

## Standard specifications, layouts and dimensions

TWO



## Floor finishes in schools

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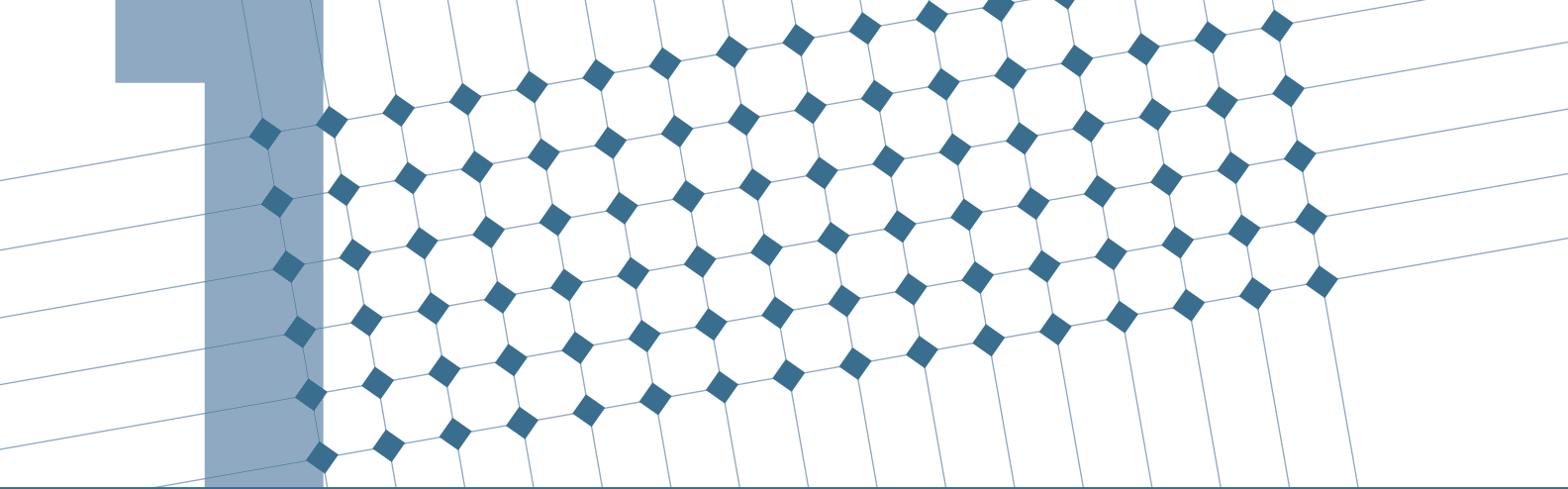
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# Introduction

This guidance is one of a series of **Standard Specifications, Layouts and Dimensions (SSLD) guidance notes** produced to inform the **Building Schools for the Future (BSF) programme**.

## Who this guidance is for

- Teachers and governors acting as clients for school capital projects
- Local authority officers responsible for procuring school capital projects
- Diocesan building officers
- Local authority and private sector school designers and specifiers
- Manufacturers and suppliers
- Contractors

## How the guidance should be used

This guidance sets out the standards of performance for floor finishes in schools in the Building Schools for the Future (BSF) programme and shows how they might be delivered through some example materials. The aim is to disseminate best practice and avoid 'reinventing the wheel' every time a school building is designed, so that consistently high quality environments can be delivered, offering best whole-life value for money.

School building clients, their professional advisers, contractors and their supply chains should use the guidance to inform their decisions on floor finishes and specification standards at the early stages of a project's development – whether that be new build, extension or refurbishment – at RIBA stages A-F.

To help encourage the take up of these performance specifications, this guidance will become the standard in BSF programme documentation and the Government will expect it to be adopted in the majority of situations where it is reasonable and appropriate to do so. While we would expect projects to comply with the standards, other solutions – possibly based on new products or technologies, or reflecting local factors – may equally comply with the performance specification and could be used. We do not want to stifle innovation by being too prescriptive.

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**When local authorities are compiling specifications, they may simply state a 'floor type' (A to E) for a space, or alternatively name a particular material that meets the requirements.**

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▲ Above floorings may help create a non institutional feel



▲ Above for hall flooring, see Section 3

Contractors and specifiers should consult with relevant manufacturers to find out which products are appropriate and compliant. Specifiers should also refer to the guidance given in the National Building Specification.

It is for users to exercise their own skill and expertise in deciding whether an example shown in this publication is reasonable and appropriate for their circumstances. The guidance here does not affect obligations and liabilities under the law relating to construction and building.

Though principally aimed at secondary school building projects delivered through the BSF programme, the specifications and example materials may also apply to other educational buildings.

We will keep this guidance under review and update it as necessary to reflect the development of new products, processes, and regulations. A web-based version is available at: [www.teachernet.gov.uk/management/resource/financeandbuilding/schoolbuildings/](http://www.teachernet.gov.uk/management/resource/financeandbuilding/schoolbuildings/)

## **Background to Standard Specifications, Layouts and Dimensions (SSLD)**

The BSF programme offers a unique opportunity over the next 10-15 years to transform our secondary schools, providing innovative learning environments that will inspire pupils to achieve more. High quality, modern school buildings will help to raise standards and play a crucial part in the Government's programme of educational reform.

With the huge increases in funding associated with this programme, there is considerable scope for using standardised specifications, layouts and dimensions to speed up design and construction, reduce whole-life costs and deliver consistently high quality and better value school buildings. Standardisation of requirements will support the use of more off-site fabrication and modern methods of construction, which should help to improve health and safety performance, reduce waste and deliver more sustainable solutions. For the supply industry, being involved in standardisation will help to demonstrate market leadership – and help firms reduce risk and increase sales, profitability, and market size.

