

Code of practice for

Dry lining and partitioning using gypsum plasterboard

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Committees responsible for this British Standard

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- Building Employers' Confederation
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- Federation of Plastering and Drywall Contractors
- Gypsum Products Development Association
- Local Authority Organizations
- National Council of Building Material Producers

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Foreword

This British Standard was prepared under the direction of Technical Committee B/544. It supersedes BS 8212:1989 which is withdrawn.

Dry lining is an alternative to the traditional wet plastering of walls and ceilings to provide surfaces suitable to receive various decorative treatments. The method involves the fixing of a sheet material, which is subsequently jointed in the appropriate manner, to the face of the walls or ceilings. This code confines itself to recommendations for dry lining using gypsum wallboard; it is not intended to apply to other sheet materials.

This code provides guidance on the selection of a dry lining system and lists factors that should be taken into consideration in the selection process. It gives recommendations for methods of dry lining to a variety of solid backgrounds and to timber and metal framing. Recommendations for on site methods of working are also included together with detailed descriptions of the materials, components and accessories used in the dry lining process.

Annex A gives thickness tolerances for metal used for metal framing. Annex B give recommendations for lighting conditions appropriate to dry lining operations.

This edition introduces technical changes but it does not reflect a full review or revision of the standard, which will be undertaken in due course.

As a code of practice, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 46, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Section 1. General

1.1 Scope

This British Standard code of practice gives recommendations for dry lining walls, ceilings and partitioning using gypsum wallboard. Composite products such as gypsum plasterboard backed with insulation materials are also included.

This code does not deal with linings to heated ceilings.

1.2 References

1.2.1 Normative references

This standard incorporates, by dated or undated reference, provisions from other publications. These normative references are made at the appropriate places in the text and the cited publications are listed on page 46. For dated references, only the edition cited applies; any subsequent amendments to or revisions of the cited publication apply to this standard only when incorporated in the reference by amendment or revision. For undated references, the latest edition of the cited publication applies, together with any amendments.

1.2.2 Informative references

This standard refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest editions.

1.3 Definitions

For the purposes of this code the definitions given in BS 1191-1 and BS 1191-2, BS 1230-1, BS 4022, BS 6100-1, BS 6100-6.1 and BS 6100-6.6.2 apply, together with the following.

1.3.1 face

surface of gypsum plasterboard on which the paper extends continuously to cover the edges

1.3.2 back

surface of gypsum plasterboard having a double thickness of paper along the two edges

1.3.3 insulating gypsum wallboard

gypsum wallboard backed with a film having a surface of low emissivity, e.g. aluminium, to improve thermal insulation when used in conjunction with an air space

1.3.4 thermal wallboard laminate

gypsum wallboard backed with an insulating material such as expanded polystyrene, polyurethane, phenolformaldehyde foam or man-made mineral fibre materials

1.3.5 predecorated gypsum wallboard

gypsum wallboard faced with either paper or cloth backed vinyl film

1.3.6 prefabricated gypsum wallboard panel partitions

prefabricated gypsum wallboard panels, manufactured in accordance with the requirements of BS 4022 and nailed to timber framing members

1.3.7 laminated gypsum plasterboard partitions

three or more layers of gypsum wallboard bonded together and fixed at the perimeter to a steel or timber frame

1.3.8 relocatable partitions

partitions that permit reassembly after removal and relocation

1.3.9 metal furring channel

galvanized steel section for the attachment of wallboard linings to solid backgrounds

1.3.10 resilient fixing channel

galvanized steel section for securing gypsum wallboard to the supporting background by a resilient mounting

1.3.11 nailable fixing plug

galvanized steel nail with an expandable plastics sleeve

1.3.12 general purpose bonding compound

adhesive made from retarded calcium sulfate hemihydrate and additives

1.3.13 thermal wallboard laminate adhesive

adhesive made from synthetic resin emulsion with fillers used for bonding thermal wallboard laminates to plastered walls

1.3.14**resilient wallboard adhesive**

adhesive made from synthetic rubber/resin used to bond plasterboard to plasterboard

1.3.15**decorative textured coating**

plastics based textured coating used as a decorative finish

1.4 Exchange of information

When preparing dry lining details the designer should take into account the following points.

