laying the screed. The structural details and the selection and installation of the flooring system must be given meticulous attention.
- 3.44 One of the earliest considerations for the design team must be the type of operating theatre table which will be used, as this will have an important bearing on the type of flooring system selected and the structural design.
- 3.45 It is also important to establish whether the table will be used for patient transfer in and out of the operating theatre.



- 3.46 Theatre tables with softer tyres, giving a greater contact area will significantly reduce possible damage to the floor.
- 3.47 Floors must be able to withstand harsh treatment including:
 - the rolling loads of heavy mobile equipment;
 - frequent spillages with subsequent 'mopping up';
 - regular hard cleaning.

Finishes

- 3.48 Flooring must also have the following characteristics:
 - hygienic finishes;
 - continuous;
 - smooth;
 - impervious;
 - sealed joints;
 - easily cleanable;
 - wear-resistant.

Note: Carpets are not acceptable anywhere within the operating department.

- 3.49 Manufacturer's information on suitable cleaning, disinfection and maintenance procedures is important at the design stage.
- 3.50 There must be a continuous return between the floor and the wall, for example coved skirtings which return a minimum of 100mm, which allow easy cleaning and avoid microbial colonisation.
- 3.51 The skirting material used should be integral with, and have properties similar to, the floor material.
- 3.52 In areas where frequent wet cleaning methods are employed, the flooring material should be unaffected by germicidal cleaning solutions.
- 3.53 The floor material must be properly anchored to the underlying surface.
- 3.54 Sheet vinyl, linoleum or rubber must have welded joints. The flooring should be at least 2mm thick. Such flooring is tolerant of small movements in the structural floor. The floor screed should be perfectly smooth, crack-free and stable. Adhesives must be powerful enough to resist the formation of 'waves' in the floor material that can result when heavy equipment is moved. Sufficient time must be allowed for the adhesive to set prior to use. Thresholds at doorways between adjacent rooms require particular attention because they are points of stress in the floor material.

Showers

- 3.55 The needs of patients with various impairments and disabilities, including wheelchair users, must all be taken into account when designing showers. The height of a floor-mounted shower tray presents a barrier to a wheelchair patient or someone with mobility impairment, so the preferred solution would be one where the showering area is dished below the level of the surrounding floor. Gently graded access ramps should provide an approach to the shower, but attention must be paid to the slip resistance of the materials used as the presence of a gradient will increase the slip risk. A shower tray which is raised above the level of the surrounding floor will require a higher level of friction to enter and exit. The higher the tray, the greater the friction requirement. The level of the structural slab may have to be adjusted to accommodate any changes in the depth of the flooring system.
- 3.56 The material must be slip-resistant (see Health & Safety Executive's [2007] 'Assessing the slip resistance of flooring') and dressed into a floor outlet.
- 3.57 Proprietary flush-to-floor trays are now available which allow the floor material to be dressed into the tray. Pre-fabricated gradients for fitting under the floor finish are also now used to create level access showers.

Attention must also be paid to the direction of the showerhead spray and the floor outlet location as this may increase the amount of water discharging beyond the shower enclosure if poorly located.

Kitchens and Pantries

- 3.58 The essential performance requirements of the material are the need to combat the slipperiness caused by water and grease lying on the surface, and the need to maintain the high level of hygiene required in food preparation areas. Cleaning will be a key control measure in these areas in terms of eliminating slip hazards, maintaining the performance of anti-slip flooring and in maintaining a hygienic environment. Further information on floor cleaning and slips can be found in paragraph 2.13 2.36.
- 3.59 Selection of an appropriate finish must be made in consultation with Environmental Health Officers (EHOs), reference to the Health and Safety Executive's (2007) 'Assessing the slip risk of flooring' and appropriate manufacturers slip resistance data. There are several areas in and around the kitchen environment which may require additional thought when selecting flooring materials, these include:
 - floor drains which will need to offer a similar level of slip resistance to the surrounding floor;
 - walk in freezers; both water and ice are likely to be present on the floor in these areas;



- delivery bays where the ingress of weather is very likely but often not considered.
- 3.60 The skirting will normally be in the same/similar material to the floor, nominally 100mm high, coved at the junction with the floor and jointed with the wall material to give an impervious finish.