This publication and the others in the SSLD series have been developed based on extensive consultation under the auspices of the SSLD Forum. Set up by the Department for Education and Skills (DfES), this forum represents key stakeholders in the building design, research, contracting, and supply communities, as well as local authority construction clients.



▲ Above consider how the floor is to be used

### Aims and scope of this guidance

This publication provides a standard performance specification and some examples for floor finishes for use in BSF secondary schools. It is structured as follows:

- **Section 2:** The generic performance requirements for floor finishes in secondary schools. This section also includes guidance on costs.
- **Section 3:** Performance specifications for floor finishes in different spaces, together with a number of examples that meet the performance requirements.
- **Section 4:** References to relevant British Standards, DfES and other design guidance..

### Definitions

For the purposes of this guide the following applies:

- **Flooring:** The uppermost layer of a floor that is designed to provide a wearing surface.
- **Floor covering:** A product prefabricated in sheet or tile form, which can be used to cover a floor.
- **Material:** What the flooring is made of.
- **Product:** A proprietary flooring available on the market.
- **Resilient flooring:** Flooring composed of vinyl, linoleum or rubber.
- **Composition flooring:** Flooring composed of wood particles and binder formed into blocks.
- **Textile floor covering:** Carpet.
- **Base or sub-floor:** The primary structural floor (usually concrete or screed) that supports the flooring.



▲ Above consider acoustics, furniture, airability and maintenance

# 2

## Key performance requirements

The following key performance requirements set the minimum standards that DfES would expect to be adopted in BSF schools wherever it is reasonable and appropriate. Section 3 defines the floor type requirements and suggests some examples that address them.

The primary function of a floor finish is to provide a durable, safe, clean, acoustically compatible, attractive and affordable surface. The flooring may vary depending on the function of the space within the school.

Generic key performance requirements for all school floors are contained in this section of the guide.

### Flooring properties

#### Acoustics

As the floor of any room represents a significant proportion of the surface area defining the space, its acoustic qualities play a role in establishing the acoustic environment of the room. For larger spaces, this proportion is particularly high. Good acoustic standards in teaching areas are crucial because if pupils cannot hear properly, their ability to learn is likely to be adversely affected.



Internal surfaces should be considered as a whole to achieve the reverberation times set out in Building Bulletin 93 (BB 93)<sup>1</sup> – all the surfaces surrounding a space will have an impact on the acoustic environment, and wall and ceiling finishes should be assessed alongside the floor. For this reason, it is not possible to prescribe in isolation a specific ‘acoustic performance’ for the floor to a particular space.

BB 93 also specifies the maximum noise level to be generated in a ‘receiving room’ by impact on the floor surface in the room above or next to it. For new construction, the main floor structure should be designed to achieve sufficient acoustic attenuation. It should not be necessary to rely on the floor finish to achieve the BB 93 standard. In refurbishment work, the finish can contribute to a reduction in noise transfer and manufacturers should be consulted for appropriate products. This may render some finishes unsuitable.

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**NB This is a specialist technical area and advice from an acoustics expert should be sought at an early stage.**

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▲ Above circulation spaces need to be particularly durable



▲ Above consider carefully the function of the space

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<sup>1</sup> [www.teachernet.gov.uk/management/resourcesfinanceandbuilding/schoolbuildings/designguidance/sbenvironmentalhs/acoustics/](http://www.teachernet.gov.uk/management/resourcesfinanceandbuilding/schoolbuildings/designguidance/sbenvironmentalhs/acoustics/)

## Durability

Resilient and textile floor finishes are classified to BS EN 685. The flooring types in Section 3 should conform to the appropriate section of this standard where these materials are appropriate.

Each material type is subject to its own standards and criteria. Reference should be made to the National Building Specification (NBS) for further details.

Floor finishes should have the capability to support furniture and equipment and withstand pedestrian traffic without undue deformation or permanent marking. It is recognised, however, that the softer floor coverings may show some indentation from furniture, particularly when new.

Specifiers will need to consider the particular type of traffic the floor finish will have, as this will affect the final choice of material. The performance data in Section 3 provides the basic criteria for selection but the specifier should discuss with manufacturers the final choice of product to suit specific circumstances. The type of footwear, the potential use of non-sporting footwear in sports halls, damage by heavy or point loads in workshops, continuous wear from bleacher seating in multi-purpose halls, and movement of furniture in dining and other spaces will all influence durability and the choice of finish.

Flooring should accommodate thermal and structural movement in both the finish and the sub-floor. Any movement joint in the base should be carried through the finish unless the designer can show that the finish is flexible enough to accommodate the movement without distortion. With some finishing materials, such as ceramics or terrazzo, movement joints may be required over day-work joints in the slab. Many defects occur because floor movement has not been properly considered.

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**The lifespan of a floor finish depends on the nature of the material, the type and extent of traffic and how well the floor is maintained. It is important to keep the floors clean, reasonably contaminant free and in good repair. The life spans specified in Section 3 are required for flooring under normal conditions of use for the specific situation. The floor should last a minimum of 10 years before it requires replacement.**

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## Fire

There is very little under the UK Building Regulations<sup>2</sup> covering the fire performance of floor finishes.

Building Regulations currently (2007) only require non-combustible floor finishes in fire fighting shafts. Part B2 (ii) of the Regulations states: 'The provisions (for fire spread) do not apply to the upper surfaces of floors and stairs because they are not significantly involved in a fire until well developed.'

Manufacturers are aware of the need to market their products abroad, where different standards may apply, and often the fire performance of a product may exceed what is strictly necessary in this country. There is currently debate within the flooring industry as to the appropriate standard of fire performance to be achieved. This may vary between the differing spaces within a school. BS EN 13501 is the relevant standard, although there is currently no UK recommendation for minimum Euroclass ratings. It is not the purpose of this specification at this stage to set a precedent on such an important matter but it is hoped that further editions will be able to set out specific requirements when these have been determined.

