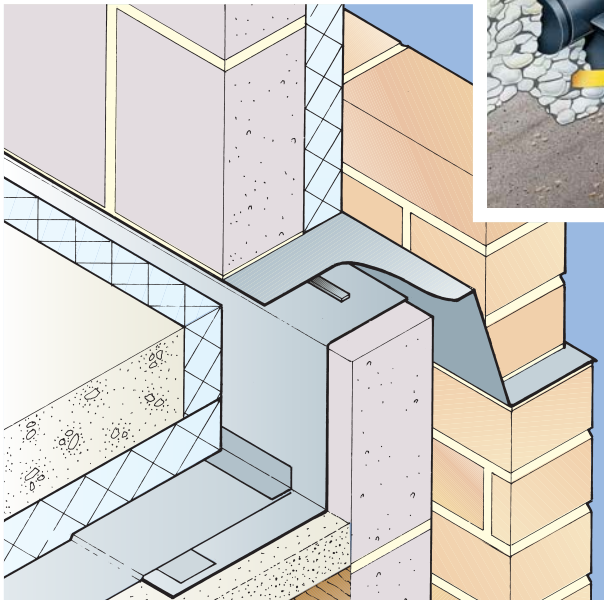
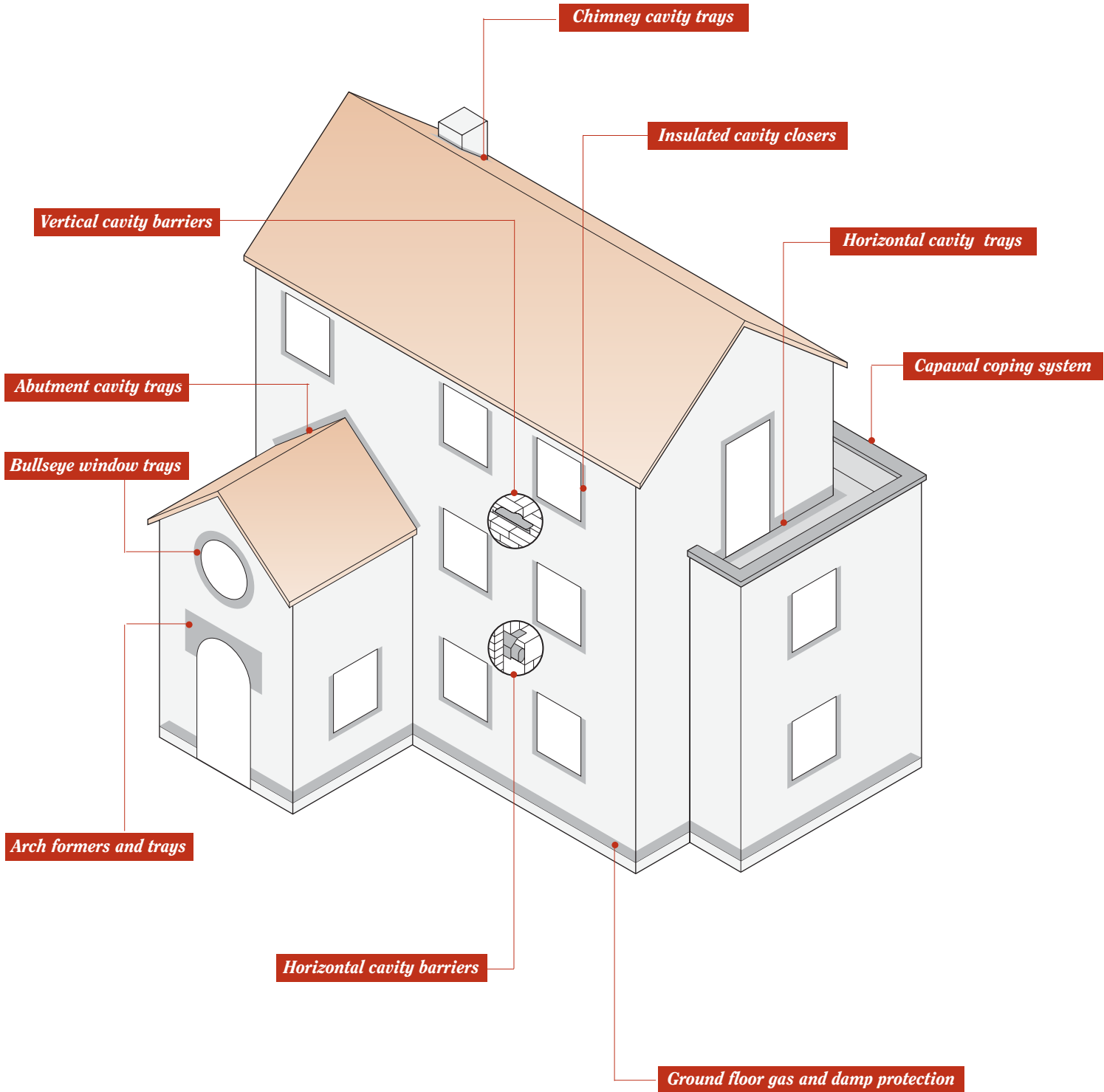


