

Cavity-Wall Insulation: Full-Fill

Jabfill

Jabfill is a cavity-wall insulation system designed to be incorporated into new masonry walls during construction to satisfy the Building Regulations' U-value requirements. The insulation boards have a fluted face and a tongued-and-grooved edge profile which is fully-interlocking; when in place, the insulation fills the cavity and does not require special clips or wall ties.

- **Low thermal transmittance**

Depending on the construction of the inner and outer leaves, 100mm of Jabfill will typically improve the U-value of a cavity wall to below 0.35W/m²K.

- **Fully interlocking**

Jabfill is tongued-and-grooved on all four sides for a positive fit and to prevent water penetration at the joints.

- **Fluted face**

The boards have 5mm-deep flutes on the external face which ensures that any moisture that penetrates the external leaf of the wall is directed down the outer face of the insulation and back into the external masonry.

- **Protected joints**

An angled fillet on the outer face at the bottom edge of each board helps to shed water away from the lateral joints by overlapping the next board.

- **Permanent**

Jabfill is rot-proof and durable and will remain effective for the life of the building.

- **Rapid, economical construction**

Jabfill is manufactured from expanded polystyrene (EPS), and is lightweight and easy to handle. To speed and simplify installation, the

boards are marked to indicate the external face and the vertical orientation.

- **Easy to cut and fit**

If required, boards can be easily cut to length using a sharp trowel or knife. No specialised trades or equipment are required.

APPROVALS

Jabfill has been assessed and approved by the British Board of Agrément for use in cavity walls to a maximum height of 12m; Certificate number 96/3215.

TYPE

Jabfill is supplied as EPS 70 as defined in BS EN 13163 containing a flame-retardant additive.

DIMENSIONS

Standard size, 1200 x 450mm nominal; 1219 x 476mm actual (including tongues and bottom-edge fillet detail). Thickness, 75 and 100mm.

SHAPE

Jabfill boards are tongued-and-grooved on all four edges.

The external face has a series of 5mm moulded flutes, and there is an angled fillet moulded into the bottom edge.

U-VALUES

Table 16 describes a selection of common cavity-wall constructions using a range of materials for both the inner and outer leaf, and gives the U-values which will typically be achieved by using 75 or 100mm thickness of Jabfill. Their calculation complies with the calculation procedures contained in the 'Conventions for U-value

calculations' document accompanying the Building Regulations. This takes into account, mortar joints, air gap connections, wall ties and linings as necessary.

The values given are based on a k-value of 0.038W/mK for the insulation. For calculation purposes, the flutes on the external face of the boards are ignored giving calculated board thicknesses of 70 and 95mm.

THERMAL RESISTANCE

The thermal resistance, R-value, of Jabfill for each thickness is as follows:

75mm	1.80m ² K/W
100mm	2.50m ² K/W

These figures can be used for calculating U-values for constructions not described in Table 16.