## Slip Resistance

The slipperiness of a floor depends not just on the material and surface texture but also on additional factors, notably whether it is wet or dry, the type of footwear, and whether it is worn, dirty or badly maintained.

Water or other contaminants can track from one surface to another and consequently affect the properties of a floor that was not envisaged to be slippery. Wetness can be caused by condensation, particularly on harder finishes.

It is important to adopt an holistic approach to selecting, using and maintaining flooring so that factors such as correct cleaning, appropriate footwear, good environmental conditions and acceptable user behaviour are taken into account.

The required slip resistance is set out for each of the standard floor performance categories in Section 3. This is stated as a Ramp Test rating (R value), which is commonly referred to in the flooring industry, and a Slip Resistance Value (SRV).

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**The slip resistance of a floor may change with the extent of its wear. If it is becoming slippery it can be assessed by a pendulum test (or other test method approved by HSE) to determine its acceptability. For areas that get wet there is an HSE requirement for a SRV36, as well as a minimum surface roughness of 20 microns.**

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<sup>2</sup> [www.ukbuildingstandards.org.uk/?gclid=CLKlwaPdjYsCFQbalAodviXCRw](http://www.ukbuildingstandards.org.uk/?gclid=CLKlwaPdjYsCFQbalAodviXCRw)

## Sustainability

The Building Research Establishment Environmental Assessment Method for Schools (BREEAM Schools) is the standard tool for assessing the environmental impact of a school.

Schools are required to meet the BREEAM standard 'Very Good' and must specify sustainable products – the environmental performance of building materials is published in the Building Research Establishment (BRE)'s The Green Guide to Specification<sup>3</sup>.

Flooring can have the greatest environmental impact of all building materials over the lifespan of a building – and encompass a wide range of environmental performance. Floors can have both some of the highest and the lowest Ecopoints per square metre of any material. (An Ecopoint is a measure of environmental impact.)



▲ Above information on sports flooring can be obtained from Sport England

BRE categorises materials into 'hard floor finishes' (timber, tile and sheet materials) and 'soft floor finishes' (carpets and matting). Each material is given a rating, from A+ to E, depending on its sustainability performance. An 'A' or 'A+' rating should generally be specified where a suitable product is available. However, 'A' products may not currently exist for all specified spaces in schools. Some materials on the market may well be suitable but have yet to be assessed. In some circumstances, where no suitable alternative is available, a lower standard could be considered.

Specific products should be checked with manufacturers, as variants of a material can have different ratings.

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**NB This specification does not exclude the reuse of reclaimed materials, providing they meet the specified performance requirements.**

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## Static electricity

Where electronic equipment is present, the floor may need anti-static properties to avoid the build up of static charge. There is a general level of conductivity required for normal traffic areas (to avoid people getting a shock when they have walked across the room and touch any metal object) and a higher level for areas where there are electrostatic sensitive devices.

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<sup>3</sup> [www.bre.co.uk/greenguide/section.jsp?sid=435](http://www.bre.co.uk/greenguide/section.jsp?sid=435)



▲ Above consider the risk of spillages together with the ease of cleaning

When it is understood what devices are likely to be present, the flooring requirements of the spaces, particularly server rooms, should be discussed and agreed with the manufacturers. For server rooms, for example, EN 1081 would be relevant. For general areas, EN 1815 is relevant, which means that the floor does not accumulate a static charge above 2kV.

There is detailed information in BS 2050 (partly superseded by BS ISO 2878), CEN Codes of Practice TS 14472-2 & 4 and BS EN 14041 (which refers to EN 1081 and EN 1815) for carpets and resilients, and ISO 6356.

### Heat Resistance

Some floors should be particularly resistant to heat. For example:

- A kitchen floor will need to withstand thermal shock from spillages of boiling water or fat as well as the heat from cooking appliances.
- The plant/equipment/processes in art rooms and workshops should be assessed to ensure the floor is suitable.

### Hygiene

All floors need cleaning but the importance of hygiene in kitchens, food technology, dining, toilets and shower areas is particularly important.

If ceramic tiling is used, it should be jointed with epoxy grout.

The specified Slip Resistance Value will need to be achieved but highly textured surfaces should be avoided, as they trap dirt.

Floors should be non-porous, reasonably joint free, with no dirt traps (a ceramic floor with epoxy grout is classed as joint free) and all welds in sheet material if required, should be smooth. Skirtings should be coved.

To distinguish the requirement for a higher standard of hygiene in these areas, the Floor Type tables (page 17-18) include the term 'high', although it is self evident that all floors will require a basic standard of cleanliness.

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**In all cases, floors should be cleaned and maintained to manufacturers' instructions.**

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## Safety

Under the Construction, Design and Management (CDM) Regulations, the designer must carry out an assessment of potential hazards associated with floor coverings. This includes:

- material selection to avoid hazardous substances
- unloading and site handling
- safe storage
- installation methods and the need for protective clothing
- adequate lighting and ventilation
- safety in the use of the floor
- safe methods of cleaning, maintenance and replacement.

Risks and counter measures should be scheduled.

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**NB This specification cannot envisage the risks inherent in each project. These should be established by the designer's risk assessment for each floor.**

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## Disability issues

### General

The correct specification of flooring is particularly important for people with disabilities. Factors include:

- texture and slip resistance
- colour, pattern and contrast
- acoustics

### Texture and slip resistance

Surface roughness and Slip Resistance Value (SRV) are particularly important for wheelchair users and people who have difficulty walking – to avoid slipping on ramps and level surfaces, and to ease wheelchair movement.