# GROUND FLOOR PROTECTION, GAS and DAMP BARRIERS



THE Z-LED PRODUCT RANGE



## GROUND FLOOR PROTECTION



### The requirement

Harmful ground gases entering buildings can pose health risks. Damp can similarly cause health problems and also damage to the building fabric.

Protective measures are therefore usually required in ground floors, and these requirements are enshrined in building regulations (see Technical requirements).

Government planning policy requires an increase in the amount of housing on brownfield land. This means that much more housing will need protection from ground gases.

Current high levels of thermal insulation and modern construction methods require ventilation within the building fabric to prevent the build-up of moisture and condensation.

### The Z-Led complete solution

Z-Led ground floor protection products offer a complete solution -

- A continuous impermeable protective barrier against gases from the ground and damp penetration.
- A single barrier avoiding the need for an additional damp-proof membrane.
- Continuity of protection at edges and penetrations by means of purpose-designed accessories.
- Ventilation of underfloor spaces and wall cavities to remove gases and moisture vapour where required.
- Easy and reliable installation using preformed components.
- Can be used for solid ground floor slabs and for suspended concrete or timber floors.
- Can be used to meet the requirements of Building Regulations Part C, see Technical requirements.

### Certification

The performance of Z-Led Protect GDB10 membrane has been independently assessed and certified by BRE Certification Limited for use in ground floors of buildings as a barrier against harmful gases (radon, methane and carbon dioxide) and damp penetration. Certificate number 127/07.

### The Z-Led Product Range

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## TECHNICAL REQUIREMENTS

### Harmful soil gases

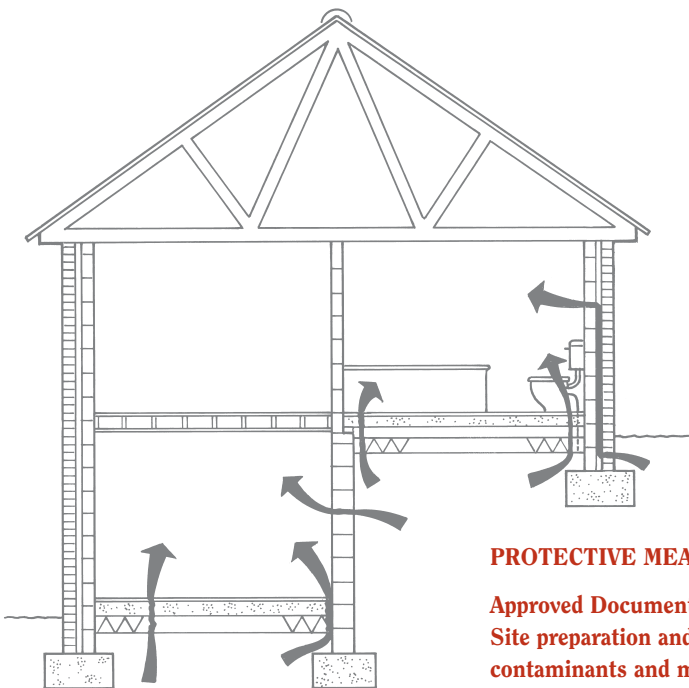
Harmful soil gases such as methane, carbon dioxide and radon can enter properties by many different routes: through cracks in floors and walls, construction joints, wall cavities, and around services pipes.