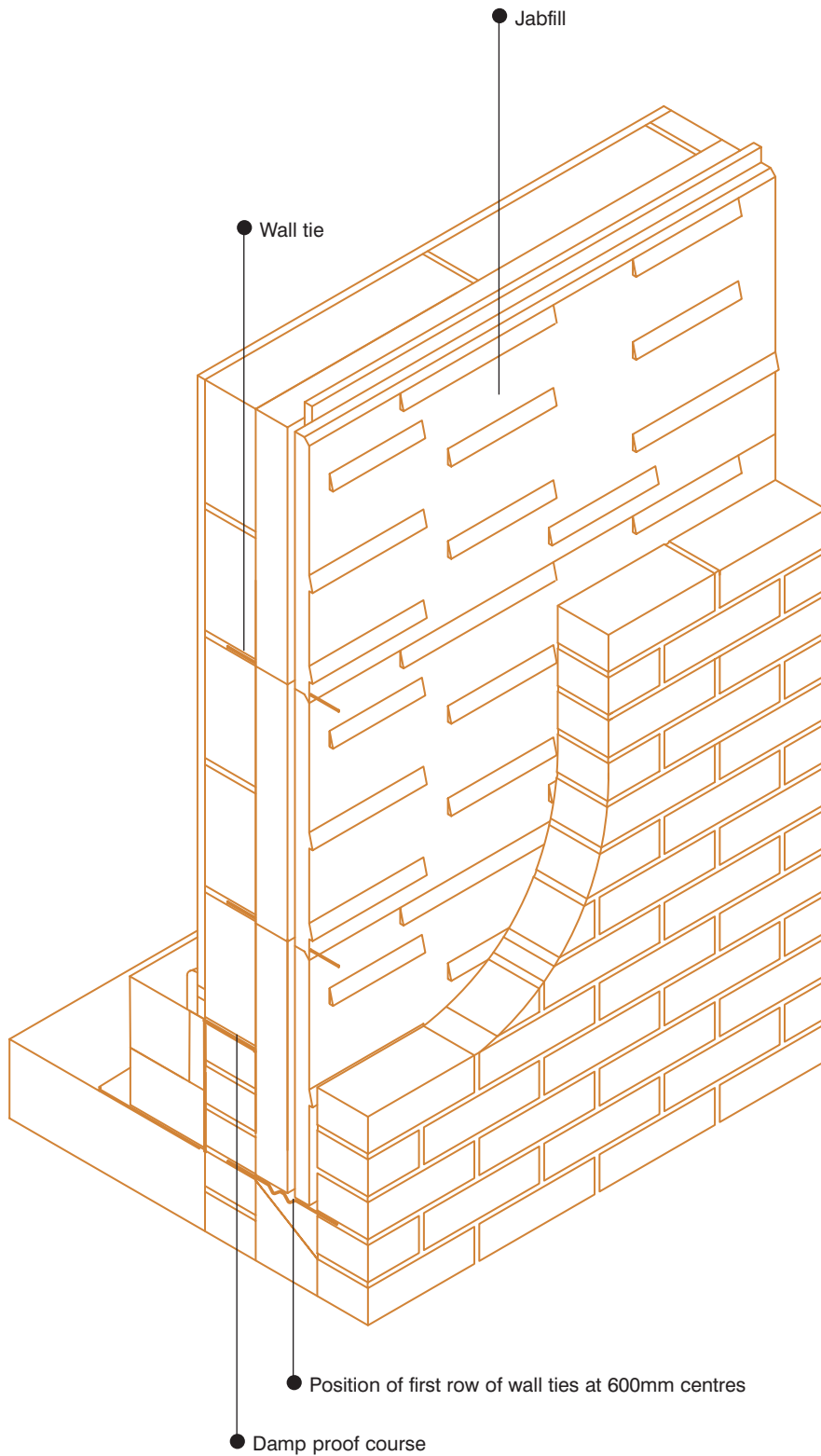
WATER PENETRATION

Jabfill is suitable for use in any exposure zone in buildings up to 12m in height. In 'severe' exposure zones, where an external render coat would normally be used, the use of Jabfill does not preclude this requirement.

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Figure 57.



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In order to minimise the risk of water penetration, in all situations it is particularly important to ensure that the following procedures are carried out:

- The use of raked or recessed mortar joints should be avoided in high exposure areas.
- Jabfill should be installed to the highest level on each wall, or the top edge of the wall should be protected by a cavity tray.
- Wall ties and fixings must be correctly installed, sloping towards the external leaf and free from mortar droppings or other debris.
- Excess mortar should be cleaned from the cavity face of the inner leaf, and any debris removed from the cavity.
- Mortar droppings should be cleaned from the exposed edges of installed Jabfill boards as installation proceeds.

WATER-VAPOUR TRANSMISSION

Jabfill has a significant resistance to the passage of water, but should not be regarded as a vapour-control layer.

