
British Standard Code of practice for

Installation of textile floor coverings

Installation des revêtements de sol textiles — Code de bonne pratique

Leitfaden für das Legen von Textilbodenbelägen

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Foreword

This British Standard has been prepared under the direction of the Textile Products and Leather Standards Committee and supersedes BS 5325 : 1976, which is now withdrawn. The first edition was produced in response to the need generated by the increasing inclusion of textile floor coverings in the basic contracts for buildings. This first

revision has been produced in close collaboration with the National Institute of Carpet Fitters.

This code of practice represents a standard of good practice and takes the form of recommendations. Compliance with it does not confer immunity from relevant legal obligations.

British Standard Code of practice for

Installation of textile floor coverings

1. Scope

This British Standard gives recommendations for the installation of textile floor coverings, i.e. all products composed of textile material with a pile or non-pile use surface. It includes the laying of fully adhered carpet tiles, and gives advice on the selection of materials and their properties. The loose laying of squares, rugs, runners, tiles, etc. is not included, nor are self-adhesive tiles.

NOTE 1. In the building industry a distinction is made between textile products that are permanently adhered to the floor and those that are loose laid or temporarily adhered, by use of the terms 'textile flooring' and 'textile floor covering', respectively. In the textile trade no such distinction in terms of nomenclature is made. In this British Standard the term 'textile floor covering' is used throughout to denote a textile product that is loose laid, partially adhered or fully adhered, either permanently or temporarily, to the floor.

NOTE 2. The titles of the publications referred to in this standard are listed on the inside back cover.

2. Exchange of information

There should be consultation, preferably early in the design stage and generally throughout the whole course of the contract, between all parties concerned with the work. Information to be exchanged should include whichever of the following are applicable.

(a) *Site.* Location; access; other contracts on site; unloading, hoisting and storage facilities; air conditioning, heating, lighting and power supply; floor loading; security arrangements.

(b) *Building.* Nature of building; assessment of type and density of traffic; particulars of corrosive or other potentially damaging conditions.

(c) *Specifications.* Specifications for or details of: structural floor; damp-proof membrane and its location within the floor construction; screed curing and drying times; floor warming installations; underlayments; interlayments; adhesives and accessories, including floor preservation treatments; textile floor coverings, including type, batch or rotation number, classification, supplier, dimensions and repeat pattern size if applicable; subsequent maintenance of the textile floor covering; finished floor level and permissible deviations.

NOTE. A clear understanding should be reached regarding the amount of extra material that is necessary for pattern match, centering of major motifs, and fitting purposes and the dimensional variations that exist or may occur in textile fabrics.

(d) *Associated work.* Services embedded in or passing through the floor, skirtings and abutments; ducts; junctions with other adjacent floorings.

(e) *Planning and procedures.* Adequate plans for total area, including landings and stairs, with number of treads, where direction of seams or lay of the pile is outside normal practice, or when stairs and landings are to be covered; method of installation and seaming.

(f) *Protection.* Method of and responsibility for the protection of the completed work and fabric of building.

(g) *Contract.* Particulars of the form and type of contract; whether the work is to be completed in any specific order or in sections; safeguarding against damage and theft; safety and health provisions; welfare facilities; air conditioning, heating, lighting and power supply; insurance.

(h) *Time schedule.* A time schedule for the progress of the work in relation to other trades and services.

(i) *Problems.* Areas where problems might be expected to arise and where special consultation might be necessary, for example pattern matching.

3. Preparation of bases

3.1 Materials

3.1.1 *Damp-proofing materials.* Damp-proofing materials should be selected and laid in accordance with the recommendations of CP 102.

3.1.2 Underlayments.

NOTE. It is accepted in the building industry that the materials described in 3.1.2 are called 'underlays', but for the purposes of this standard the term 'underlayments', acceptable to the textile floor covering trade, is used throughout.