- a) The choice of dry lining systems to be used in various parts of the building depends on functional requirements and the nature of the background. The background, including building and manufacturing tolerances, and its dry lining should therefore receive consideration together.

This is particularly important where plasterboard is to be fixed to trussed rafters. A thickness of rafter conforming to BS 5268-3 and perfectly adequate from a structural point of view may be unsuitable to permit adequate fixing of the end of the plasterboard in accordance with the recommendations given in 4.3.3.

- b) The type of surface finish and any other points affecting the final appearance, particularly the compatibility of the dry lining with the proposed decorative finish.

- c) The area and types of finish and thickness required together with sufficient details of the nature of the surfaces to be dry lined and the junctions with window frames, door frames, ceilings and linings, so that the most suitable dry lining materials and methods can be selected.

- d) The effect of the thickness of the dry lining on:

- 1) the finished sizes and heights of rooms or other spaces;
- 2) the thickness of grounds; timber framing requirements;
- 3) flames which are to be flush both sides in thin walls and partitions;
- 4) the positioning of frames and other joinery relative to dry lining faces;
- 5) grooves in joinery that are to receive dry lining;
- 6) the positioning of and provision of adequate support for heating appliances and other installations, fixtures and fittings;
- 7) any other items, the specification for which can be drawn up in detail only after the dry lining thicknesses have been determined.

- e) The preparation of the different building surfaces to receive the various types of cornices, arrises, corner treatments, metal accessories (such as angles and beads), expansion joints, coves, mouldings, dado treatments and enrichments.

- f) The work in other trades, particularly in connection with service pipes, conduits and wiring, that are to be covered by or contained in the dry lining; the predetermined position of any heating appliances and their dry lining treatment. Care should be taken not to destroy the structural integrity of the dry lining or partitioning.

- g) The suitability of materials that may be in contact with different types of dry lining, as well as of any protective treatment that may be necessary.

Exchange of pertinent information should take place as soon as possible after contract among those responsible for the execution of backgrounds, the dry lining, internal plastering and subsequent decoration and with other trades whose work will affect or be affected by the dry lining. The dry lining contractor should be furnished with all necessary specifications and appropriate working drawings and should visit the site to become acquainted with building progress.

A record should be kept of all dates in connection with construction and preparation of backgrounds and of the different operations of dry lining and decoration in the various parts of the building.

There should be a full exchange of information regarding site conditions.

1.5 Time schedule

When preparing a time schedule for the building operations it should be ensured that the various trades follow one another in correct sequence and that they do not interfere unduly with each other's work.

The time schedule for the whole of the building work should be planned in the initial stages before operations are begun and in consultation with those who will be responsible for carrying out the work of each of the trades concerned.

The time schedule should allot times for the construction and preparation of the backgrounds to receive dry lining and allow sufficient intervals for drying out, either by natural or artificial means, after the structure has been made weatherproof, so that the dry lining work may proceed without subsequent damage to it or its decoration.

The time schedule should provide for the completion of the works of preceding trades prior to commencement on site of the dry lining contractor.

Sufficient areas of work should be made available in sequence so that the dry lining or partitioning work can start and continue as part of the programme. All concerned should be aware that, after having agreed a programme, it is not always possible to increase or decrease labour on site at short notice, just as and when work is available.

It is essential that the areas to be dry lined or partitioned are watertight, weatherproof and dry. This is of particular importance as dry lining materials are vulnerable to wet or high humidity conditions. Screeds should be completed and dry before partitions and linings are erected.

Door frames, window frames and other joinery first fixings should be in position. The relevant first fixings of other trades and services should be finished prior to the commencement of dry lining work. Where door frames are a second fixing operation, provision should be made for their installation.

On projects where hollow metal stud plasterboard partitions are specified to be erected between the structural soffit and the floor, the metal framework and plasterboard to one side should be fixed prior to the installation of any horizontal or vertical services to ensure that proper fixing and alignment of the partition can be achieved. The period of partial completion should be kept to a minimum. The primary support members for suspended ceilings should also be in position prior to the installation of services.

Sufficient working areas should be clear and clean prior to the commencement of the dry lining and partitioning work.

The time schedule should also allow for the necessary drying out time after completion of dry lining using a water mixed joint system, prior to the application of decoration or other finishes. This is of particular importance in the winter period as the hardening and drying time of many materials used in the wet treatment of joints is dependent on atmospheric conditions.