**Methane** is a colourless, odourless, explosive and asphyxiating gas.

**Carbon dioxide** (CO<sub>2</sub>) is a colourless, odourless, non-flammable, asphyxiating and toxic gas.

Methane and carbon dioxide can arise from landfill sites, mine workings, and organic-rich soils such as peat or river silt.

**Radon** is a naturally-occurring colourless, odourless radioactive gas; some parts of the country have higher levels than elsewhere. Exposure to high levels of radon for long periods increases the risk of developing lung cancer.



Gas entry routes into buildings

### Building Regulations (England and Wales)

Protection against ground contaminants and moisture are specific requirements of the Building Regulations Part C for England and Wales. The relevant requirements are:

**“Preparation of site and resistance to contaminants** C1 (2) Reasonable precautions shall be taken to avoid danger to health and safety caused by contaminants on or in the ground covered, or to be covered by the building and any land associated with the building.”

**“Resistance to moisture** C2 The floors, walls and roof of the building shall adequately protect the building and people who use the building from harmful effects caused by:

- (a) ground moisture
- (c) interstitial and surface condensation.”

### PROTECTIVE MEASURES

**Approved Document C**  
**Site preparation and resistance to contaminants and moisture**

#### Gases from the ground

Information on methane and other gases is given in paragraphs 2.25 - 2.35. Gas control measures are given in 2.36 - 2.38. For dwellings these should consist of a gas resistant barrier across the whole building footprint, above an extraction or ventilation layer from which gases can be dispersed and vented to the atmosphere.

Detailed guidance is given in BRE/Environment Agency Report BR 414 *Protective measures for housing on gas-contaminated land*.

#### Radon protection

Information on radon and protective measures is given in paragraphs 2.39 - 2.41.

All new buildings, extensions and conversions in areas where there may be elevated radon emissions may need to incorporate precautions.

Guidance on protective measures is given in BRE Report BR 211 *Radon: guidance on protective measures for new dwellings*.

Areas where protective measures should be taken are given in the report, but these are subject to review. Current information should be obtained from local authority building control.

#### Moisture from the ground

Technical solutions include the following - *Ground supported floors* 4.6 - 4.12: a damp-proof membrane which is continuous with any damp-proof course in walls.

*Suspended timber ground floors* 4.13 - 4.16: a ventilated air space between the floor and the ground covering, and damp-proof courses to protect the floor timber.

*Suspended concrete ground floors* 4.17 - 4.19: a damp proof membrane, and a ventilated airspace under the floor.

*Internal and external walls* 5.4 - 5.6: a damp-proof course continuous with any damp-proof membrane in the floor, and a damp-proof cavity tray in certain circumstances.

A damp-proof tray above an opening should have stopends and weep holes.

#### Hydrocarbons

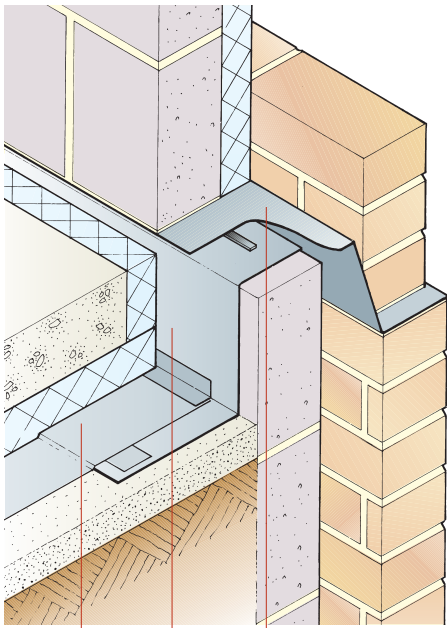
Ground contaminated with hydrocarbons such as diesel or motor oils may also generate harmful emissions (not specifically covered by Approved Document C). Testing for these is extremely difficult, therefore Z-Led recommend that in such cases a ventilated sub-floor void is provided in addition to a barrier membrane.

