

2.6 Application in pitched roofing (sarking)

2.6.1 Selection of boards for pitched roofing

The selection and thickness of wood-based panels for use in pitched roofing as a sarking material depends primarily on whether or not the sarking is undertaking a bracing role. Table 2.6 provides the range of products available where the sarking undertakes either a bracing or non-bracing role.



Figure 2.12 The use of OSB for sarking

2.6.2 The design factors relating to sarking

2.6.2.1 Non-bracing sarking (non-structural)

For a particular set of conditions, defined in terms of design, load and environmental conditions, long-term experience has demonstrated compliance of the design with specified requirements. These designs are **deemed to satisfy** and Table 2.6 provides the minimum thickness of fibreboards, particleboard and OSB at certain support centres based on long-term experience.

Table 2.6 “Deemed to satisfy” minimum board thicknesses for sarking (non-bracing)

Panel type	Rafter centres (mm)		
	400	450	600
Softboard	12	15	18
Mediumboard	9/10	9/10	12/13
Hardboard	3.2	4.8	6.4
Particleboard	12	15	18
Cement bonded particleboard	11	11	18
OSB	9	11	15
Plywood	9	11	15

For rafter centres different from those in Table 2.6, the thickness of the sarking can be determined by testing and designing to BS 5268-2.

TABLE 2.7 PANEL GRADES* FOR PITCHED ROOFS AND THE LOCATION OF DESIGN AND TESTING INFORMATION

	ROOFS	CONSTRUCTION	PLYWOOD EN 636	PARTICLEBOARD EN 312	OSB EN 300	MDF EN 622-5	FIBREBOARD EN 622-3,4	CBPB EN 634
Selection	Pitched roofs (sarking)	non-bracing	636-2	P5	OSB/3	-	SBH, SB.E, SB.HLS, MBL.H, MBL.E, HB.E, HB.HLA1, HB.HLA2	CBPB
		bracing	636-2	P5	OSB/3	-	-	CBPB
Design by Deemed to satisfy	✓	For non-bracing sarking, deemed to satisfy performance requirements based on long-term experience are given in Table 2.6. For sarking that has a bracing role deemed to satisfy performance requirements are given in BS 5268-3.						
or								
Design by performance testing	✓	Alternatively, for sarking that has a bracing role it is possible to test and design to BS 5268-2 and 3.						
	for pitch <10°	[Test using EN 1195. Satisfy requirements in BS 5268-2. Design using BS 5268-2 (revised 2001).					
		or	Test using EN 1195. Satisfy requirements in EN 12871. Design using ENV 1995-1-1 (Eurocode 5).					
Design by Calculation	-	Not available at present.						
Guidance on application	✓	Guidance on the use of load-bearing boards in sarking is given in BS 5534-1.						

* The table provides the minimum grade of panel that satisfies the particular set of requirements: panels of higher quality may be substituted, and their selection may result in a reduction in required thickness.

Although all the panels meeting the grade specifications will satisfy a particular set of requirements, the level of performance of different brands of these panels may vary considerably, some may even be endowed with high levels of properties not directly covered by the table.

2.6.2.2 Sarking which has a bracing role

Where the sarking board acts as structural bracing to the roof, thickness and rafter centres will be interdependent and related to the desired bracing design loads. Sarking acting as bracing in the plane of the rafters should be specified and fixed in accordance with BS 5268-3 Annex A. When such sarking is directly fixed to the top face of the rafters, diagonal, chevron and longitudinal bracing in the plane of the rafters may be omitted. Care should be taken during erection to ensure that the stability, vertically and straightness of the rafters are maintained when the sarking is being installed.

Typical board sizes are 2400 x 1200mm and 2400 x 600mm, with other sizes available to order.

Boards may be plain (square) edged, or profiled. Profiled edges provide improved weathertightness and remove the need to provide support under the edges of plain boards. Profiled edges may be a form of half-lap joint, grooves to take loose tongues or matching tongue-and-groove. Boards may be profiled on all four edges or on long edges only.