Carpets are not generally a problem but materials with deep or uneven pile are discouraged. Guidance on entrance flooring and disabled access is available in BS 7953 and BS 8300 section 9.

Variation in the texture of a floor may help to identify the transition from one space to another for people with impaired vision. However, it is inadvisable for very smooth and very rough floors to be next to each other as safety may be compromised by very abrupt changes in slip resistance.

Changes in floor texture to indicate a difference in floor function – through using textured or tactile surfaces at the approaches to ramps and stairs externally – has been embodied as a principle in Building Regulations and may be incorporated in subtler form internally.

ADM and BS 8300 have important guidance on stairs and in particular the importance of correct nosing design.

## Colour, pattern and contrast

Contrast in colour and pattern can help disabled people identify different building elements.

The entire colour environment should be considered as a whole in terms of hue, tone and emphasis.

For people who are visually impaired, contrast is essential for identifying the junctions between surfaces (e.g. between a floor and a wall), as similar colours could make the change of direction difficult to see.

The Building Regulations require contrasting colour for stair nosings.

Similarly, changes in floor colour can help to identify different spaces and differing functions within spaces.

A well-designed floor pattern can help people orientate themselves by providing a sense of scale and perspective.

Confusing floor images and highly reflective surfaces should be avoided.

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**Further guidance on disability can be obtained from the Centre for Accessible Environments<sup>4</sup>, the Building Regulations Part M and BS 8300.**

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## Acoustics

Please refer to page 6 for further details on acoustics.

Advice should be sought from an acoustics expert to ensure that the acoustic environment meets the needs of all its users.

## Installation

### Installers

Floor finishes require experienced, skilled labour. The specifier should identify the requirements for installers, including membership of a recognised trade organisation and, for some materials, belonging to a list of the manufacturer's approved contractors.

Responsibilities for delivery, offloading, storage and handling should be defined.

All installation should be in accordance with relevant manufacturer's instructions.

The designer should carry out a CDM risk assessment of the installation methods as part of the overall risk review.

### Sub-floor

The specifier should identify the requirements for the sub-floor – in terms of its moisture content, strength, hardness, level and smoothness – to ensure that it is suitable to receive the proposed finish.

In some situations the choice of floor finish will be influenced by its ability to cope with a floor base that is not yet fully dried out. It is important to consult manufacturers to ensure that the appropriate required moisture content of the sub-floor is specified.

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<sup>4</sup> [www.cae.org.uk](http://www.cae.org.uk)



## Fixing

Fixing, bedding and jointing of materials should be adequate to ensure and maintain the requirements for stability and structural resistance under normal loading conditions.

There should be no detrimental reactions from contact between the floorings, their fixings, beddings or adjoining materials.

## Protection

To avoid damage, the provision and type of floor protection should be specified for work both during and after installation, up to handover.

## Standards

Refer to the following standards for guidance on installation:

- Resilients, BS 8203
- Concrete/Resins, BS 8204
- Textiles, BS 5325
- Ceramics, BS 5385.

All these codes have substantial text on consultation during design and statements on the responsibilities of the different parties involved and later maintenance. The philosophy of the codes is for issues to be resolved early in the process so that action can be identified in sufficient time to avoid costly remedial site work.

## Maintenance

A floor's longevity, appearance, safety and hygiene depend on the correct maintenance regime.

- The flooring manufacturer's written recommendations should be followed in all cases
- Cleaning materials should be included in the designer's risk assessment for the project
- Cleaning and maintenance regimes should be incorporated in the Health and Safety file, which should be made available at building handover

## Furniture

Furniture and equipment chosen will influence the selection of flooring material. They should all be considered together early in the design process to ensure that they are compatible.

Indentation from chairs for example can be avoided by choosing suitable leg detail to spread the load.

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**Key issues are the indentation and marking or scratching of the finish; and the choice of furniture and floor to minimise this damage, both initially and over the life of the school.**

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## Cost comment

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### Capital costs

The flooring finishes element in a school will comprise 3% to 4% of the total construction cost. Total costs (excluding screeds and raised floors) range from approximately £35m<sup>2</sup> to £40m<sup>2</sup> of gross internal floor area (based on 4th quarter 2006 tender prices). Including raised floors or screeds, the total cost of the floor element will range between £67m<sup>2</sup> and £82m<sup>2</sup>.

### Whole-life costs

Whole-life costs are crucial to the design, procurement, selection and maintenance of flooring. Whichever specification is chosen, an holistic approach to decision making will deliver maximum benefits, as opposed to floor finishes selected on capital cost criteria alone.

The overall equation to be evaluated when selecting a material should factor in the following:

- Initial installation costs and affordability targets
- Cleaning and planned maintenance costs
- Repairs and reactive maintenance
- Replacement costs including disposal
- Life span of the asset compared to life expectancy of the floor
- Trade offs (e.g. acoustic or programme)
- Consequential costs (e.g. on servicing strategy, IT access and flexibility)
- Disruption costs (operational continuity)

- Environmental costs (re-cycling, toxicity, embodied carbon dioxide)
- Risk (both financial risks and health and safety, e.g., indoor air quality, accidents etc)
- Taxation, VAT and capital allowance

Professional advisors should take due regard of these factors and carry out option appraisals in developing project budgets, including discounting procedures<sup>5</sup>.

Over the lifetime of a typical 30 year PFI concession for a new school, the total discounted floor finish costs can be around £200-£250m<sup>2</sup>.