FIRE

When properly installed, Jabfill is fully protected by the masonry and will have no adverse effect on the fire resistance of the wall. Although Jabfill is a combustible material, it is unlikely that there will be sufficient air present in the cavity to support combustion.

INSTALLATION

Figure 58 gives a typical installation of Jabfill, showing how the insulation should be extended below the damp-proof course (DPC) level to provide floor-edge

insulation. The illustration also shows the tongued-and-grooved board joints. Individual boards are marked on their external face to indicate their correct orientation in the cavity.

The boards are secured between wall ties. It is important to use the correct size of wall tie in relation to the thickness of the wall; further information can be obtained by consulting the wall tie manufacturer's literature.

Damp-proof membrane

For buildings where the floor structure penetrates the external-wall cavity, for example at balcony positions, a horizontal damp-proof tray should be installed immediately above the upper limit of the insulation in order to avoid the transfer of moisture to the inner leaf.

Construction procedure

The walls are constructed in the normal way but the inner leaf should be advanced to sufficient height, and the mortar cleaned off the cavity face, before installing the insulation boards and continuing construction of the outer leaf.

The first row of wall ties should be positioned at the base of the lowest insulation board but not directly on the DPC; the wall ties should be located at 600mm horizontal centres and should slope down towards the outer leaf. Subsequent wall ties should be placed at 450mm centres vertically, and at maximum 900mm centres horizontally to suit the regulations (as laid down in Table 9 of BS 5628:Part 3) and the structural

requirements for the wall.

When the first row of boards needs trimming to height to meet course requirements, this must be carried out on the bottom edge of the boards.

A section of the internal leaf should be built up to a course above the next row of wall ties.

The boards are fitted between the upper and lower wall ties, with their edges tightly-butted together; the horizontal tongue should be uppermost, and the fluted face to the outer leaf. Care should be taken not to damage the tongues when inserting the wall ties.

Construction of the outer leaf should proceed until it reaches the top level of the installed Jabfill boards. The bricks or blocks should be laid so that they are in contact with the fluted face of the insulation.

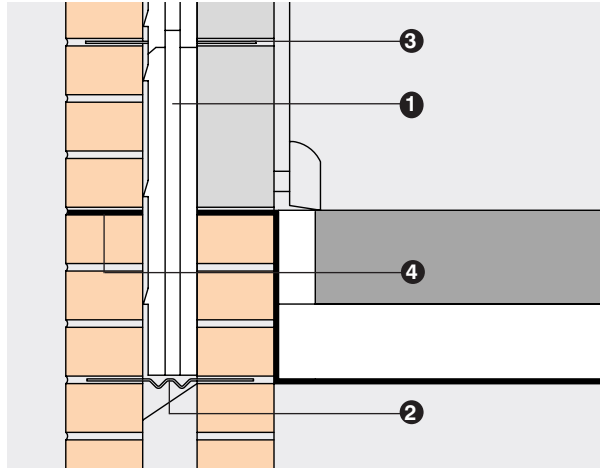
Successive sections of the wall are constructed in the same way, with the wall ties and insulation boards installed as work proceeds.

After raising each section of the outer leaf, excess mortar should be removed and any mortar droppings cleaned from the top edges of the insulation boards. The use of a cavity board is recommended to protect the edges of the insulation during construction and to facilitate cleaning. BS 5628:Part 3 gives further information on the protection of work in progress.

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Figure 58.
Full-fill wall insulation



1. Jabfill
2. Position of first row of wall ties at 600mm centres
3. Wall tie
4. Damp-proof course

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Jabfill boards should be installed to the highest level in each wall. If this is not possible, the top edge of the boards must be protected by a cavity tray with alternate perpendicular joints raked out to allow drainage from the tray.