2.6.2.3 Other design consideration for both bracing and non-bracing sarking

In order to avoid condensation on the underside of sarking boards ventilation should be provided.

Where sarking boards are used over a roof-space with insulation on a horizontal ceiling, the roofspace must be adequately ventilated from eaves to eaves, or with additional ridge vents if desired (see Figure 2.13). It is possible to construct roofs in different ways with the advent of new building products which may allow or require the ventilation to be different to that on fig 2.13. Further information is given in the TRADA publication 'Timber frame: Standard Details for Houses and Flats'.

Where sarking boards are used over a 'room-in-the-roof' with sloping ceilings and insulation between the rafters, there must be adequate ventilation space to the underside of the sarking over the insulation, ventilated from eaves to ridge, and a vapour control layer positioned on the warm side of the insulation (see Figure 2.14).

Detailed recommendations are given in BS 5250 which now refers to EN ISO 13788 as the method of calculation.

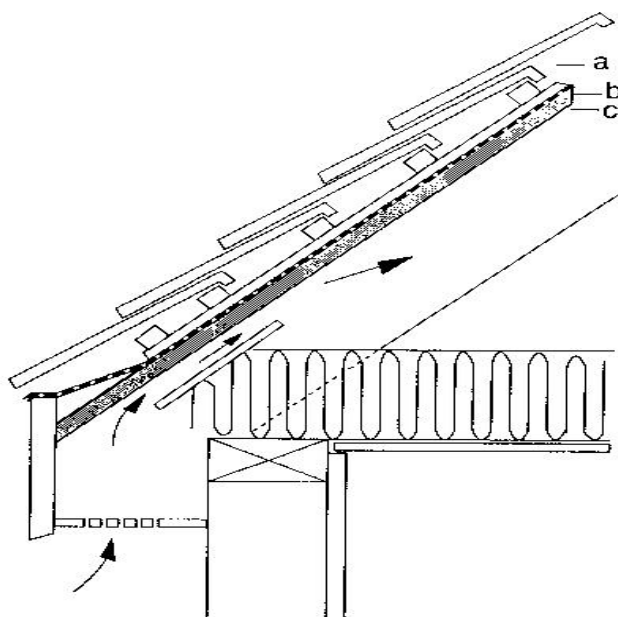


Figure 2.13 Example of a roofspace with insulation at ceiling level must be adequately ventilated

- a: tiles on battens and counterbattens**
- b: tiling underlay**
- c: sarking board**

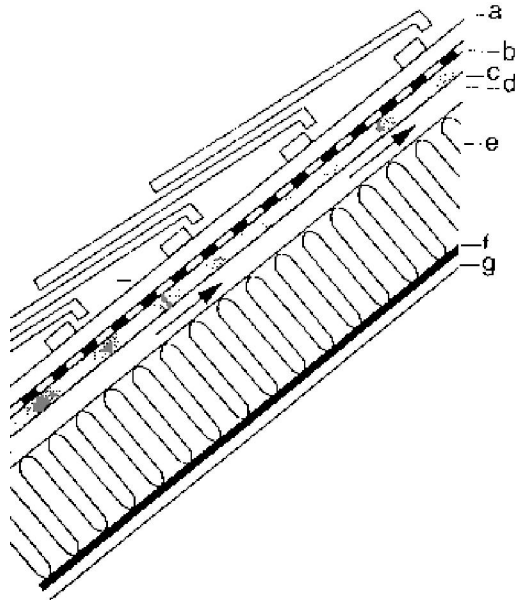


Figure 2.14 Example of room in the roof with sloping ceiling and insulation between rafters must have adequate ventilation above the insulation

- a: tiles on battens and counterbattens**
- b: tiling underlay**
- c: sarking board**
- d: ventilation space**
- e: insulation**
- f: vapour control layer**
- g: ceiling lining**

2.6.3 Sitework: roof sarking

2.6.3.1 Conditioning

It is important that boards are installed at a moisture content close to that which they will achieve in service. Advice on the conditioning of boards is to be found in Section 4.2.4 of PanelGuide.