### Enhanced specifications in heavy traffic areas

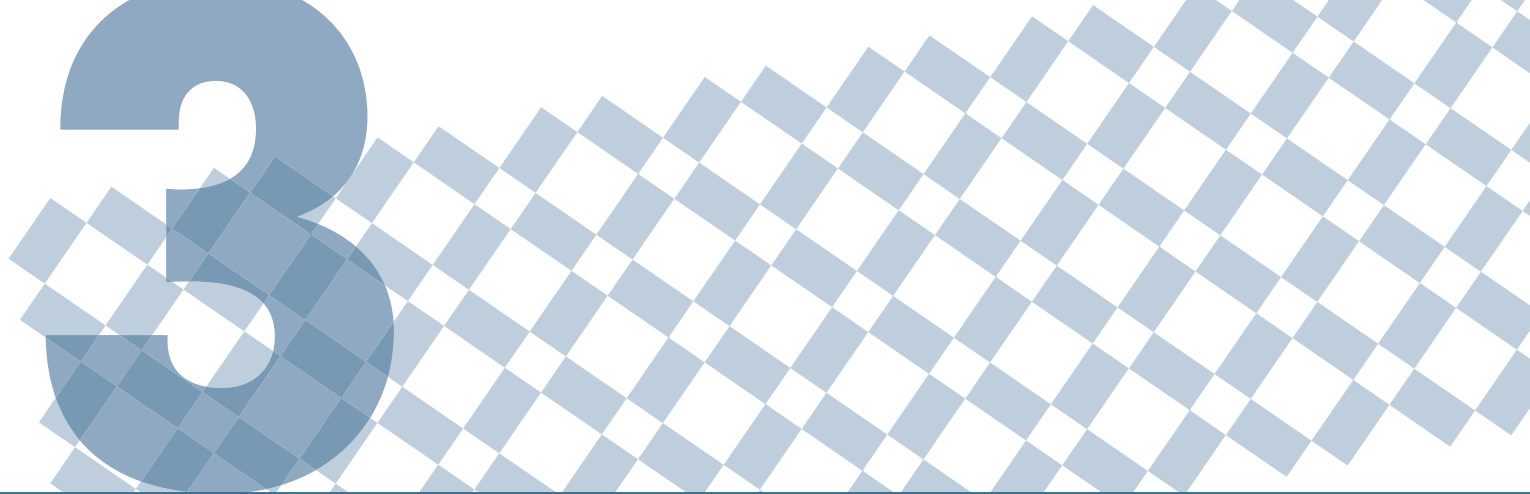
Approximately 14% to 20% of the gross floor area in a typical 10,000m<sup>2</sup> school is made up by circulation space. Harder wearing, more durable finishes are possible, for example, in corridors and reception areas, as the higher initial on-costs can be offset by the whole-life cost advantages, particularly longer replacement cycles. However it is important to consider other factors such as the acoustic environment of the space.

### Impact on capital costs for specifying a 10 year minimum life span for BSF

Research indicates that there should not be a significant cost premium under BSF if a minimum life span of 10 years is applied to floor finishes. Manufacturers typically quote life spans in excess of 10 years providing their materials are appropriately specified to match the expected footfall.

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<sup>5</sup> Further information on option appraisal is available in Finding the Right Solution at: [www.teachernet.gov.uk/docbank/index.cfm?id=4730](http://www.teachernet.gov.uk/docbank/index.cfm?id=4730). A whole-life cost model, including a discounting procedure, is available at: [www.teachernet.gov.uk/docbank/index.cfm?id=3352](http://www.teachernet.gov.uk/docbank/index.cfm?id=3352)



## Performance specifications and example materials

To simplify the specification of floorings, we can group these into five categories. The floor for a space within the school will fall into one of the following types:

- Type A General flooring
- Type B Light practical flooring
- Type C Heavy practical flooring
- Type D Wet area flooring
- Type E Hall flooring

Within these types there will be some variants; these are listed in the tables.

### Performance specifications

This section provides key performance requirements and recommended locations for five floor types.

Table 1 contains the majority of secondary school spaces as defined in Building Bulletin 98. It can be used to identify the finish (type A B C D or E) required for a particular space. The finish types are defined in the tables that follow.

For some spaces there will be a requirement for a sub-type with slightly different characteristics to those in the general group. This is indicated by a suffix (e.g. B.1.2), which is explained in the notes below table 1.

### Example materials

Some example materials are given for each type. They are listed in alphabetical order – there is no intention to rank them in terms of suitability. This does not preclude the designer from using other materials to achieve a particular aesthetic or functional effect – but the alternative must comply with the key performance requirements for the intended room. Within any material category, certain products may or may not be suitable and it is essential to consult manufacturers before making a decision. This specification does not intend to prescribe materials but to offer some examples of those that meet requirements.



### Floor type allocation: Table 1

For explanation of codes see notes after table.

Room type	Floor type
General teaching	A
Seminar room	A
Classroom	A
Small group room	A
Music recital room	A
Music classroom	A
Music practice room	A
Music ensemble room	A
Recording studio	A
Control room	A
A/V studio – video conference	A
Small lecture theatre	A
Large lecture theatre	A
SEN base	A
Library	A
Study area	A
Staff meeting room	A
Office	A
Staff room	A
Common room (6th form)	A

Room type	Floor type
Atria	A.3
Corridors and stairs	A.3
IT room	A
Science lab	B1.2
3D and 2D art	B1.2
Dark room	B1.2
Electronics and control	B
Textiles	B2
Graphics	B
Art/Design resource area	B1.2
Food room	B1.4
Drama studio	B or E
Walk-in store	B
Science prep room	B1.2
Chemical store	B1.2
Physical education store	B
Non-teaching stores	B
Locker areas	A or B
Chair store	B