## BARRIER MEMBRANES

Two Z-Led barrier membranes are available:

**Protect GDB10** provides protection against methane, carbon dioxide and radon as well as damp.

**Protect Radon Shield** is for use against radon and damp.



Protect GDB10 Membrane

Slab Edge Protection Tray

Cavity Barrier and combined Cavity Tray

### PROTECT GDB10 GAS & DAMP BARRIER

Z-Led Protect GDB10 is a universal barrier membrane for protection of new buildings against gas and damp penetration from the ground.

Used as an oversite membrane below floor slabs or suspended floors, in conjunction with Z-Led Cavity and Slab Edge Protection System, it provides a complete solution when installed in accordance with BRE Report BR 414.

- Excellent resistance to harmful soil gases and damp penetration.
- Enables Building Regulations Part C to be met by reference to Approved Document C, see Technical requirements.
- No additional damp-proof membrane required.
- Tough and durable, excellent tensile strength, puncture and tear resistance.
- Easily installed: easy to cut, lightweight and clean to handle.
- Each roll supplied with fixing instructions.
- Full range of accessories and underfloor ventilation products.

#### Composition

Multi-layer reinforced polyethylene/polypropylene membrane with an integral continuous aluminium foil.

#### Size

Roll length 40m  
Roll width 2.5m  
Basis weight 145kg/m<sup>2</sup>  
Roll weight 17.5kg

### PROTECT RADON SHIELD

Protect Radon Shield is a strong durable membrane, suitable for protection against radon from the ground.

- Quick and easy to install
- Can also be used as a damp proof membrane.

#### Material

Low and medium density polyethylene co-polymer.

Colour: green.



### Performance and test methods (Protect GDB10)

	MD (along roll)	CD (across roll)
Nail tear strength (N) to BS EN 12310-1 modified	420	380
Tensile strength (N/50mm) to BS EN 12311-1 modified	760	650
Elongation (%) to BS EN 12311-1 modified	25	15
Water vapour resistance (MNs/g) to BS EN 1931	> 1000	
Methane permeability based on BS EN 374-3	< 1.5 ml/m <sup>2</sup> /day	
Carbon dioxide (CO <sub>2</sub> ) permeability to BS EN 374-3	< 0.005µg/cm <sup>2</sup> /min	
Radon permeability	4.2 x 10 <sup>-12</sup> m <sup>2</sup> /s	
Radon transmittance	21 x 10 <sup>-9</sup> m/s	
Water penetration resistance to BS EN 1928 Method A modified	Pass Class W1	

## PREFORMED ACCESSORIES

A comprehensive range of preformed accessories is available for use with membranes to maintain protection at wall cavities, corners, pipe and service entries etc.

- Design of components removes the need to form difficult shapes on site, giving a simpler and more reliable installation.



### Radon Cavity Barrier and combined Cavity Tray

One size fits wall cavities from 50 to 100mm wide.

Also suits 150mm deep suspended floors. Other sizes available to special order. Ribbed surface promotes mortar adhesion and prevents the creation of slip planes in masonry.

Supplied in 25m or 50m rolls.

### Cavity Barrier Universal Corner

Preformed unit which is reversible for external or internal corners.

150mm deep as standard. Other sizes available to special order.

### RSE Radon Slab Edge Protection Tray

Designed to accommodate slab thicknesses of 100 or 150mm.

Supplied in 25m or 50m rolls.

### RS22 Slab Edge Universal Corner

Preformed unit which is reversible for external or internal corners.

For slab thicknesses: RS22/100 for 100mm, RS22/150 for 150mm.

### RAC Radon Airbrick Cloak

Provides continuity where the cavity barrier meets a subfloor airbrick/vent.

### RS Radon Sump

Installed within fill material in underfloor voids to collect radon gas and vent it by convection through a vertical pipe.

### RPS1 Universal Pipe Seal

Seals around service pipes which penetrate the membrane.