The time schedule should be carefully planned to avoid the risk of serious damage to the dry lining by subsequent work and to avoid any question of last minute alterations in the sequence of operations. If permanent decoration is delayed the boards should be given an appropriate treatment (see 6.7).

Allowance should also be made in the time schedule for decorator's preparatory work which may become necessary if finished and jointed wallboard surfaces are likely to be subjected to adverse atmospheric conditions or damage by other trades. This is particularly relevant for long term contracts.

Section 2. Materials, components and accessories

2.1 Materials

2.1.1 Gypsum plasterboard

Gypsum plasterboard for dry lining and partitioning should conform to BS 1230-1 and should be in accordance with the following types.

- a) *Gypsum wallboard*. Gypsum wallboard (type 1) can be used for dry lining walls, ceilings and roofs, for the construction of partitions and cavity barriers and for encasing steel beams and columns.
- b) *Gypsum wallboard F*. Gypsum wallboard F (type 5) should be used in the same situations as gypsum wallboard when a greater degree of fire protection is required.
- c) *Moisture resistant gypsum wallboard*. Moisture resistant gypsum wallboard (type 3) resists absorption of water both by its paper surface and core and can be used as a backing for ceramic tiles as a form of sheathing and for other applications where there is a risk of gypsum wallboard being exposed to moisture.

NOTE 1 See Table 1 of BS 1230-1:1985 for gypsum wallboard types.

NOTE 2 All the above types of gypsum plasterboard are available with square or tapered edges.

2.1.2 Composite board

Gypsum wallboard which has a material attached to the face or the back as a secondary operation of manufacture should be one of the following:

- a) insulating wallboard;
- b) thermal wallboard laminate;
- c) predecorated wallboard;
- d) prefabricated wallboard panels.

NOTE Insulating wallboard and thermal wallboard laminate are available with an integral vapour check.

Prefabricated gypsum wallboard panels should conform to BS 4022. They can be used in conjunction with timber perimeter framing and jointing battens to provide hollow plasterboard partitions and wall linings.

Where thermal wallboard laminates incorporate a backing of man-made mineral fibre the backing should be of sufficient density to resist compression under normal usage.

2.1.3 Gypsum cove

Lightweight gypsum cove such as a gypsum core encased in a paper liner suitable to receive direct decoration can be used as a cornice at the angle between wall and ceiling. It should be fixed with a suitable adhesive.

2.2 Components and accessories

2.2.1 Framing members

Framing members should be selected from the following.

- a) *Timber framing*. Structural timber, e.g. framed walls, partitions and floor and ceiling joists should be in accordance with BS 5268-2 and should be a suitable size on the face to permit the plasterboard to be adequately fixed (see 4.3).

All timber sizes should be in accordance with the dimensions for softwood given in BS 4471. For basic sizes reference should be made to Table 1 of BS 4471:1987. For finished sizes after planing reference should be made to Table 3 of that standard.

- b) *Metal framing*. A variety of non-loadbearing plasterboard lined steel framed partition, separating wall and lining systems is available to meet specifiers' requirements.

Metal framing members should conform to BS 7364. They can be used in conjunction with galvanized steel channel of similar minimum thickness to provide a framework to which one or more layers of plasterboard can be screw fixed.

Relocatable and loadbearing partition systems based on metal studs and channels are available. Independent wall linings using "I" profile studs which impart greater stiffness can accommodate gypsum plasterboard fixed from one side only.

- c) *Metal furring channels*. Metal furring channels provide framing systems to walls and for suspended ceilings. The steel sections should be manufactured from galvanized mild steel strip conforming to BS EN 10142:1991 with zinc coating type Z275 and a nominal thickness of 0.55 mm (see Annex A for tolerances).

For walls the channel should be of a suitable profile to provide an upstand with a minimum bearing surface of 40 mm and have a series of slots on its long edges to provide a key for the gypsum adhesive dabs used to secure and align the channels to solid backgrounds.

