

## Corkboard insulation

**Westco Corkboard, offering excellent thermal insulation, can also be supplied cut to falls both principally for flat roof insulation.**

### GENERAL

**Introduction** Cork is obtained from the cork oak (*Quercus Suber L*) - a forest tree with the particular feature of allowing itself to be stripped of the outer casing which it then regenerates. The bark is stripped first when the tree is 20 to 30 years old, subsequent strippings take place every 9 to 10 years.

The bark has a cellular structure consisting of myriads of tiny, 14-sided cells, each imprisoning a microscopic volume of air. In a piece of natural cork of only one cubic inch in size, there are approximately 200 million of these minute cells, each separated by an impermeable and remarkably strong, resinous membrane. Slightly more than 50 per cent of the volume of a piece of cork is captive air within the cells.

This cellular structure makes cork light in weight, buoyant, resistant to the penetration of moisture, compressible, resilient, resistant to the effects of friction and an ideal thermal and sound insulation material.

In addition, cork is much more chemically inert than most materials, and is therefore capable of withstanding deterioration through age. It also has a strong resistance to the effects of varying temperature and humidity levels.

Cork does not support its own combustion and chars only slowly when subjected to a flame. Unlike some synthetic insulation materials, in burning it does not produce chlorides, cyanides or other toxic gases.

### Applications

**Building insulation** Westco Corkboard provides high thermal insulation and is used in roof and wall composite systems as the main thermal barrier.

The principal area of application is as thermally insulating underlay under built-up roofing systems. The strength of a 50mm corkboard slab is sufficient to bridge the troughs in the decking and withstand light foot traffic on the roof without deformation.

In existing rooms it is used as a wall and ceiling lining where it is both decorative and provides thermal insulation and acoustic absorption.

In floating floor construction, used between the slab and a screed, corkboard provides both thermal insulation and a high reduction in impact noise transmission.

**Cold store insulation** The impermeability of corkboard makes it an ideal insulant in cold storage or cool room construction and in lagging storage tanks or pipes storing or carrying low-temperature liquids such as water or brine.

**Beam bearing pads** as a structural isolator.

**Machine beds** Retention of resilience under moderate pressure loads and resistance to water and chemicals makes corkboard a frequent choice as a material for machine bases to isolate vibrating machinery from the building structure. It insulates acoustic vibrations which may be transmitted through the structure and may prevent actual structural damage due to stresses arising from high amplitude heavy oscillation of machinery such as printing presses.

### DESCRIPTION

Westco corkboard is available in the following formats.

**Flat board** - as flat rectangular boards of uniform thickness.

**Cut to falls** - as tapered boards to form falls to clear water from flat roofs. Tapered systems are manufactured to meet individual specifications and roof requirements; it is a single layer system.

**Angle fillet** - standard sized fillets.

**Composition, manufacture** Westco corkboard insulation is manufactured from natural cork which is reduced to granules. These are graded as to size and expanded and agglomerated by pressure and temperature, without the addition of any foreign substances. The exuded resins, resulting from the high temperature and compression to which the granules are subjected in the manufacturing process, make it possible to obtain agglomeration without the addition of any binders foreign to cork. The blocks are sawn into slabs of required thickness and packed.

**Dimensions** Board dimensions, thickness, packing and coverage per pack:

Board size - all formats: 1000 mm x 500 mm

Thickness (mm)	Slabs per carton	Coverage per carton (m <sup>2</sup> )
13.5	20	10
20	15	7.5
25	12	6
30	10	5
40	8	4
50	6	3
60	5	2.5
75	4	2
100	3	1.5
150	2	1
200	2	1
300	1	0.5

Angle fillets: 50 mm x 50 mm, 75 mm x 50 mm, 100 mm x 100 mm

**Density** Roof insulation grade cork: 110 - 130 kg/m<sup>3</sup>

Machine base cork: 170 ± 10 kg/m<sup>3</sup>

### PERFORMANCE

#### Mechanics

**Compressive strength** Can support loads of 20 kN/m<sup>2</sup> (2000 kgf/m<sup>2</sup>) in elastic conditions without permanent deformation. High resistance to fatigue.

In recent tests carried out at the BBA test centre, showed the following mean results:

Density 117 (Kgm<sup>3</sup>) Compressive strength 152 (kNm<sup>2</sup>)

Bending strength 140 kN/m<sup>2</sup>

## Western Cork Limited

Corkboard insulation

### PERFORMANCE (continued)

**Fire Combustibility** Tests made with a corkboard block of 50 mm thickness over a Bunsen-burner at a temperature of 815°C (1500°F) have shown that it took four hours for the flame to penetrate.