3.1.2.1 Fabricated underlayments

3.1.2.1.1 *Chipboard and plywood.* Wood chipboard and plywood should comply with the requirements of BS 5669 and BS 1455, respectively. Chipboard having a density of not less than 640 kg/m³ or resin-bonded plywood may be used as an underlayment on top of wooden subfloors that are in accordance with 3.2.3.

3.1.2.1.2 *Hardboard.* Standard or tempered hardboard should comply with the requirements of BS 1142. Hardboard that is at least 3 mm thick forms a satisfactory underlayment for textile floor coverings dealt with in this standard when it is laid over a wooden floor in which movements are low, provided that it is properly fixed (see 3.2.4). Continuous flexing of boards below the hardboard will cause loosening of the fixings. These may then protrude with liability of damage to the textile floor covering and also result in loosening of the sheets of hardboard.

3.1.2.2 In-situ underlayments. The following in-situ underlayments are appropriate:

- (a) mastic asphalt complying with Grade I of BS 1076;
- (b) rubber latex/cement, resin emulsion/cement or one-pack smoothing compounds.

3.2 Workmanship

NOTE. Reference may also be made to CP 203, where applicable.

3.2.1 Damp-proofing solid floors. It is essential that all materials be laid on a dry base.

Solid floors that are in contact with the ground should always incorporate a damp-proof membrane.

Materials and methods for damp-proofing solid floors are described in CP 102 and Building Research Establishment Digest No. 54*, the treatments being divided into two classes, namely, surface layers and sandwich membranes.

It should be noted that an integral waterproofer incorporated in the concrete or screed is not a satisfactory alternative to a damp-proof layer since it will not prevent moisture vapour passing through the screed.

A concrete base is deemed to be sufficiently dry to receive flooring if a hygrometer shows that the relative humidity of a small volume of air in equilibrium with the surface of the base, but isolated from the air of the room, does not exceed 75 % r.h., or if its conductivity falls below a defined level†. Suitable forms of test are described in appendix A.

The use of anhydrous copper sulphate, which turns blue in the presence of moisture, or of anhydrous calcium chloride, which liquefies, is not recommended for the purposes of this standard.

Even under favourable conditions, the concrete may take as long as 1 month per 25 mm of thickness before it is sufficiently dry for the textile floor covering to be laid. The position of the damp-proof membrane affects the programme of work, as the drying time is correspondingly longer with greater thickness, e.g. a 150 mm combined thickness of site concrete and screed may take up to 6 months to dry. Proprietary screeds are available that dry out much more quickly than normal screeding.

It is essential that all damp-proof layers be continuous with the damp-proof courses in adjoining walls and with membranes in adjacent floors. Where necessary, a vertical damp-proof course should be provided to link membranes and damp-proof course at different levels.

Special precautions, such as tanking, may be necessary to resist water pressure and to prevent the entry of moisture into the floors below ground level.

For bases such as clay tiles, concrete tiles or terazzo, see 3.2.5.

3.2.2 Concrete and screed bases. The structural base slab should be finished directly by trowelling, grinding, or by applying a cement and sand or small aggregate concrete screed, or finished with an anhydrite or other proprietary form of screed.

A guide to the tolerances for screed levels is given in CP 204. Localized deviations of ± 3 mm in any 3 m would normally be acceptable in a nominally flat floor. Where screeds are used, they should be correctly mixed in accordance with the appropriate design specification, properly bonded, where applicable, and laid within the

recommended tolerances for level and the surface finished with a steel trowel to produce a hard, 'closed in' surface. There are practical difficulties in achieving at the same time the required flatness and the high degree of smoothness that is necessary to permit the successful application of a thin flooring up to about 3 mm thick. A screed mix of a consistency necessary to enable flatness to be achieved is difficult to trowel up to produce the well 'closed in' surface. Where the required degree of smoothness is not achieved, or where minor surface damage occurs, the screed may require the application of a proprietary form of smoothing compound.