Entrances

3.61 Much damage and soiling can be caused by dirt, grit and liquids brought into a building on the feet of those entering. Figure 1 illustrates a typical arrangement to prevent ingress of dirt.

Suitable types of flooring

External zone:

• slip-resistant surface.

Intermediate zone:

• absorbent barrier mat for moisture removal with built-in scraper action.

Inner zone:

- dust control mat;
- barrier mat with built-in scraper action.



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Figure 1: Typical arrangement to prevent ingress of dirt

- 3.62 Matting is one control that can be used to reduce the risk of slips at entrances by removing wet contamination from pedestrian footwear. It will work best when used in conjunction with other controls including effective or enclosed canopies and heating, in particular underfloor heating and ventilation. If considered early enough in the design process, the location and orientation of entrances may also help to control the risk by reducing the ingress of wind-driven rain and snow. Other controls at entrances, such as the provision of umbrella covers, will help reduce the ingress of wet contamination further.
- 3.63 Materials technology continues to develop and associated costs reduce as more products enter the market place. There are a number of special matting systems appearing in the market place and project teams should check latest products when specifying and selecting the most appropriate materials and systems for particular situations.
- 3.64 The pendulum test or the Health and Safety Laboratory (HSL) ramp test can be used to determine the slip resistance of mats. The property may be directional, and this should be tested by the operator.
- 3.65 Surface micro-roughness measurements cannot be made on the matting materials themselves but may provide additional useful information on metal, plastic, rubber or other inserts (often an integral part of the matting, which is used to help remove gross contamination from footwear).
- 3.66 Barrier matting must be of sufficient quality and quantity to ensure, as far as reasonably practicable, the removal of dirt and water from footwear. Typically, it requires each foot to contact the mat at least three times while crossing i.e. at



least 6 metres. The more footfalls which contact the mat before reaching the floor beyond, the more effective it will be. If wet footprints are visible beyond the matting, it is being compromised and further controls will have to be considered. In situations where it is difficult to achieve these space standards, a risk assessment should be carried out taking into account: location, traffic – volume and type of pedestrians, wheeled traffic and goods/equipment, wear and potential slip factors - the level of likely contamination given the entrance location, orientation, protection, prevailing winds, etc.

- 3.67 Matting should extend to, and include, the threshold. There must be no strips of unprotected floor between threshold and matting. The matting must be fixed securely and installed flush with the surrounding area such that it does not present a tripping hazard. It must be cleaned and maintained appropriately and regularly. If wet cleaning techniques are used, the mats must have sufficient time to dry before use. Worn matting may present a trip risk.
- 3.68 If supplementary matting is needed, it should be butted up to the fixed matting with no gaps and should not be allowed to curl or ruck so as to introduce a trip risk. Temporary matting will often 'migrate' during the day as a result of foot traffic, leaving an area of floor between itself and any fixed matting. Mats should be monitored and repositioned as necessary. Again, given the availability of different products, project teams must specify and select finishes with backing suitable for the substrates on which they will be laid.
- 3.69 The way in which pedestrians use the entrance will determine how and where the matting should be positioned. The position and dimensions must prevent short-cut routes across the matting.
- 3.70 Matting is functional, and designers should avoid using it to make aesthetic design statements.
- 3.71 Consideration of the particular entrance requirements of accident and emergency departments and entrances in general, in addition to the use of automatic doors, may increase relevant dimensions. Reference must be made to Scottish Health Planning Note 22: 'Accident and emergency facilities for adults and children'.

Streets and corridors

- 3.72 These areas must be capable of withstanding the loads imposed by heavy wheeled traffic and intensive pedestrian traffic.
- 3.73 In selecting and specifying the system, the following points need to be considered:
 - type and volume of traffic will vary greatly depending upon whether the corridor is used as a main whole-hospital service street, or is used solely by one department;

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- mobile equipment may range from wheelchairs and small trolleys to comparatively heavy battery-powered 'tugs' hauling a train of loaded trucks;
- a high-bearing-strength screed is recommended. Wherever possible, movement and expansion joints should be located in positions where wheeled equipment will cause minimum damage;
- joints in the floor material can be a source of progressive failure in heavily trafficked areas, and materials requiring the minimum amount of jointing should be chosen in such areas.