For ceilings the channel should be of suitable profile to provide an upstand with a minimum bearing surface of 50 mm when used to provide a horizontal framing system.

d) *Resilient fixing channel.* Resilient fixing channels can be used to improve the sound insulation performance of timber frame construction and should be manufactured from galvanized mild steel strip conforming to BS EN 10142:1991 with zinc coating type Z275, nominal thickness 0.5 mm, with a free standing flange of 40 mm minimum width (see Annex A for tolerances).

e) *Channel to engage with 19 mm wallboard.* Channel to engage with 19 mm wallboard should be of a minimum nominal thickness of 0.7 mm conforming to BS EN 10142:1991 with zinc coating type Z275 and should be capable of taking an insert of 19.5 mm to 21 mm thickness, with 19 mm (minimum) supporting flanges (see Annex A for tolerances).

f) *Movement joint section.* Movement joint sections should be stainless steel or zinc alloy sections profiled to incorporate a tapering recess between perforated shoulders to provide a featured movement joint.

2.2.2 Adhesive fixing materials

The following adhesive fixing materials should be used.

- a) *Gypsum based adhesives*
 - general purpose bonding compound.
- b) *Resin based adhesives*
 - thermal wallboard laminate adhesive;
 - resilient wallboard adhesive.

2.2.3 Mechanical fixing devices

The following mechanical fixing devices should be used.

- a) *Plasterboard nails.* Nails used for fixing gypsum plasterboard and gypsum wallboard laminates to timbers should be hot dip galvanized, zinc electroplated or sheradized steel. Nails should have a shank of minimum finished diameter 2.5 mm and a head of minimum diameter 7.0 mm. Minimum length of nails should be as follows.

Board thickness 9.5 mm	Not less than 30 mm
Board thickness 12.5 mm	Not less than 40 mm
Board thickness 15 mm	Not less than 40 mm
Board thickness 19 mm	Not less than 50 mm
Double board thickness	
12.5 mm on 12.5 mm	Not less than 50 mm
Double board thickness	
12.5 mm on 19 mm	Not less than 65 mm
Double board thickness	
15 mm on 15 mm	Not less than 65 mm

For thermal laminate boards, nails of a length at least 25 mm more than the total laminate thickness should be used.

b) *Drywall screws.* Screws used for fixing gypsum wallboard and gypsum wallboard laminates to metal or timber should be zinc electroplated or black phosphate oiled steel self drilling and tapping drywall screws having trumpet countersunk and cross punched heads. Minimum lengths of screws should be as follows.

	Metal	Timber
Board thickness 9.5 mm	22 mm	32 mm
Board thickness 12.5 mm	22 mm	36 mm
Board thickness 15 mm	25 mm	36 mm
Board thickness 19 mm	32 mm	42 mm
Double board thickness		
12.5 mm on 12.5 mm	36 mm	50 mm
Double board thickness		
12.5 mm on 19 mm	42 mm	60 mm
Double board thickness		
15 mm on 15 mm	42 mm	60 mm

The length of screws used for fixing thermal wallboard laminates to metal and timber should be at least 10 mm and 25 mm greater, respectively, than the thickness of the laminate.

c) *Framing screws.* Framing screws for fixing metal to metal should be zinc electroplated or black phosphate oiled steel self drilling and tapping screws with cross punched low profile or pan heads. They should be fully threaded to the flat underside of the head to facilitate the pulling together of metal framing sections.

2.2.4 Surface treatment materials

2.2.4.1 Dual purpose primers

As a single application, dual purpose primer equalizes suction and provides an even texture. It also facilitates the removal of wallpaper. If used in two applications it provides additional resistance to moisture vapour movement.

2.2.4.2 Decorative textured coatings

Decorative textured coatings are used, in conjunction with the manufacturer's proprietary tape, as an alternative to jointing tapered edge boards and decorative treatments.

Ready-mixed finishing compounds should not be used for bedding the tape.

2.2.5 Jointing material

Proprietary materials manufactured for the jointing of plasterboards should be used for seamless jointing. They include paper jointing tape, tape bedding compounds, joint finishing compounds and compounds suitable for both bedding and finishing.

External angle corner tape, which has two parallel hot dipped galvanized, zinc electroplated, or painted steel reinforcement strips bonded to a paper tape may be used to reinforce external corners.

2.2.6 Sealants

Elastomeric sealants can be used at the perimeter of the dry lining or partitioning to provide an airtight construction.

2.2.7 Beads

Galvanized steel beads, e.g. edge beads and corner beads, should conform to BS 6452-1.

Plastics extrusions in various profiles can be used as trim, edge beads and joint battens.