To fit pipe/sleeve diameters as follows:

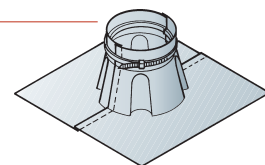
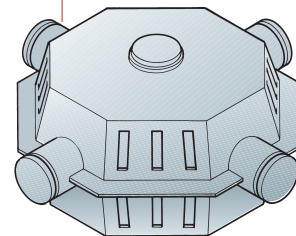
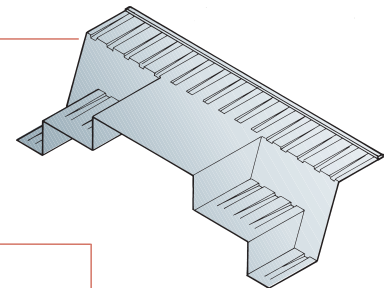
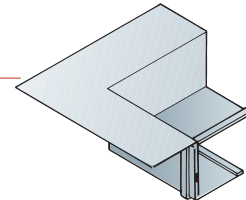
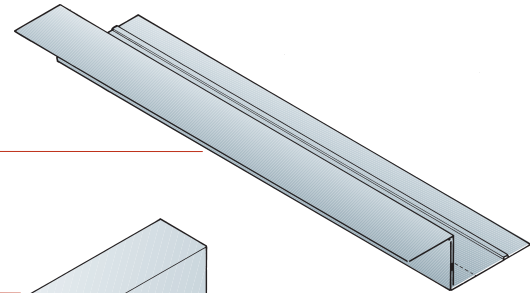
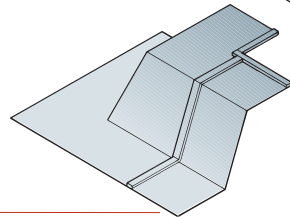
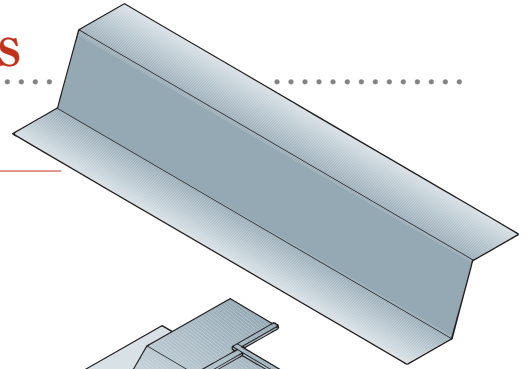
RPS1/110: 100 to 120mm.

RPS1/130: 130 to 150mm.

RPS1/160: 160 to 170mm.

### Jointing tape

Gas Jointing Tape and Joint Protection Tape for making joints in membranes and between membranes and other components. Available in roll widths of 12mm, 30mm and 50mm.



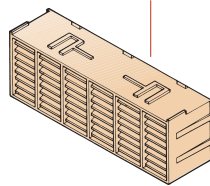
## UNDERFLOOR and CAVITY WALL VENTS

The Z-Led range of underfloor and cavity wall ventilation products enable the regulatory requirements for ventilation to be met.

- Adaptable to a wide range of situations including different floor depths and remote voids.
- Also provides protection against the entry of driving rain, birds, rodents and large insects.

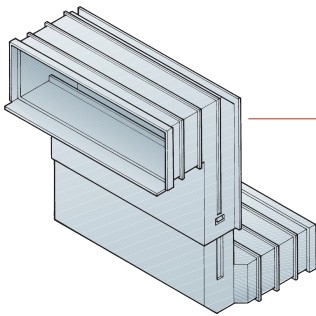
### ZLAB Airbrick

Ventilation area 6000mm<sup>2</sup>  
 Standard brick face dimensions.  
 Can be stacked in multiples.  
 Driving rain resistant.  
 Can be used with ZLPS Periscope and ZLPA Vent Pipe Adaptor.  
 Colours: terracotta, buff, anthracite.



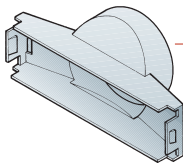
### ZLPS Periscope

Provides ventilation beneath suspended floors.  
 Vertical adjustment for 3 - 4 brick courses.  
 Suitable for cavity widths from 50mm to 100mm.  
 Can be used with ZLAB Airbrick, ZLVS Vertical Sleeve and ZLPA Vent Pipe Adaptor.



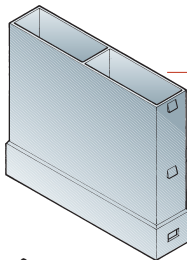
### ZLPA Vent Pipe Adaptor

Enables remote voids to be ventilated via connection to 100mm internal diameter pipe.  
 Can be attached to ZLAB Airbrick and ZLPS Periscope.