Reveals

At the reveals of openings additional wall ties are generally introduced at maximum 300mm centres and within 225mm of all openings. However, this method of construction would mean that the Jabfill boards must be pierced to accommodate the non-standard tie spacings and this can introduce an unacceptable risk of water penetration. A better method of construction is to introduce additional wall ties at each board course (ie, 450mm) and within 225mm of the opening; this will satisfy the structural requirements of the wall, and simplify construction.

Door and window reveals should incorporate an approved cavity closer, or other closing method, according to the set-back of the frame. Consult the Vencel Resil Technical Services Department for further information.

Corner details

Corner details are formed by interlocking the boards, and it is important that the joints are closely butted; this will usually require accurate removal of the tongue.

Internal corners require that the flutes be removed where the face of one board abuts the next; this will ensure that the joint can be tightly butted.

Both internal and external corner details must incorporate a vertical DPC positioned between the face of the insulation and the external leaf, and returning along each wall face to at least 150mm.

Cutting

The insulation boards can be cut with a fine-tooth saw, either to obtain a specific length or to fit around apertures in the brick or blockwork, and for general cutting to length.

REFERENCES

BS 5628 Code of practice for use of masonry: Part 3, materials and components, design and workmanship.

BS EN 13163 Thermal insulation products for buildings - Factory made products of expanded polystyrene (EPS) - Specification.

TABLES OF U-VALUES

The U-value table on page 89 is primarily arranged according to the material of construction of the outer leaf of the wall. Different thermal values are given according to the finish applied to the outer leaf, and for different inner-leaf constructions and finishes.

Notes

Block densities (kg/m³):	
Dense concrete	1950
Lightweight concrete	1300
Aerated concrete (AAC) block	650
Super-aerated concrete (SAAC) block	480
Thermal conductivity, k-values (W/mK) for materials and finishes:	
Dense concrete block	1.06
Lightweight concrete block	0.42
Brickwork	0.77
Natural or reconstructed stone	1.30
Aerated concrete (AAC) block	0.17
Super-aerated concrete (SAAC) block	0.11
Dense plaster	0.50
Lightweight plaster	0.16
Plasterboard	0.16

Table 16 U-Value achieved using Jabfill thickness 75mm and 100mm.