Section 3. Design

3.1 Selection of a dry lining system

The following factors can influence the choice of a dry lining system and should be considered:

- a) type of building, occupancy and use;
- b) thickness of dry lining system;
- c) accuracy of background;
- d) provision for services;
- e) decoration;
- f) loadings, reduction of dead load;
- g) exposure to knocks and abrasions;
- h) space utilization;
- i) temperature and humidity conditions;
- j) sealing;
- k) thermal insulation;
- l) sound insulation;
- m) fire protection, fire resistance, surface spread of flame, cavity barriers.

It is important that a decision is made as early as possible as to whether the dry lining system is to be applied as a finish to masonry construction, or incorporated as an integral part of the building to take full advantage of the systems available, e.g. non-loadbearing partitions and wall and ceiling linings incorporating thermal and sound insulation.

3.2 Thickness of dry lining system

3.2.1 General

The overall protection of the lining will vary according to the type of dry lining system selected. An allowance should be made for the insulation material where appropriate, the fixing method, and any tolerance which might be associated with the particular type of background (see section 4).

3.2.2 Linings to solid backgrounds

Where the direct bond method of fixing to solid backgrounds is used, generally, the thickness of gypsum based adhesive will be not less than 10 mm or more than 25 mm. Where a resin based adhesive is used its thickness will be approximately 3 mm. The minimum design allowances from the face of the background to the face of the lining should be as given in Table 1.

3.2.3 Independent wall linings

Various methods of providing independent wall linings are available. These may take the form of plasterboard systems assembled in situ or framing systems based on timber or metal studs.

Prefabricated gypsum wallboard panels manufactured in accordance with BS 4022 in thicknesses of 50 mm, 57 mm and 63 mm should be constructed using timber perimeter framing and intermediate timber joint battens.

Table 1 — Design allowance for thickness of linings to solid backgrounds

Dimensions in millimetres

Lining	Minimum design allowance	
	Gypsum based adhesives	Resin based adhesives
9.5 mm gypsum wallboard	20	13
12.5 mm gypsum wallboard	23	16
25 mm thermal wallboard laminate	35	28
32 mm thermal wallboard laminate	42	35
40 mm thermal wallboard	50	43
50 mm thermal wallboard laminate	60	53

Laminated linings should be constructed using 19 mm gypsum wallboard (plank), positioned vertically, and fixed to perimeter timber framing. Channels to engage 19 mm wallboard [see 2.2.1 e)] folded back to back should be fixed to the edge of adjoining planks to provide alignment and support at mid-height. A further layer of plank, with joints staggered, should be stuck with a gypsum based adhesive and secured to the perimeter framing.

Loadbearing or non-loadbearing timber stud frames should have studs positioned at centres not exceeding 600 mm. Gypsum wallboard should have a minimum total thickness of 12.5 mm and should be positioned vertically unless additional timber supports have been provided to coincide with the horizontal joint in the boards. Where more than one layer is required, bound edges should be staggered.

Non-loadbearing metal stud frames should be assembled to provide stud supports at (nominal) 600 mm centres. Gypsum wallboard should have a minimum total thickness of 12.5 mm and should be positioned vertically and screwed to the framing. Where more than one layer is required, bound edges should be staggered.

Table 2 — Typical independent wall linings

Minimum thickness mm	Description	Maximum height mm
42	Laminated gypsum plank	2.6
50	Prefabricated gypsum wallboard panel	2.4
57	Prefabricated gypsum wallboard panel	2.7
63	Prefabricated gypsum wallboard panel	3.6
60	Galvanized steel “I” section, minimum 48 mm with 12.5 mm gypsum wallboard	2.7
73	Galvanized steel “I” section, minimum 48 mm with two layers of 12.5 mm gypsum wallboard (joints staggered)	3.0
72	Galvanized steel “I” section, minimum 60 mm with 12.5 mm gypsum wallboard	3.6
85	Galvanized steel “I” section, minimum 60 mm with two layers of 12.5 mm gypsum wallboard (joints staggered)	4.2
79	Galvanized steel “C” section, 48 mm, 60 mm and 70 mm with two layers of 9.5 mm gypsum wallboard one layer of 12.5 mm gypsum wallboard one layer of 15.0 mm gypsum wall board or two layers of 12.5 mm gypsum wallboard	^a
81	Timber stud 75 mm wide with one layer of 9.5 mm wallboard	2.4
100	Timber stud 89 mm wide with one layer of 12.5 mm wallboard	3.0

^a Suitable to any height for wall lining applications if adequately supported at 1 m intervals or if boxed with mid-height support fixing up to 3 m intervals.