Flatness of the surface is important in minimising damage to the floor finish.

Radiodiagnostic rooms

- 3.74 The equipment in this activity space may change several times during the life of the department, and it is possible to provide flexibility in the construction of the floor to allow for alterations (see Scottish Health Planning Note 06 'Part 1: Facilities for diagnostic imaging and interventional radiology').
- 3.75 Raised access floors are sometimes used, but must provide structural support for the table and other heavy equipment. Floors to radiodiagnostic rooms, processing and associated accommodation should be impervious. Sub floors require to be sealed with an appropriate finish to minimise dust adhesion.

Ancillary Areas

'Cold' rooms

3.76 Cold rooms can introduce additional hazards to the healthcare environment and floor finish selection must take account of the particular requirements of these areas, including issues such as the integration of floor gulleys. The specification of floor finishes must allow for the low temperatures required and the use of profiled and gridded flooring surfaces should be carefully considered due to potential lack of slip resistance.

Receipt/dispatch areas

3.77 Due to the nature of the activities carried out in these areas, together with the high risk of contamination, floor finishes must be slip resistant with good wear qualities. Flooring must be carefully selected and present a low slip potential in the presence of common contaminants.

Plant rooms and maintenance areas

3.78 These areas are likely to be used less frequently than other areas of a health building and the risk of contamination will come from a variety of sources i.e. water tanks, discharges from pipework, leakages from equipment.

Again, additional warning signs and related visible markings must be used together with requirements for staff and operatives using these areas to wear appropriate footwear.

3.79 Research by the HSE suggests that profiled flooring does not always offer the enhanced level of slip resistance that most pedestrians expect. The action of the profile is highly dependent on the pedestrian's footwear and the area of the profile they make contact with. These surfaces are often implicated in accidents.

Appendices

Appendix 1: SHTM 61 Floor Finish Selection Matrix

Appendix 2: Sample Risk Assessment

Appendix 1: Floor Finish Selection Matrix

SHTM 61 Floor Finish Selection Matrix

SHTM 61 Floor Finish Selection Matrix Performance Project Example

SHTM 61 Floor Finish Selection Matrix Material Project Example

The above documents are all available in electronic format on the Health Facilities Scotland website http://www.hfs.scot.nhs.uk/

Appendix 2: Sample Risk Assessment

This sample risk assessment has kindly been provided by Salus Occupational Health and Safety as guidance.

Methodology

1.0 As has already been indicated in the introductory paragraphs to this document, there has been a growing emphasis on designing out the potential for slips and trips in the built environment over recent years. The hazards and associated risks with the use of floor covering materials in the various locations applicable in healthcare environments require identifying and assessing. It is important to identify the potential impact of the hazards identified, whether in existing situations or in new proposals, and what can effectively be done to mitigate the risks.

Definitions:

- Hazard is anything with the potential to cause harm;
- Risk is the likelihood (great or small) that the hazard will cause significant harm;
- **Risk Assessment** may be considered as the identification of the hazards present and an evaluation of the extent of the risks involved, taking into account whatever precautions are already in place.

Due to the impact of slips and trips in healthcare premises in Scotland, Safety Action Notice - Flooring Materials, Risks of Pedestrian Slips and Trips, SAN (SC) 05/08, was published in February 2005. This document details the need for a suitable and sufficient risk assessment to be undertaken which takes into consideration the following factors: The type of floor covering.

- 1. Slip resistance and surface roughness data;
- 2. Work activity;
- 3. Possible contamination;
- 4. Cleaning and maintenance regimes;
- 5. Staff training, awareness and action;
- 6. Control measures currently in place;
- 7. Additional control measures required.

Risk Assessment Process

2.0 Management responsibilities:

- to make a suitable and sufficient assessment of the risks to the health and safety of employees whilst at work. Where a risk is identified as high and medium the assessment should be in writing;
- to make a suitable and sufficient assessment of the risks to the health and safety of others who may be affected by your operations e.g. patients, visitors, contractors, general public, etc;
- to eliminate the risk where reasonably practicable;
- to reduce risk by implementing control measures to reduce the risk to as low a level as is reasonably practicable;
- to document any significant findings of risk assessments including the hazards, the control measures and the groups who are at risk;
- to inform those affected about the significant findings;
- to review assessments at a specified time scale or if there is reason to suspect that it is no longer valid or there has been a significant change in circumstance.