*Continued*

Room type	Floor type	Notes on suffixes (see relevant floor type table)
Cleaners' store	<b>B1.2</b>	• Suffix 1 denotes a sub-type with an increased slip resistance requirement.
Kitchen staff and stores	<b>B1.2.4</b>	• Suffix 2 denotes a sub-type with an increased chemical resistance requirement.
Server room	<b>B</b>	• Suffix 3 denotes a sub-type with an increased durability requirement.
Dining area	<b>B3.4.6</b>	• Suffix 4 denotes a sub-type with a high hygiene requirement.
Serveries	<b>B1.3.4.6</b>	• Suffix 5 denotes a sub-type with an increased heat resistance requirement.
Kiln room	<b>C</b>	• Suffix 6 denotes a sub-type with an increased water resistance over other floors of that type.
Resistant materials	<b>C</b>	
Resistant materials prep room	<b>C</b>	
Kitchen	<b>D5</b>	
Changing rooms	<b>D</b>	
Showers	<b>D</b>	
Toilets	<b>D</b>	
Sports hall	<b>E</b>	
Activity studio	<b>E</b>	
Multi purpose	<b>E4.6</b>	
Gymnasium	<b>E</b>	



▲ Above floorings offer opportunities for creative design

## Performance criteria for types A to E: Table 2

Each floor type is defined by its requirements when assessed against the following criteria:

1. Essential characteristics: BS EN 14041	Covers resilient, textile and laminate floorings.
2. BS EN 685	Covers resilient, textile and laminate floorings. It relates primarily to durability. Because ceramics, resin and concrete surfaces can be used in industrial applications, it is likely that their durability for school use is more than adequate. In all cases, manufacturers should be referred to for advice on suitable products.
3. Other applicable standards	Different floor types are covered by separate standards specific to the floor function or material. The floor is required to meet these standards if applicable.
4. Required life	The floor should maintain its characteristics and performance under normal conditions of use for the minimum period listed.
5. Slip resistance (Ramp Test)	See page 9. The floor is required to maintain the specified slip resistance over its required life.
6. Slip Resistance Value (SRV) and surface roughness	As above.
7. Water resistance	All floors should withstand a reasonable degree of spillage and dampness from footwear etc. However, the floors specified to be water resistant allow frequent spillage or wetting without damage, staining or absorption. Requirements for resilients are covered in BS EN 661 1995 and BS EN 662 1995.
8. Fire performance	See page 9
9. Electrostatic performance	See page 10
10. Hygiene performance	See page 11

*Continued*

11. Under-floor heating	Where required, flooring types should be suitable to withstand the effects of under-floor heating up to a temperature of 27°C. BS 8203 has requirements for resilients. The advice on comfort in CP 1018 should be followed. BS EN 14041 should also be referred to. The Contract Flooring Association has published a Code of Practice for under-floor heating.
12. Chemical resistance	If chemicals are used in the space, the flooring must be resistant to it. General guidance is given but the specific risk assessment should identify chemicals applicable for a specific project. Manufacturers should then be consulted for appropriate flooring solutions. If a particular chemical is of concern, a floor covering's resistance to it can be determined using BS EN 423. This standard is also applicable for resistance to staining for resilient coverings.
13. Heat resistance	See page 11







## TYPE A GENERAL FLOORING

Type A floors would be used for the typical general teaching spaces in a school, together with associated circulation areas.

It is not envisaged that they would normally become wet, either through spillages or tracking in of rainwater. If this is likely to happen, for example with stairs or circulation areas, a more slip resistant floor should be specified.

There may be parts of a classroom or staff room where a sink is included – a type B1 floor should be inset here.

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Corridors using type A floors would be general circulation zones, not areas where more onerous standards are required to cope with situations such as dirt from outside sports footwear or the delivery of heavy materials.

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▲ Above consider the effect of shadow to enliven the floor



Performance requirements – type A	
1. BS EN 14041 Essential characteristics	Yes
2. BS EN 685 European Flooring Use classification	Type A: Commercial 32 Type A.3: Commercial 33
3. Other applicable standards	Refer to standards applicable to selected product type.
4. Minimum required life (years)	10
5. Slip resistance (Ramp Test)	No
6. Slip Resistance Value (SRV)	No
7. Water resistance	No
8. Fire performance	Refer to page 9
9. Hygiene performance	Moderate. Cleaning to be in accordance with manufacturers' instructions.
10. Electrostatic	Yes – Refer to BS EN 14041 – see also page 10
11. Suitable for under-floor heating	Yes – Refer to BS EN 14041
12. Chemical resistance	No
13. Heat resistance	No

Example materials – type A	
Carpet	Refer to NBS section M50*
Linoleum	Refer to NBS section M50*
Rubber	Refer to NBS section M50*
Vinyl	Refer to NBS section M50*

- NBS (National Building Specification).
- Materials are listed alphabetically and not ranked by suitability.
- Refer to manufacturers for product details.

## TYPE B

### LIGHT PRACTICAL FLOORING

Type B floors are intended for spaces that are normally dry but where there could be some likelihood of spillages. They are typically more durable than type A.

Where the suffix 2 appears in Table 1, the specifier should ensure that the material is resistant to chemicals used.

Dining areas fall into this category and have been allocated a B3.4.6 rating. (see notes to Table 1.) Slip resistant surfaces may not be necessary if the risk is considered to be small. Note that the more slip resistant a surface, the more difficult it will be to clean. Spillages could be likely but it may be considered that the management would deal with these quickly. Serveries have perhaps a greater risk and have therefore been allocated a B1.3.4.6 (slip resistant) rating. The circumstances for each school may differ and it is important to discuss the issue with the relevant staff, operators and flooring manufacturers to ensure that any risks are addressed and the correct surface provided.