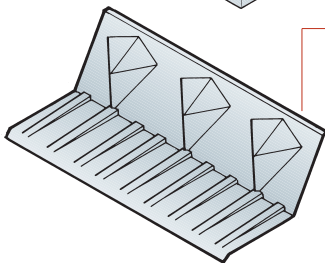
### ZLVS Vertical Sleeve

Fits between two halves of ZLPS Periscope to increase overall depth adjustment up to 5-6 brick courses.  
 Modular design allows additional units to be added for even greater depths.



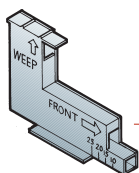
### HT Airbrick Cavity Tray

Installed above an airbrick to protect the wall cavity against damp penetration.  
 Short length for ease of installation whilst providing 100mm extension on each side of airbrick.



### MV650 Weepvent

Cavity wall ventilator and weep unit in one innovative product.  
 Fits into a single perpend joint.  
 Ventilation area 220mm<sup>2</sup>.  
 Driving rain resistant and protects against large insect ingress.  
 Colours: terracotta, buff, grey.  
 Can be used in brickwork, blockwork, timber-framed and rendered walls.



### Installation

#### Underfloor vent spacing

Locate underfloor vents on opposite sides of the building to achieve the most effective mix and distribution of air flow.

Installed at 4.0m centres they will provide 1500mm<sup>2</sup> ventilation area per metre of external wall to comply with Building Regulations Approved Document C.

However Z-Led recommend spacing at 2.0m centres to avoid the risk of stagnant air pockets and consequent risk of accumulation of gases.

#### Cavity trays

BS 8215: 1991 recommends use of cavity trays above any point where a wall cavity is bridged. Z-Led HT or HTR cavity trays with stopends and weepvents should be used above ZLAB Airbricks and ZLPS Periscopes.

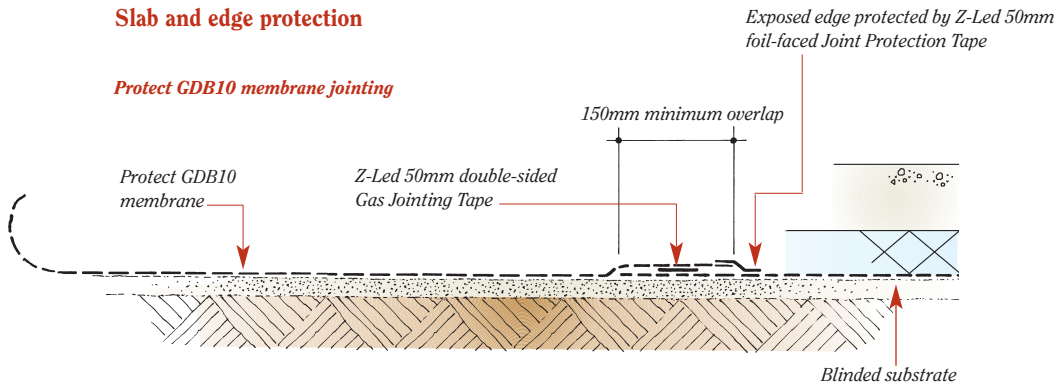
#### Weepvents

Weepvents should be installed on all cavity trays at 450mm centres.

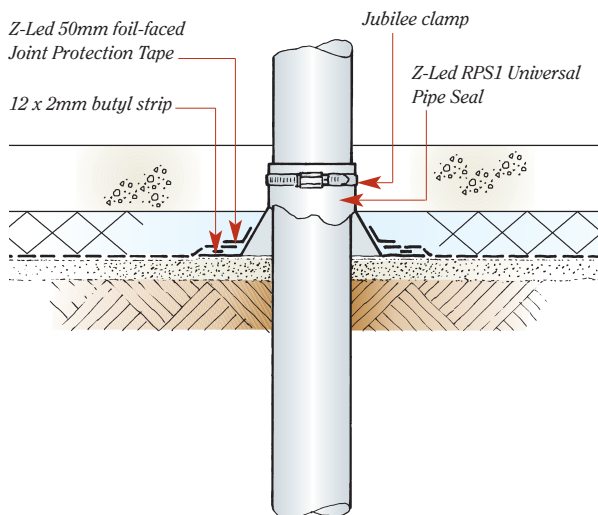
For timber frame wall cavity ventilation, install at a horizontal spacing of 450mm centres, at low and high level and above and below fire stops in a staggered layout.