Having identified where a risk assessment is required, the residual risk must be evaluated, into a high, medium or low risk category. This will ensure any residual risk is prioritised and actioned appropriately within a specified time scale.

Risk Rating (Evaluation):

In its simplest form, risk is a function of the severity of the consequences arising from the hazard being realised, and the likelihood that it will occur.

This may depend on the frequency at which the hazard is encountered.

Risk = Severity x Likelihood

If numerical values can be given to the severity and the likelihood, then the risks can be **rated** in some order.

For example, if we decide that for any given hazard, the following can be said;

Severity

- 5 **Catastrophic**: could result in a fatality;
- 4 **Major**: serious disabling injury/ill health;
- **3 Moderate**: Semi Permanent injury/ill health;
- 2 Minor: Short term;
- **1 Insignificant**: No injury or ill health;



Frequency (Likelihood)

- 5 Almost certain: Regular Occurrence;
- 4 Likely: Probably will occur, but is not a persistent issue;
- **3** Possible: Would expect to happen once a year;
- 2 Unlikely: Do not expect to happen, but is possible;
- 1 Rare: Has happened rarely/never before.

After calculation these estimations of risk can be put in grid format.

The higher the score, the higher the risk.

Risk Rating

High = 15 - 25 Med = 6 - 14 Low = 1 - 5

Likelihood (PLR) Severity (PSR)	Almost Certain 5	Likely 4	Moderat e 3	Unlikely 2	Rare 1
Catastrophic 5	25	20	15	10	5
Major 4	20	16	12	8	4
Moderate 3	15	12	9	6	3
Minor 2	10	8	6	4	2
Insignificant 1	5	4	3	2	1

Risk Rating Action: On completion of the Risk Rating identification, and based on the level of risk, the following action should be taken by a competently qualified person.

High Risk

Complete a written risk assessment:

- review existing controls and confirm risk rating;
- take steps to reduce risk immediately. In certain circumstances you may need to cease the activity until risks are controlled.

Medium Risk

Complete a written risk assessment:

- review existing controls and confirm risk rating;
- reduce risk as soon as possible.

Low Risk

• record the findings, review as necessary.

Monitor and Review

All risk assessments should be reviewed at a specified timescale, commensurate with the risk.



3. Location and type of floor tested

Location	Floor Finish



Slips Risk Assessment Form No 001

Location	Department	
Operation/Activity		Complete the relevant details of the activity being assessed.
		A separate assessment must be completed for each individual floor covering within your department.
Individuals or groups exposed		Highlight who
Maximum numbers exposed		numbers
Typical Use		exposed and the duration of any exposure.
		Are there any non- employees eg, visitors and contractors exposed?

Type of Flooring In use	Nature of hazard	Manufacturer's/Independent Information available in relation to Pendulum Test Value (PTV) and Surface Roughness (Rz)



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Comments/Observations on the hazards associated with the Flooring being assessed.	Technical Information currently available and
The adjacent information is based on the guidelines issued by the UK Slip Resistance Group.	endorsed by the HSE.
The methodology and equipment used, is recognised by the Health and Safety Executive (HSE) as the standard measurement for slip resistance.	Pendulum Test value in relation to slip potential
	24 and Below HIGH
	25 to 35 Moderate
	36 + Low
	Surface roughness value in relation to slip potential
	Below 10 HIGH
	10 to 20 Moderate
	20 to 30 Low
	NOTE: The information given is in relation to 'able bodied pedestrians' . Additional consideration should be given to the infirm, elderly and children, when considering your assessment.