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**This performance type does not require the floor to be especially heat resistant. However, if, for example, art rooms are to include hot processes (e.g. welding or soldering), then a type C floor should be installed in the relevant area.**

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▲ Above consider chemicals and materials used in the space



▲ Above consider the range of 2D and 3D art activities

Performance requirements – type B		
1	BS EN 14041 General characteristics. Note that resin floors are not included in this standard. Refer to BS 8204-6	Yes
2	BS EN 685 European Flooring Use classification. Note that resin floors are not included in this standard	B commercial 33 B3 commercial 34
3	Other applicable standards	Refer to standards applicable to selected product type.
4	Minimum required life (years)	10
5	Slip resistance (Ramp Test)	Type B: Not applicable Type B1: R10
6	Slip Resistance Value (SRV) and roughness	Type B: Not applicable Type B1: SRV36 + 20 microns
7	Water resistance	Yes
8	Fire performance	Refer to page 9
9	Hygiene performance	Type B: Moderate Type B4: High
10	Electrostatic	Yes – see also page 10
11	Suitable for under-floor heating	Yes
12	Chemical resistance	Type B: No Type B2: Yes
13	Heat resistance	No

Example materials – type B	
Linoleum	Refer to NBS section M50*
Resin	Refer to NBS section M12*
Rubber	Refer to NBS section M50*
Vinyl	Refer to NBS section M50*

- NBS (National Building Specification).
- Materials are listed alphabetically and not ranked by suitability.
- Refer to manufacturers for product details.

# TYPE C

## HEAVY PRACTICAL FLOORING

Type C floors are intended for heavy duty areas such as technology workshops, and should be very durable.

Spillages and contaminants may be present.

The floor is not normally wet but contaminants such as oil or sawdust may be present at times and the floor will require the appropriate degree of slip resistance.

There is the likelihood of hot processes such as welding. If this is the case then some sheet materials may be inappropriate. Check with manufacturers.

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**Risk assessment will be important, as this specification can state general requirements only.**

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## Performance requirements – type C

1	BS EN 14041 Essential requirements	Applicable for rubber and vinyl. Resins and concrete wearing surfaces to comply with relevant material standards.
2	BS EN 685 European Flooring Use classification	Commercial 34 for rubber and vinyl. Resins and concrete wearing surfaces to comply with relevant material standards.
3	Other applicable standards	Refer to standards applicable to selected product type.
4	Minimum required life (years)	10
5	Slip resistance (Ramp Test)	R11
6	Slip Resistance Value (SRV) and roughness	Minimum SRV 36 – but see notes below
7	Water resistance	Yes
8	Fire performance	Refer to page 9
9	Hygiene performance	Moderate
10	Electrostatic	Yes – see also page 10
11	Suitable for under-floor heating	Yes
12	Chemical resistance	Yes
13	Heat resistance	Yes

## Example materials – type C

Concrete wearing surfaces	Refer to NBS section E41*
Resin	Refer to NBS section M12*
Rubber	Refer to NBS section M50*
Vinyl	Refer to NBS section M50*

- NBS (National Building Specification).
- Materials are listed alphabetically and not ranked by suitability.
- Refer to manufacturers for product details.

## Note on slip resistance

1. SRV should be tailored to the worst case contaminant identified through an assessment of use. The more viscous the agent, the higher the SRV needed to combat it. See HSE guidance (listed in Section 4) for required levels for common contaminants. The floor finishes used in technology workshops would be dependent upon the viscosity of the contaminant present but have a minimum SRV of 36.

# TYPE D

## WET AREA FLOORING



The main characteristics of a type D floor are that it is often wet, either through spillages, showering, wet footwear or wet processes. These floors need to be durable, easily cleaned, hygienic and slip resistant.

**There is a degree of conflict between slip resistance and ease of cleaning because the rougher surfaces can trap dirt. Designers should discuss this issue with floor manufacturers to arrive at the optimum product.**

### Example materials – type D

Ceramic	Refer to NBS section M40
Resin	Refer to NBS section M12
Rubber	Refer to NBS section M50
Vinyl	Refer to NBS section M50*

- NBS (National Building Specification).
- Materials are listed alphabetically and not ranked by suitability.
- Refer to manufacturers for product details.

Performance requirements – type D	
1. BS EN 14041 Essential characteristics	Applicable for vinyl. Resins and ceramics to comply with relevant material standards.
2. BS EN 685 European Flooring Use classification	Commercial 34 for vinyl. Resins and ceramics to comply with relevant material standards.
3. Other applicable standards	Refer to standards applicable to selected product type. BS EN 661 covers the spreading of water and BS EN 13553 covers the use of vinyl in wet areas.
4. Minimum required life (years)	10
5. Slip resistance (Ramp Test)	R10 or R11 (not relevant for showers – see note 2 below.)
6. Slip Resistance Value (SRV)	Minimum SRV 36 – but see note below
7. Water resistance	Yes
8. Fire performance	Refer to page 9
9. Hygiene performance	High
10. Electrostatic	No – see page 10
11. Suitable for under-floor heating	Yes
12. Chemical resistance	Yes
13. Heat resistance	D: No D5: Yes

### Note on slip resistance

1. SRV should be tailored to the worst case contaminant identified through an assessment of use. The more viscous the agent, the higher the SRV needed to combat it. See HSE guidance (listed in Section 4). Kitchens will be the worst case as there are likely to be fats and semi-solid material present – hence an SRV in excess of 36 may be required. The floor should be R10 as a minimum standard where there are water-based contaminants. Where there is a significant risk of more viscous contaminants R11 would be appropriate. Toilets are likely to have water-based contaminants, and SRV at 36 should suffice.
2. Barefoot areas need to be ‘Barefoot slip resistance category B’.
3. For areas that get wet there is an HSE requirement for a pendulum result of SRV36 measured with a 4S Rubber (now called Slider 96), as well as a minimum surface roughness of 20 microns.