Most metal framing systems are designed for partition use with boards fixed to both sides. A significant reduction in strength can, therefore, be expected when boards are fixed to one side only of metal framing. The maximum heights will therefore depend upon the structural strength of the metal frame sections. Fixings to the structure from the steel framework may be provided which will impart extra stability and increase maximum heights.

Recommendations for minimum thickness and maximum height of independent wall linings are given in Table 2.

3.3 Deviations and tolerances

NOTE The tolerances given in 3.3 do not include residual deflections resulting from, for example, heavy fittings.

3.3.1 Background

Deviations from verticality or straightness of a wall lining system will depend primarily on the trueness of the background to which it is fixed (see 4.1 d) and 4.2.2).

Dry linings which are fixed by nails, screws or thin contact adhesives will always follow the contour of the solid background or framing to which they are applied.

A satisfactory finish to dry lining, to the tolerances given in 3.2.2, can only be obtained if the alignment of the background is such that any deviation in excess of those required for the final finish can be accommodated by the method of fixing of the wallboard.

3.3.2 Setting out of partitions and independent linings

Where the framework of a partition or a lining is independent of the structure, the deviation from the setting out positions should be within the following tolerances:

- a) the offset on plan from an agreed ± 3 mm line or position, measured at the setting out level (ceiling or floor)
- b) the offset from vertical, ± 5 mm measured above or below the setting out position (ceiling or floor)

3.3.3 Finished surfaces of partitions and independent linings

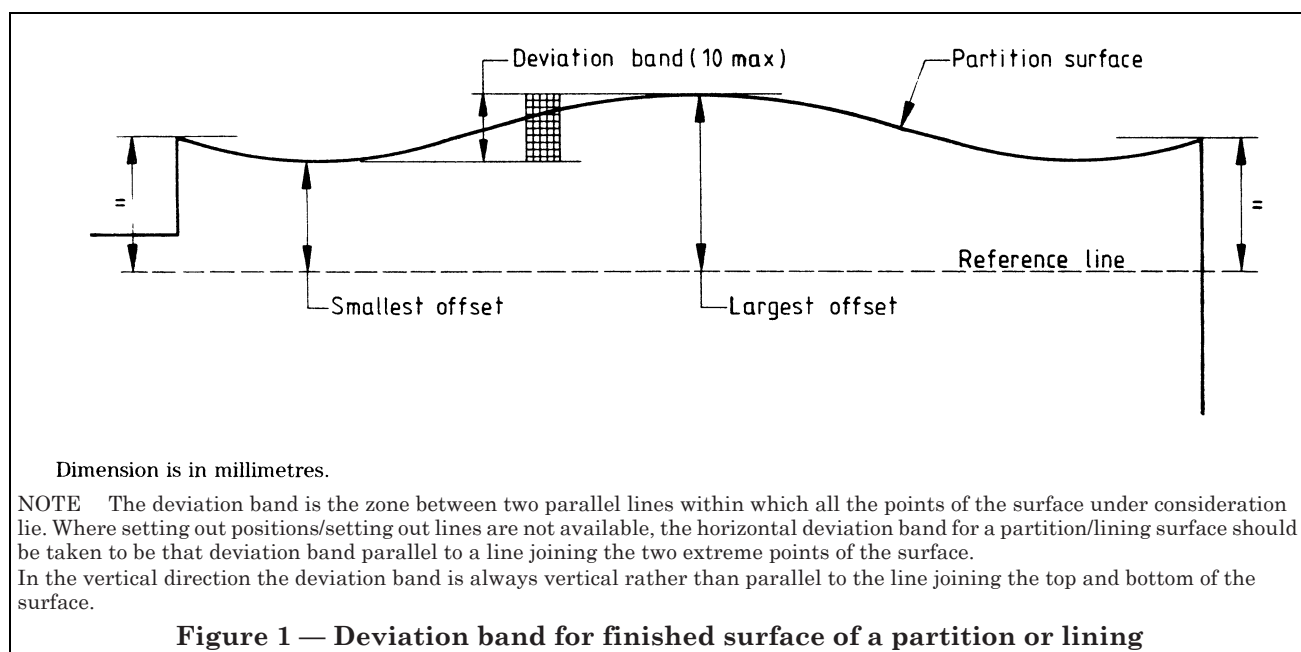
The deviations in the position of a finished surface of a partition or lining from the straight line connecting end points of the partition should be within a band of 10 mm as shown in Figure 1.