External Leaf	150mm Stone	102.5mm Brick	100mm DC Block	100mm Lt Wt Block	100mm AC Block	100mm SAC Block					
Internal Leaf	Fair-faced	Fair-faced	Fair-faced	Tiles	Fair-faced	Tiles					
100mm Dense Concrete Block											
Fair faced	75mm	0.47	0.47	0.47	0.43	0.44	0.41	0.40	0.37	0.37	0.35
	100mm	0.36	0.36	0.37	0.34	0.35	0.33	0.32	0.30	0.30	0.29
13mm Dense Plaster	75mm	0.46	0.46	0.47	0.43	0.44	0.41	0.39	0.37	0.36	0.34
	100mm	0.36	0.36	0.36	0.34	0.35	0.33	0.32	0.30	0.30	0.28
13mm Lt Wt Plaster	75mm	0.45	0.45	0.45	0.42	0.43	0.40	0.39	0.36	0.36	0.34
	100mm	0.35	0.35	0.36	0.34	0.34	0.32	0.31	0.30	0.30	0.28
12.5mm P/b on Dabs	75mm	0.42	0.42	0.43	0.40	0.41	0.38	0.37	0.35	0.34	0.32
	100mm	0.34	0.34	0.34	0.32	0.33	0.31	0.30	0.29	0.28	0.27
12.5mm P/b on Studs	75mm	0.42	0.42	0.42	0.39	0.40	0.38	0.36	0.34	0.34	0.32
	100mm	0.34	0.33	0.34	0.32	0.32	0.31	0.30	0.28	0.28	0.27
100mm Lightweight Concrete Block											
Fair faced	75mm	0.44	0.44	0.44	0.41	0.42	0.39	0.38	0.36	0.35	0.33
	100mm	0.35	0.35	0.35	0.33	0.34	0.32	0.31	0.29	0.29	0.28
13mm Dense Plaster	75mm	0.44	0.44	0.44	0.41	0.42	0.39	0.38	0.35	0.35	0.33
	100mm	0.35	0.35	0.35	0.33	0.33	0.32	0.31	0.29	0.29	0.28
13mm Lt Wt Plaster	75mm	0.43	0.43	0.43	0.40	0.41	0.38	0.37	0.35	0.34	0.32
	100mm	0.34	0.34	0.34	0.32	0.33	0.31	0.30	0.29	0.29	0.27
12.5mm P/b on Dabs	75mm	0.40	0.40	0.41	0.38	0.39	0.36	0.35	0.33	0.33	0.31
	100mm	0.33	0.32	0.33	0.31	0.31	0.30	0.29	0.28	0.27	0.26
12.5mm P/b on Studs	75mm	0.40	0.40	0.40	0.38	0.38	0.36	0.35	0.33	0.33	0.31
	100mm	0.32	0.32	0.32	0.31	0.31	0.30	0.29	0.28	0.27	0.26
100mm Aerated Concrete Block											
Fair faced	75mm	0.40	0.39	0.40	0.37	0.38	0.36	0.35	0.33	0.32	0.31
	100mm	0.32	0.32	0.32	0.30	0.31	0.29	0.29	0.27	0.27	0.26
13mm Dense Plaster	75mm	0.39	0.39	0.39	0.37	0.38	0.35	0.34	0.32	0.32	0.30
	100mm	0.32	0.32	0.32	0.30	0.31	0.29	0.29	0.27	0.27	0.26
13mm Lt Wt Plaster	75mm	0.38	0.38	0.39	0.36	0.37	0.35	0.34	0.32	0.31	0.30
	100mm	0.31	0.31	0.31	0.30	0.30	0.29	0.28	0.27	0.27	0.25
12.5mm P/b on Dabs	75mm	0.37	0.36	0.37	0.35	0.35	0.33	0.32	0.31	0.30	0.29
	100mm	0.30	0.30	0.30	0.29	0.29	0.28	0.27	0.26	0.26	0.25
12.5mm P/b on Studs	75mm	0.36	0.36	0.36	0.34	0.35	0.33	0.32	0.30	0.30	0.29
	100mm	0.30	0.30	0.30	0.28	0.29	0.28	0.27	0.26	0.26	0.24
100mm Super Aerated Concrete Block											
Fair faced	75mm	0.36	0.36	0.37	0.35	0.35	0.33	0.32	0.31	0.30	0.29
	100mm	0.30	0.30	0.30	0.29	0.29	0.28	0.27	0.26	0.26	0.25
13mm Dense Plaster	75mm	0.36	0.36	0.36	0.34	0.35	0.33	0.32	0.30	0.30	0.29
	100mm	0.30	0.30	0.30	0.28	0.29	0.28	0.27	0.26	0.26	0.24
13mm Lt Wt Plaster	75mm	0.36	0.35	0.36	0.34	0.34	0.32	0.31	0.30	0.30	0.28
	100mm	0.29	0.29	0.30	0.28	0.29	0.27	0.27	0.25	0.25	0.24
12.5mm P/b on Dabs	75mm	0.34	0.34	0.34	0.32	0.33	0.31	0.30	0.29	0.28	0.27
	100mm	0.28	0.28	0.28	0.27	0.27	0.26	0.26	0.25	0.24	0.23
12.5mm P/b on Studs	75mm	0.34	0.34	0.34	0.32	0.33	0.31	0.30	0.29	0.28	0.27
	100mm	0.28	0.28	0.28	0.27	0.27	0.26	0.26	0.24	0.24	0.23

KEY: P/b Plasterboard, Lt Wt Lightweight.

The orange areas indicate those constructions achieving a U-value of 0.35W/m²K