## TYPE E HALL FLOORING

Type E floors are characterised by durability, and the capacity to accommodate a variety of functions. Sports halls have particular needs and designers should consult Sport England for further information.

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**Multi-purpose halls should not normally be used for specialist sports where a dedicated sports hall and gymnasium/activity space would be available.**

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Performance requirements – type E	
1. BS EN 14041 Essential characteristics	Yes for vinyl. Timber and composition flooring should comply with relevant material standards.
2. BS EN 685 European Flooring Use classification	Commercial 34. Timber and composition flooring should comply with relevant material standards.
3. Other applicable standards	Refer to standards applicable to selected product type. All sports floors should comply with BS EN 14904. For timber floors BS 8201 has useful guidance. Ensure that only sustainable timbers are selected from the available lists.
4. Minimum required life (years)	10
5. Slip resistance (Ramp Test)	No
6. Slip Resistance Value (SRV)	No
7. Water resistance	E: No E6: Yes
8. Fire performance	Refer to page 9
9. Hygiene performance	E: Moderate E4: High
10. Electrostatic performance	No – see page 10
11. Suitable for under-floor heating	Yes
12. Chemical resistance	No
13. Heat resistance	No

Example materials – type E	
Composition	Refer to NBS section M40*
Linoleum	Refer to NBS section M50*
Rubber	Refer to NBS section M50*
Timber	Refer to NBS section K21*
Vinyl	Refer to NBS section M50*

- NBS (National Building Specification).
- Materials are listed alphabetically and not ranked by suitability.
- Refer to manufacturers for product details.

## Entrances

It is essential to provide sufficient flooring that both absorbs water and cleans off dirt efficiently.

The objective with any entrance flooring system is to achieve the maximum number of footfalls within the space available.

The relationship between entrances and adjacent floors is important to ensure that water-based contaminants are not transferred by wet shoes to smoother surfaces.

Damage, soiling and slips can be caused by dirt, grit and water entering the building on shoes and clothing. The entrance area should include three zones:

- an external zone with a slip resistant surface
- an intermediate zone including a rigid entrance flooring system with built-in scraper action
- an inner zone with textile entrance flooring system

Because every project is different, it is not possible to prescribe exact dimensions – but experience tends to suggest that this area is often undersized and greater lengths of entrance flooring should be installed. Part M of Building Regulations prescribes lobby dimensions to facilitate wheelchair use.

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**Refer also to BS 7953 and BS 8300 section 9 for guidance on entrance areas and disabled access.**

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An external canopy is helpful in reducing wetness immediately outside the door.

The orientation and a sheltering design for the entrance will also reduce wind-blown rain, sleet and snow entering the area. Guidance on materials is given in BS 7953.

The entrance flooring should extend up to the threshold and there should be no strips of unprotected floor between matting and threshold.

The material should be designed to fit securely into the floor – loose mats are not acceptable.

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**The designer should carry out a risk assessment for the specific site conditions but in most cases a drained mat well is not necessary.**

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## References

This document was published in April 2007. After this date readers should ensure they use the latest edition for all references.

### Legislation

- Building Regulations ADB Fire Safety, 2006
- Building Regulations ADM Access to and use of Buildings, 2004
- Construction (Design and Management Regulations) 2007, HMSO 2007
- Disability Discrimination Act 1995, HMSO 1995
- Workplace (Health, Safety and Welfare) Regulations 1992, HMSO 1992

## Publications

- DfES Building Bulletin BB 93 *Acoustic Design of Schools*
- DfES Building Bulletin BB 98 *Briefing Framework for Secondary School Projects*
- *The National Building Specification* (NBS)
- Contract Flooring Association, *Guide to contract flooring*
- The National Federation of Terrazzo, Marble and Mosaic Specialists – *Specification sheet for pre-cast and in-situ terrazzo and mosaic*
- CIRIA Document C652 (2006), *Safer surfaces to walk on*
- HSE Information Sheet, *Preventing slips and trips in the education sector*
- HSE Information Sheet, *Preventing slips and trips in kitchens and food service*
- HSE Information Sheet, *Slips and trips, the importance of floor cleaning*
- HSE Information Sheet, *The assessment of pedestrian slip risk*
- Building Research Establishment, *The Green Guide to Specification*
- *Cleaning timber floors*, BS 8201:1987 and BS CP 209
- *Cleaning flexible sheet floors*, BS 6263 Part 2 1982
- *Cleaning hard floors*, BS CP 202 and BS 5385-3: 1989 for cleaning ceramics
- The Tile Association, *Cleaning of ceramic tiles*, 2000
- British Board of Agreement Product Certificates

## Associations

Guidance is available from:

- Resin Flooring Formulators and Applicators [www.ferfa.org.uk](http://www.ferfa.org.uk)
- The Concrete Society [www.concrete.org.uk](http://www.concrete.org.uk)
- Contract Flooring Association [www.cfa.org.uk](http://www.cfa.org.uk)
- The Carpet Foundation [www.comebacktocarpet.com](http://www.comebacktocarpet.com)
- National Institute of Carpet and Floor Layers [www.nicfltd.org.uk](http://www.nicfltd.org.uk)
- The British Coatings Federation [www.coatings.org](http://www.coatings.org)
- The British Plastics Federation [www.bpf.co.uk](http://www.bpf.co.uk)
- The Centre for Accessible Environments [www.cae.org.uk](http://www.cae.org.uk)
- British Board of Agreement [www.bbacerts.co.uk](http://www.bbacerts.co.uk)
- The Tile Association [www.tiles.org.uk](http://www.tiles.org.uk)
- The Stone Federation [www.stone-federation.org.uk](http://www.stone-federation.org.uk)





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