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Current Control measures			List control
			measures taken to reduce risks.
			Do not forget to include other controls including safe working procedures, information, instruction and training. Include details of maintenance and test schedule for physical controls.
With these controls the risk is (tick)	LOW	MEDIUM	HIGH



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Additional Control measures			List any identified control measures which can be reasonably taken to reduce risks further.
			Consideratio n to be given to location of entrances, prevailing winds, volume of traffic etc.
			All additional control measures that are reasonably practicable should be implemented.
			Where slip risk cannot be achieved by all reasonably practicable means, alterations and/or modifications to existing floor surfaces may be required.
With these additional controls, the risk is (tick) Include reasonable time scales for completion.	LOW	MEDIUM	HIGH

Date			
Initial			

References

Acts and regulations

Construction (Design and Management) Regulations 2007

Disability Discrimination Acts 1995 and 2005. The Stationary Office (TSO)

Workplace (Health, Safety and Welfare) Regulations 1992, SI 1992 No. 3004, TSO, 1992.

Scottish Government and NHSScotland

Environmental Management Policy for NHSScotland. HDL (2006)21. Scottish Executive Health Department, Directorate of Finance (2006). http://www.sehd.scot.nhs.uk/mels/hdl2006_21.pdf.

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;

Corporate GREENCODE (Version 1.0). Health Facilities Scotland (2004).

The publications listed below are available from the Health Facilities Scotland website http://www.hfs.scot.nhs.uk/online-services/publications/.

SHPN 06 Part 1: 'Facilities for diagnostic imaging and interventional radiology'. Health Facilities Scotland, 2004.

SHPN 22: 'Accident and emergency facilities for adults and children'. Health Facilities Scotland, 2007.

SHFN 30: Version 3: '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) Version 2. Health Facilities Scotland, 2007

SHTM 54: 'User manual'. Health Facilities Scotland, 2006



SHTM 55: 'Windows'. Health Facilities Scotland, 2006

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

SHTM 57: 'Internal glazing'. Health Facilities Scotland, 2006

SHTM 58: 'Internal doorsets'. Health Facilities Scotland, 2006

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

SHTM 60: 'Ceilings'. Health Facilities Scotland, 2006

SHTM 62: 'Demountable storage systems'. Health Facilities Scotland, 2006

SHTM 63: 'Fitted storage system'. Health Facilities Scotland, 2006

SHTM 64: 'Sanitary assemblies'. Health Facilities Scotland, 2006

SHTM 66: 'Cubicle curtain track'. Health Facilities Scotland, 2006

SHTM 67: 'Laboratory fitting out systems'. Health Facilities Scotland, 2006

SHTM 69: 'Protection'. Health Facilities Scotland, 2006

SHGN: 'Static discharges'. Health Facilities Scotland, 1999.

British Standards

BS 5325:2001 Installation of textile floor coverings. Code of practice. British Standards Institution, 2001.

BS 5385-3:2007 Wall and floor tiling. Design and installation of internal and external ceramic and mosaic floor tiling in normal conditions - Code of practice. British Standards Institution, 2007.

BS 7976-1:2002 Pendulum testers. Specification. British Standards Institution 2002.

BS 7976-3:2002 Pendulum testers. Method of calibration. British Standards Institution 2002.

BS 8000-2.1:1990 Workmanship on building sites. Code of practice for concrete work. Mixing and transporting concrete. British Standards Institution, 1990.

BS 8000-9:2003 Workmanship on building sites. Cementitious levelling screeds and wearing screeds. Code of practice. British Standards Institution, 2003.

BS 8004:1986 Code of practice for foundations. British Standards Institution, 1986.

BS 8102:1990 Code of practice for protection of structures against water from the ground. British Standards Institution, 1990.

BS 8203:2001 Code of practice for installation of resilient floor coverings. British Standards Institution, 2001.

BS 8204 parts 1 to 7 Screeds, bases and in-situ floorings. Concrete bases and cement sand levelling screeds to receive floorings. Code of practice. British Standards Institution, 2003.

BS EN 1307:2008 Textile floor coverings. Classification of pile carpets. British Standards Institution, 2008.

BS EN ISO 9000:2005 Quality management systems. Fundamentals and vocabulary. British Standards Institution, 2005.