2.6.3.2 Preparation of the structure

Supporting rafters should be plumb, in line and to level.

Timber rafters treated with water-borne preservative or which have high moisture contents should be dried to moisture contents less than 22% prior to fixing of the sarking, as water can migrate from wet timber into the sarking and may cause localised swelling of the boards.

Any rafters or noggings should provide a minimum support width of 18mm for the board edge.

2.6.3.3 Laying and fixing

Boards should be laid with long edges across the rafters, with short edges supported on rafters. It is recommended that long edges should be either tongued and grooved, supported by proprietary panel clips or by battens/noggings to avoid sagging or excessive gapping. Where sarking acts as bracing all edges must be supported and fully nailed.

Boards should be laid to break joint i.e. with staggered short edge joints to avoid lining them up.

2.6.3.4 Expansion gaps

A 3mm gap should be left between square edged boards used as sarking except for impregnated softboard which should be tightly butted.

Where sarking abuts vertical or parapet walling a perimeter gap should be provided to allow for possible expansion. This should be a minimum of 10mm and, where required, 2mm per metre run of board between adjacent walling.

2.6.3.5 Fixings

Boards should be fixed using corrosion resistant nails or, for softboard, staples. Corrosion resistant materials include galvanised or sheradised steel, austenitic stainless steel, phosphor bronze and silicon bronze.

Screws and flat headed improved nails (e.g annular grooved or ringshank) have superior holding power and should be used in preference to plain shank nails.

Minimum nail length is 50mm or 2.5 times the board thickness, whichever is greater.

Staples should have as wide a crown as possible - 11mm minimum, be not less than 15 gauge and not less than 50mm in length.

The frequency and pattern of nailing to rafters should be as follows unless structural calculations require otherwise. Where manufacturer's instructions are supplied with the boards their recommendations should be followed. To avoid tear out at board edges, fixing should not be inserted closer to the edges than the minimum distances given in Table 2.8.

Table 2.8 Spacings of fixings for sarking

Panel type	Maximum spacings (mm)		
	Board end rafters	Intermediate rafters	Min edge distance (mm)
Softboard	75	150	8
Mediumboard	150	150	8
Hardboard	150	150	8
Particleboard	200	200	8
OSB	200	200	8
Plywood	200	200	8

With the thinner and more flexible boards, to avoid buckling, nailing should commence at the top centre and continue outwards and downwards.

2.6.4 Coverings

Tiling or slating should be fixed to tiling battens on counter battens with a tiling underlay.

Counter battens should not be fixed to sarking alone but should be fixed through the sarking board into the rafters beneath.

The position of the underlay depends on its vapour resistance: if low ($<5.7\text{MNs/g}$) it can be laid directly on the sarking board, under the counter battens; if high ($>5.7\text{MNs/g}$) it should be laid between the counter battens and tiling battens, forming a cavity to allow ventilation below the tiling underlay.

A typical roof construction is shown in Figure 2.15

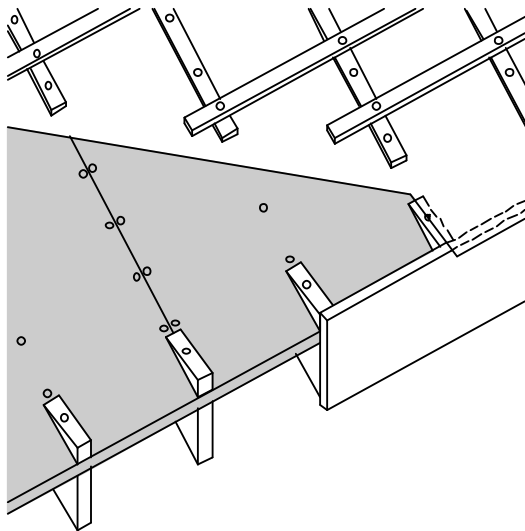


Figure 2.15 Typical pitched roof with sarking board and tiling underlay beneath the counter battens.