The use of directly finished high grade concrete bases to take flooring avoids the need for added screeds. The degree of flatness obtained may not comply with the accepted tolerance for level nor the smoothness required for floorings and may necessitate the use of a proprietary form of smoothing compound.

3.2.3 Timber bases. All timber bases should be sound, rigid, level and dry. The timber should, ideally, be at equilibrium moisture content, i.e. the state of dryness it will attain in normal service conditions, at the time it is covered. In new buildings, this might involve an unacceptable delay, but steps should be taken to approach this condition as nearly as is practicable by the careful storage of timber on site and by the early introduction of normal heating into the building. The use of excessive heat or accelerated drying should be avoided.

In certain cases when floorboards have received special treatments, e.g. anti-woodworm solutions, preservative and/or flame retardant treatments, the treatment can cause severe and permanent distortion of the textile floor covering and breakdown of adhesive. The effect may be long lasting and the advice of the manufacturer of the products involved should be sought.

Suspended timber floors at ground level should be adequately ventilated (see CP 201).

Chipboard, of size 600 mm $\times$ 2400 mm or 1200 mm $\times$ 2400 mm, if laid over floor joists at up to 450 mm centres, should be of a flooring grade with a density of not less than 700 kg/m³ and a minimum thickness of 18 mm. If laid over joists with 600 mm centres, 22 mm board should be used. If tongued and grooved or slotted loose-tongued, the board should be glued on all edges which should be supported across joists or by noggings. Fixing should be by annular-ring shanked lost head nails or screws, with a length of 2.5 times the board thickness, spaced at 350 mm centres along all joists. The boards should be primed using a primer recommended by the adhesive manufacturer unless pre-sealed, when they should be suitably protected up to the time of laying the floor finish.

Plywood, if laid over floor joists at up to 500 mm centres, should be sanded, with a size of 1200 mm $\times$ 2400 mm and a minimum thickness of 15.55 mm, tongued and grooved along the long sides which should be laid at right angles to the joists. Short edges should have a solid bearing on the joists. If laid over joists with 600 mm centres, 18 mm plywood should be used.

* Building Research Establishment Digest No. 54 'Damp-proofing solid floors', available from HMSO.

† If using the 'Protimeter' mentioned in appendix A, this represents a maximum reading of 5.5.

Fixing should be by annular-ring shanked lost head nails, with a length of 2.5 times the board thickness, spaced at 300 mm centres along all joists.

Where tongued and grooved boards have been nailed to joists, the use of an underlayment is strongly recommended. This will act as a buffer and thereby help to minimize movement in the boards which might affect the appearance of the flooring. Any gap that might exist at the intersection of the boards and the wall should be sealed to prevent the incursion of dust.

Fabricated underlayments should not be laid on uneven timber floors without previously levelling by sanding, planing, or the use of one of the in-situ underlayments for patch filling only.

Boarded floors nailed into joists secured by clips set in concrete or dovetailed battens set in concrete, or boards nailed direct into 50 mm of clinker concrete, should never be covered by impervious floorings because of the dangers of dry rot.

Wood blocks may be covered by textile floor coverings if they comply with the following:

- (a) the surface of the wood blocks is clean and free from wax;
- (b) the condition of the floor is such that the blocks are sound and firmly bonded;
- (c) the wood blocks are adequately protected against moisture.

However, if any doubt exists, the wood blocks should be removed.

NOTE. If it is felt necessary that the textile floor covering should be stuck down, consideration should be given to the possibility that lifting of blocks from the subfloor could occur during the life of the textile floor covering and also when the textile floor covering is lifted for renewal or for building maintenance.

Attention is drawn to the need to protect adequately against dry rot.

3.2.4 Fabricated underlayments. Chipboard, plywood or hardboard should be securely fixed to the subfloor, after hollows have been brought level with latex cement or similar material.

Chipboard sheets should be countersunk and screwed at 300 mm centres in each direction to within 12 mm of the edges. Alternatively, twisted shank or ring shank nails, normally 30 mm long, should be used at the same centres. All nail heads and screws should be finished flush and filled as necessary to give a smooth finish.