Other publications

BREEAM Healthcare. Building Research Establishment (2008). http://www.breeam.org/page.jsp?id=109

Health & Safety Executive (2003). **Slips and trips in the health services.** Health services information sheet No 2. Health & Safety Executive. http://www.hse.gov.uk/pubns/hsis2.pdf

Health & Safety Executive (2007). **Assessing the slip resistance of flooring**. Guidance note Slips 01. Health & Safety Executive. http://www.hse.gov.uk/pubns/web/slips01.pdf

Health & Safety Executive (2005). **Slips and trips: the importance of floor cleaning**. Information sheet (Slips 02). Health & Safety Executive. http://www.hse.gov.uk/pubns/web/slips02.pdf

The cleaning of ceramic tiles. The Tile Association, 2000.

CIRIA (2006), **Safer surfaces to walk on – Reducing the risk of slipping**. CIRIA http://www.hse.gov.uk/slips/information.htm#other

Other useful publications

Acts and regulations

The Management of Health and Safety at Work Regulations 1999 and (Ammendment) Regulations 2006.

Scottish Government and NHSScotland

Choosing Our Future: Scotland's Sustainable Development Strategy. Scottish Government (2005). http://www.scotland.gov.uk/Publications/2005/12/1493902/39032

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

CIRIA (2006), **Safer surfaces to walk on – Reducing the risk of slipping**. CIRIA http://www.hse.gov.uk/slips/information.htm#other

SAN(SC)05/08. Flooring materials: risk of pedestrian 'slip and trip' accidents. Scottish Government and NHSScotland. http://www.show.scot.nhs.uk/shs/hazards_safety/ SANPDF/PSAN0508.pdf

United Kingdom Slip Resistance Group (2005), **The assessment of floor slip resistance** Issue 3.

The Green Guide to Specification'. Anderson et al, 2002

Department of Health resources

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

HBN 26: 'Facilities for surgical procedures'. The Stationery Office, 2004.

British Standards

BS 1881 – Various documents relating to testing concrete. British Standards Institution.

BS 4027:1996 Sulphate-resisting Portland cement. British Standards Institution, 1996.

BS 4551-1:2005 Mortar - Methods of test for mortars – chemical analysis and physical testing. British Standards Institution, 2005.



BS 4592-0:2006 (and subsequent parts) Industrial type flooring and stair treads. Common design requirements and recommendations for installation. British Standards Institution, 2006.

BS 5385-5:1994 Wall and floor tiling. Code of practice for the design and installation of terrazzo tile and slab, natural stone and composition block floorings. British Standards Institution, 1994.

BS 5606:1990 Guide to accuracy in building. British Standards Institution, 1990.

BS 6925:1988 Specification for mastic asphalt for building and civil engineering (limestone aggregate). British Standards Institution, 1988.

BS 7953:1999 Entrance flooring systems. Selection, installation and maintenance. British Standards Institution, 1999.

BS 7976-3:2002 Pendulum testers. Method of calibration. British Standards Institution 2002.

BS 8000-2.1:1990 Workmanship on building sites. Code of practice for concrete work. Mixing and transporting concrete. British Standards Institution, 1990.

BS 8000-9:2003 Workmanship on building sites. Cementitious levelling screeds and wearing screeds. Code of practice. British Standards Institution, 2003.

BS 8004:1986 Code of practice for foundations. British Standards Institution, 1986.

BS 8102:1990 Code of practice for protection of structures against water from the ground. British Standards Institution, 1990.

BS 8215:1991 Code of Practice for design and installation of damp proof courses in masonry construction.

BS EN 12620:2002 + AI: 2008 Aggregates for concrete. British Standards Institution, 2002 and 2008.

BS EN 12825:2001 Raised Access Floors. British Standards Institution, 2001.

CP 102:1973 Protection of buildings against water from the ground. Code of practice. British Standards Institution, 1973 (partially replaced by BS 8102, 1990 and BS 8215, 1991).

Useful websites

Guidance may be available from:

British Cement Association: http://www.bca.org.uk

Federation of Plastering and Drywall Contractors: http://www.fpdc.org.uk

The Health and Safety Laboratory: http://www.hsl.gov.uk/

Mastic Asphalt Council: http://www.masticasphaltcouncil.co.uk/

Contract Flooring Association: http://www.cfa.org.uk

Construction Industry Research and Information Association: http://www.ciria.org.uk/

The Carpet Foundation: http://www.carpetfoundation.com/

National Institute of Carpet and Floor Layers: http://www.nicfltd.org.uk

The British Textile Technology Group: http://www.bttg.co.uk

British Resilient Flooring Manufacturers Association. 4 Queen Street, Brighton, BN1 3FD.