**Gas emission** During the burning process it does not produce chlorides, cyanides or other toxic gases. This characteristic, when compared with other synthetic insulators, gives insulation corkboard an enormous advantage in the safety of its application.

**Surface spread of flame** Correctly treated corkboard insulation has a low flame-spread and can be classified as flame-retardant in certain applications.

Even without anti-fire treatment, corkboard satisfies Class 1 of BS 476: Part 7:1971, Surfaces of very slow propagation of flames. It does not exceed 101 mm during the first minute nor a final value of 171 mm.

**Liquids** Water repellent with no capillarity and thus practically impermeable to the penetration of moisture. Even if corkboard insulation is accidentally soaked, provided that the water is allowed to evaporate, it preserves its thermal insulation characteristics.

**Chemical** Unaffected by water, alkalis, fuming hydrochloric acid at 100°C and organic solvents. Does not disintegrate.

**Biological** Resistant to mould and bacterial growth and not attacked by rodents.

#### Heat

**Thermal expansion** Practically stable. Coefficient 20 to 25 x 10<sup>-6</sup> at 20°C.

**Thermal conductivity** Cork: 0.042 W/mK at 20°C.

**Thermal resistance and conductance** R-values for standard corkboard and R-values and U-values of a standard metal roof deck specification consisting of decking, vapour barrier, three layers of bituminous felt with a finish of white reflective chipping when used in conjunction with corkboard insulation for a range of board thicknesses are tabulated below.

Corkboard Thickness (mm)	Corkboard Resistance R-value (m <sup>2</sup> K/W)	Roof deck with corkboard:	
		Resistance R-value (m <sup>2</sup> K/W)	Conductance U-value (W/m <sup>2</sup> K)
25	0.595	0.870	1.15
37	0.881	1.156	0.87
50	1.190	1.465	0.68
60	1.429	1.704	0.59
75	1.786	2.061	0.49

In some situations, the application of corkboard as a wallcovering prevents the formation of condensation.

**Working temperatures** From -180°C to +110°C

**Stability under temperature variations** In tests carried out in a temperature of variations between 20°C and 100°C, corkboard had a coefficient of linear variation equal to 35 x 10<sup>-6</sup>.

**Sound** Sound absorption is 0.5 dB to 0.8 dB at 500 Hz.

**Durability** Indefinite.

### DESIGN CONSIDERATIONS

*Design pressure for machine bases*

Thickness (mm)	Recommended pressure (kN/m <sup>2</sup> )	(kgf/cm <sup>2</sup> )
25	100 to 150	1.0 to 1.5
50	80 to 180	0.8 to 1.8
80	60 to 200	0.6 to 2.0
100	50 to 220	0.5 to 2.2

*Cold storage insulation*

Temperature (°C)	(°F)	Recommended insulation thickness (mm)
-40 to -25	-40 to -13	250
-25 to -18	-13 to 0	200
-18 to -10	0 to 14	180
-10 to -4	14 to 25	150
-4 to 2	25 to 35	130
2 to 16	35 to 60	100
16 to 20	60 to 70	80
up to 20	up to 70	50

### SITWORK

**Storage** Store in dry conditions.

**Cutting** Corkboard is sawn or cut easily with hand tools.

**Fixing** Corkboard can, in general, be fixed with either adhesives or mechanical fastenings.

**Roofing underlay** Fix with hot bitumen or mechanical fasteners.

**Wall insulation** Render the surface to be insulated with a 1:5 mixture of cement and sand and let it dry. Spread cold asphaltic glue with a brush on the surfaces of both the wall and corkboard slab. Wait about five minutes and fix the slab checking if the slabs are properly stuck to the wall and to each other. If the wall is not entirely even, the fixing should be reinforced by zinc nails. Do not start coating the corkboard surface for 24 hours after fixing the slabs.

### SUPPLY

**Availability** Westco structural and insulation boards are available direct from the company or through insulation distributors. Westco decorative cork tiles for use as an internal finish are available in packs from hardware stores or DIY outlets.

**Packaging** Boards are packed in cartons (see **Dimensions**)

### SERVICES

**Sales** For advice contact the Sales Department at the address below.

**Technical** For cut to falls systems, Westco offers a full package from site inspection through scheme design to manufacture.

## Western Cork Limited

Penarth Road, Cardiff CF11 8YN

Tel: 029 2037 6700 Fax: 029 2038 3573

Website: westcofloors.co.uk

Email: richardharries@westcodiy.co.uk