Plywood or hardboard should be laid in sheets not exceeding 1200 mm × 1200 mm using twisted shank or ring shank nails, or serrated staples. Fixing should start at the centre of the sheet. Each sheet should be secured at not more than 100 mm intervals around the sides, with the fixing line 12 mm from the edge, and at 150 mm intervals at intermediate centres across the sheets. All nail heads should be finished flush with the surface. Joint lines should be staggered and every effort should be made to prevent coincidence of joints in the sheets and the timber base. To allow for possible expansion due to atmospheric changes, a gap of 0.5 mm to 1.0 mm should be left between plywood sheets and a gap of 1.0 mm to 2.0 mm should be left between hardboard sheets.

Hardboard sheets should be conditioned by sponging with water on the mesh side, using approximately 0.5 L of water for 1200 mm × 1200 mm sheet, at least 24 h but not more than 72 h before fixing, or alternatively conditioned by air by placing the boards, preferably in the rooms in which

they are to be fixed, with separators between each board to encourage free air circulation over all surfaces, for not less than 72 h. When it is laid damp, the hardboard should be allowed to dry out fully before the textile floor covering is installed.

NOTE. Hardboard is hygroscopic and expands on absorbing moisture. If the moisture content of the material is in equilibrium with the surrounding air there will be no further movement of the board. In centrally heated buildings, with a low moisture content, the boards will reach equilibrium by exposure to the surrounding air. However, in damp buildings or new constructions, conditioning by water application is preferable.

Consideration should be given to the properties of the opposed surface of hardboard sheets, i.e. smooth, non-absorbent surfaces and rough, absorbent surfaces. The preferred way up depends upon the material and the adhesive used, and the finish required. Hardboard is frequently laid with the absorbent, rough face uppermost to give maximum adhesion, but with certain release systems it is desirable to use the smoother, non-absorbent side.

3.2.5 Other bases. Some bases, such as clay tiles, concrete tiles or terrazzo, are unaffected by dampness, but may be sufficiently permeable to allow moisture to pass through. Bases such as magnesium oxychloride (magnesite), cement or those based on polyvinyl acetate/cement are adversely affected by dampness rising through concrete from the ground and should not be covered with a damp-proof layer or with relatively impervious materials. Unless it can be established that there is an effective damp course below these bases, they should be removed.

3.2.6 In-situ underlayments

3.2.6.1 Mastic asphalt. Mastic asphalt should be nowhere less than 15 mm thick and should be laid in accordance with the recommendations of CP 204. Where it is used as a combined underlay and damp-proof layer, care should be taken to connect it with the damp-proof course in the walls. Where a textile floor covering is to be bonded to asphalt, it is recommended that a latex/cement smoothing underlayment should be laid on the asphalt to ensure adequate drying of water-based adhesives and minimize the effect of solvent from solvent-based adhesives or alternatively adhesives that are suitable for direct application to asphalt should be used.

3.2.6.2 Smoothing underlayments. Rubber latex/cement, resin emulsion/cement and one-pack polymer modified smoothing underlayments should be laid according to manufacturer's instructions, and advice should be sought if heavy point loading is envisaged.

3.2.7 Existing floorings. When laying a new textile floor covering over an existing flooring, care should be taken to establish the following:

- (a) compatibility of the floorings and adhesives;
- (b) bond of existing flooring to the subfloor;
- (c) removal of all contaminants (particularly polish).

3.2.8 Stairs. Worn stair treads should be replaced or restored to a sound, rigid and level condition. In cases where the textile floor covering is being installed as a close cover or runner, the leading edge of the tread should be to a radius of at least 12.5 mm. If the radius is less than this, or if a high concentration of traffic is expected, consideration should be given to the use of a pre-formed slip-resistant nosing, e.g. aluminium or rubber, and treads and risers should be installed individually.

NOTE. Such edgings in public areas are often the subject of local Bye-laws, etc.