Federation of Resin Flooring Formulators and Applicators www.ferfa.org.uk/index.html)

The National Federation of Terrazzo, Marble and Mosaic Specialists http://www.nftmms.co.uk/

Health Facilities Scotland http://www.hfs.scot.nhs.uk/



SHTM 61 Flooring - Building Component Series



Floor Finish Selection Matrix Performance Project Example

Multi Practice Health and Resource Centre			N	laterial	Characte	eristics		Operational Requirements														ADB Category	Ri: Asses	sk sment	Comments				
Glasgow	Refer also to ADB and relevant SHPN / HBN guidance	Hard F	inish (2.3	3) So	ft Finish (2.5)				Clea	ning (2.:	10-2.12)- F	Refer to I	National	Cleaning	g Spec	ification for	codes		Slip resist	т	raffic (2.2	7)	Repair a	nd replaceme (2.28)	nt		Yes	No	
	Section references indicated for clarity	Impervious (2.4)	Jointless / Continuous (2.4)	Smooth (2.4)	Impervious Jointless / Continuous	Recovery from indentation (2.7	Electrostatic properties (2.8)	Resistance to chemicals (2.9)	Specification Code - A Specification Code - B	Specification Code - C	Specification Code - D	Specification Code - E	Specification Code - F	Specification Code - G	Specification Code - H	Specification Code - I Specification Code - K	Specification Code - L	Specification Code - M	Indicate if slip resistance is required (2.13-2.26)	required (z. 1.9°2zo) Light traffic - generally pedestrian only	Medium traffic - including beds and patient trolleys	Heavy traffic - including FM trolleys and tugs	Can room or area be easily isolated for repair or repla cement?	Are patch repairs acceptable? - relates to final design	Required life cycle	Use ADB Category only if satisfied that this meets specific project requirements			
ADB Room Code	List of Room/Spaces by Main Groups and Sub-Groups Individual Activity Spaces																												
c	CONSULTING, EXAMINATION, CLINICAL MEASUREMENT																												
C01	CONSULTING ROOM																								7				Good non-slip qualities required due to probable wet contaminants from clinical hand washing, etc.
C02 C03	CONSULTING, EXAMINATION ROOM ADMISSION/EXAMINATION/ASSESSMENT					+		—F			+		_												7				Good non-slip qualities required due to probable wet contaminants from clinical hand washing, etc.
C05	EXAMINATION																								7				Good non-slip qualities required due to probable wet contaminants from clinical hand washing, etc.
C06	EXAMINATION/TREATMENT																								7				Good non-slip qualities required due to probable wet contaminants from clinical hand washing, etc.
014																									- 1				Good non-silp qualities required due to probable wet contaminants nom clinical hand washing, etc.
D	STAFF, PATIENTS & RELATIVES: REST, DAY, DINING ROOM Includes Overnight Stay Facilities																												
D04	STAFF REST & DINING ROOM																								7				Mix of hard and soft flooring to architects detail design
D15	STAFF OVERNIGHT STAT							_																	7				Periodic use
F	DINING/SERVERY/COFFEE-LOUNGE																												
F04	COFFEE LOUNGE, CAFE/REFRESHMENT AREA																								7				Mix of hard and soft flooring to architects detail design
G	PARKING BAY AND CORRIDORS							-																					
G03	TROLLEY/CONTAINERS/RACKS PARKING																								12				
G04	CORRIDOR, EXIT BAY																								12				
G05 G07	LOBBY PUBLIC TELEPHONE													_			_								12				
																									12				
н	EDUCATION/LIBRARY/SEMINAR																								12				
H03 H05	LIBRARY SEMINAR ROOM													-											12				
H06	DISCUSSION ROOM																								12				
J 101	ENTRANCE/RECEPTION/WAITING													_			_								40				
J04	RECEPTION & RECORD OFFICE																								12				Proprietary barner mat system to be accommodated
J11	MAIN WAITING AREA																								12				Consider cleaning and impact on use
J12 J14	CHILDREN WAITING. PLAY AREA							-																	12				Consider cleaning and impact on use
																									12				e energe energiene generge energiene wit www
K	ENGINEERING PLANT/MAINTENANCE																												
K07	HEATING SERVICES, PLANT ROOM							-+												1					15			-	
Mos	OFFICES, INTERVIEW Includes offices serving also duty base																												
M07	INTERVIEW ROOM																								7				
P11	CA LEKING Food and Beverages Preparation and Wash-up KTCHENUTITY													_											7				
																									,				
Q (0)3	REHABILITATION See code 'X' for Physiotherapy etc Treatment OFFICE REHABILITATION							\square																	12				
Q04	ARTS AND CRAFT																								12				Likely wet contamination from use of sinks
Q05	OCCUPATIONAL THERAPY (OT) DAYSIOTHERAPY, ACTIVITIES AREA																								12				
400	THOUTHENNEL, NOTIVITED AREA																								12				opecialist noor innish should accommodate slip resist as per typical gym area
т	STAFF BASE/CLEAN UTILITY																												
T05	CLEAN UTILITY				1						1						1				1								