## APPLICATION DETAILS

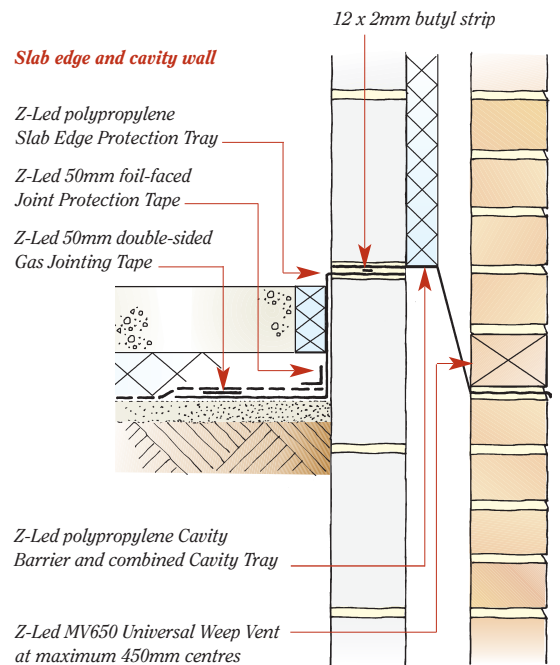
### Slab and edge protection



### Service pipe penetration of membrane

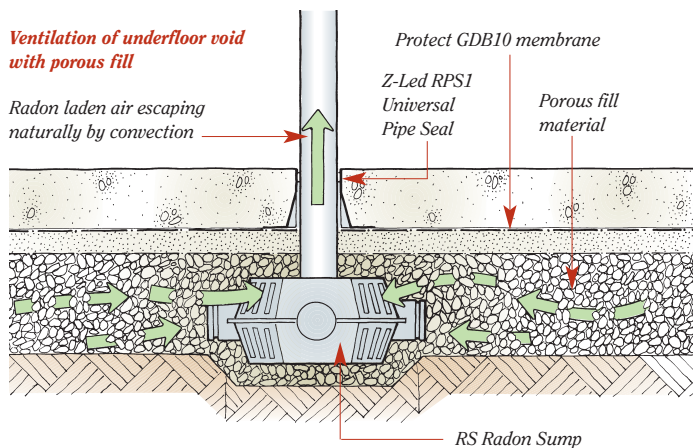


### Slab edge and cavity wall



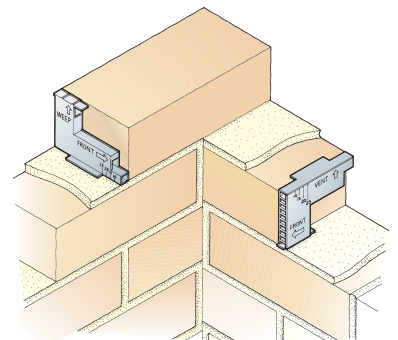