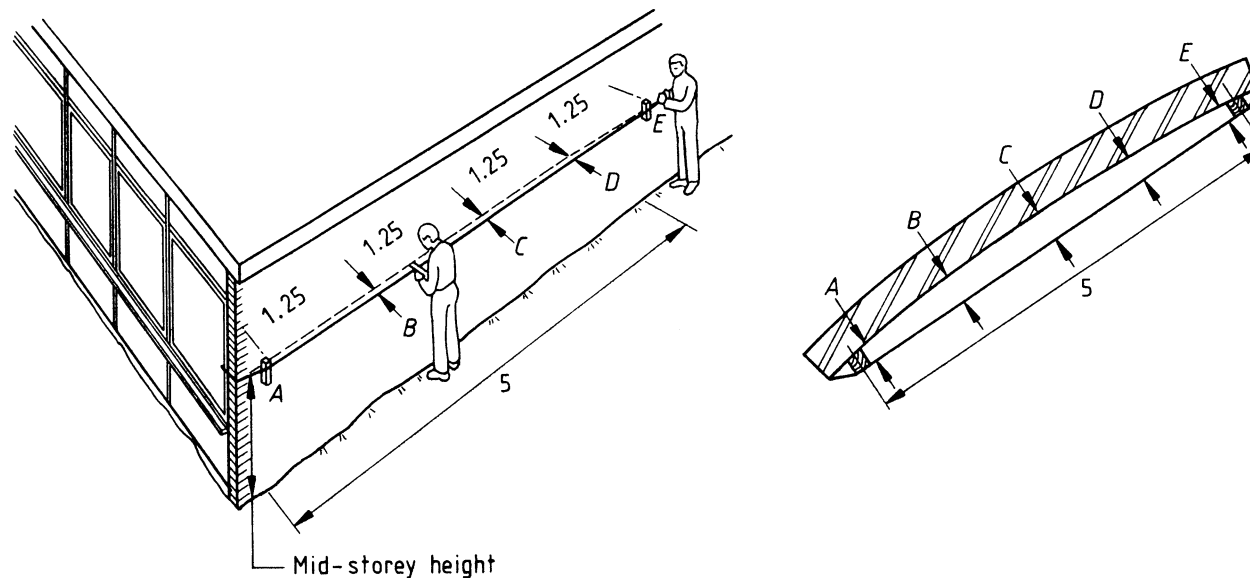
The measurements should be taken at approximately 600 mm above finished floor level and should be accompanied by measurements of the partitions or linings vertically at the measuring points and should be within the 10 mm band.

The method of measurement should be by laser or optical instruments. In small buildings, e.g. housing, a simplified method of measurement may be used on partition or lining runs up to 5 m (see Figure 2).

3.3.4 Finished surfaces of linings to solid backgrounds

Provided the trueness of the solid background is such that it can be accommodated within the thickness of the particular adhesive used (see 3.2.2), the deviations in the position of the finished surface should be as given in 3.3.3.





All dimensions are in metres.

NOTE To measure the straightness of a wall, stretch a nylon line tightly over two timber pieces of equal size (about 25 mm square) placed at the ends. The tension will hold the blocks in position. Measure the distance between the line and the wall face at the five quarter points. Avoid small surface irregularities and in brick and block walls measure to a brick or block face, not to a joint. Measure the straightness over 5 m length of wall on one side only. (A long wall may be divided into several 5 m lengths.)

Tools required

Fine nylon line or similar, breaking strain about 10 kg, available from fishing tackle shops.

Rule graduated in millimetres, from builder's or tool merchants.

Timber pieces 25 mm × 25 mm × 150 mm.

Steel tape with metric graduations: either a pocket tape or a normal steel tape may be used.

Figure 2 — Straightness of walls in any 5 m length