Multi Practice Health and Resource Centre			Materia	I Charact	eristics		Operational Requirements															ADB Category	Ri Asses	isk ssment	Comments	
Glasgow	Refer also to ADB and relevant SHPN / HBN guidance	Hard Finish	(2.3) S	oft Finish (2.5)			Cle	ecificatio	on for cod	les	Slip resis	at	Traffic ((2.27)	Rep	air and repl (2.28)		Yes	No							
	Section references indicated for clarity	Impervious (2.4) Jointless / Continuous (2.4)	Smooth (2.4)	Impervious Jointless / Continuous	Recovery from indentation (2.7	Electrostatic properties (2.8) Resistance to chemicals (2.9)	Specification Code - A	Specification Code - B Specification Code - C	Specification Code - D	Specification Code - E	Specification Code - F Specification Code - G	Specification Code - H	Specfication Code - I	Specfication Code - K	Specfication Code - L	Specification Code - M Indicate if slip resistance is	required (2.13-2.26) Light traffic - generally	pedestrian only Medium traffic - including	beds and patient trolleys Heavy traffic - induding FM	trolleys and tugs Can room or area be easily isolated for renair or	replacement? Are parch repairs acceptable? - reates to final design	Required life cycle	Use ADB Category only if satisfied that this meets specific protect requirements	o i i o i i o i o o fo a i i o o da		
ADB Room Code	List of Room/Spaces by Main Groups and Sub-Groups																									
-																_	_	_		_				-		
v	STAFF & PATIENTS CHANGE, SANITARY FACILITY, HAIRDRESSERS																									
V05	STAFF CHANGE																					12				
V07	PATIENT CHANGING																					12				
V08	STAFF SHOWER																					12				Interface between shower zone and adjacent surfaces to be carefully considered
V10	STAFF WASHROOM, WC includes BIDET																					12				
V11	PATIENT WC, HANDWASH including NAPPY CHANGE																					12				
V12	PATIENT WASHROOM, WC, BIDET, dual access							_														12				
V13	WASHCOOM, WC, SHOWER, AMBODINI						1										_		_	_		12				
V16	SHOWER, WC, WASH, ASSISTED					-																12				Interface between shower zone and adjacent surfaces to be carefully considered
																						12				menado berrear anover zone ana aqueen sanaces to be carefully considered
w	STORES/RECEIPTS-ISSUE																							1	1	
W08	PATIENT RECORDS																-			-	-	12		1	1	
																								1	1	
x	TREATMENT																									
X01	TREATMENT ROOM				1 1			1								-	-					7			-	
X05	TREATMENT & RECOVERY									1		1				1	1					7				
X06	GROUP THERAPY						1	1		1				1		1	1					7			1	
X07	BEHAVIOUR THERAPY																					7				
Y	DIRTY UTILITY/DISPOSAL/CLEANING				1 1																1					
Y04	DIRTY UTILITY						1	1		1				1		1	1					12			1	
Y06	DISPOSAL HOLD ROOM																					12				
Y12	CLEANERS ROOM																					12				