### Radon ventilation

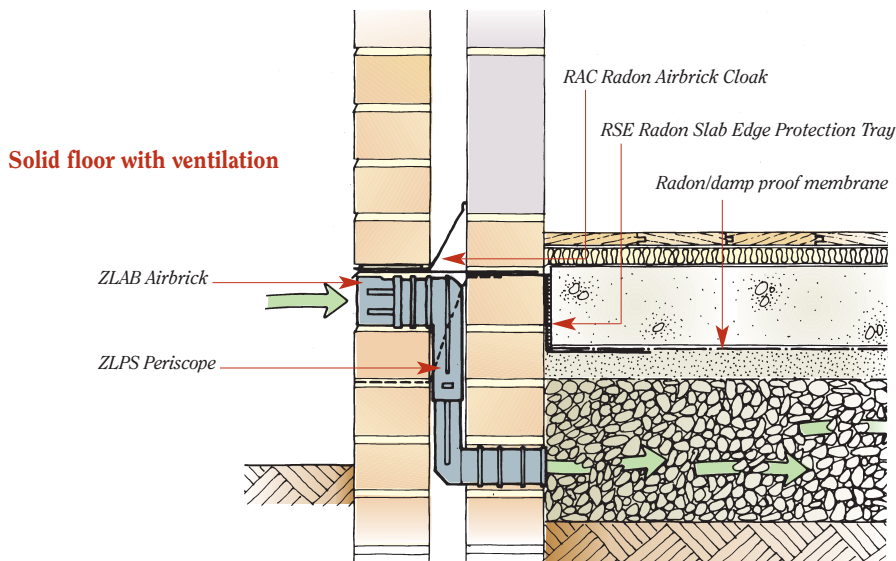
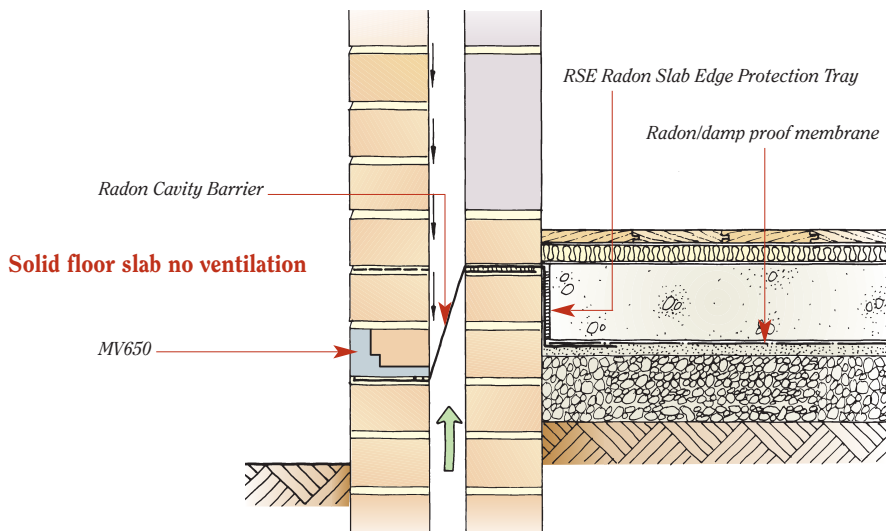
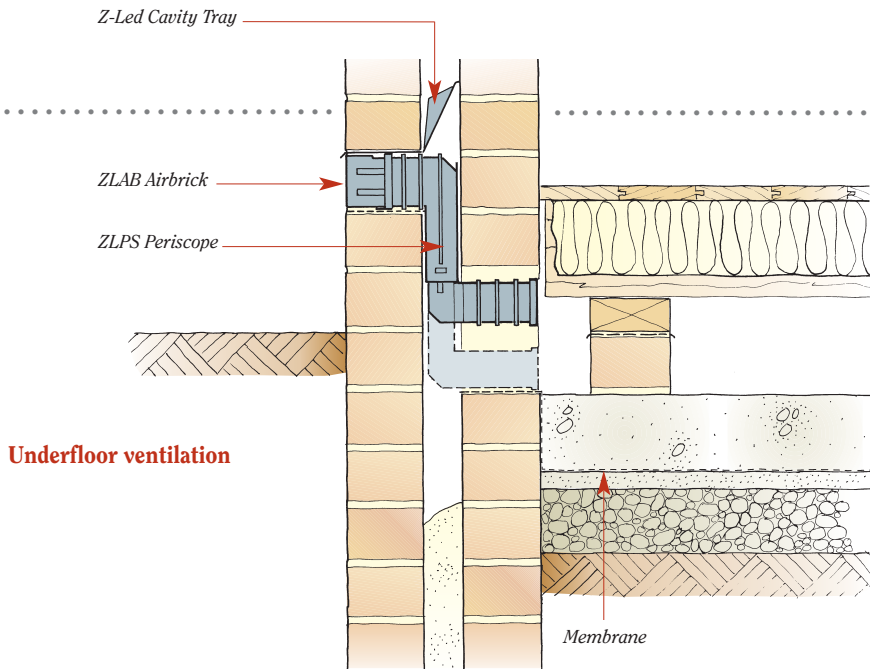
#### Ventilation of underfloor void with porous fill



### Wall ventilation

#### MV650 used as weep or ventilator





**Specification clauses  
Gas/damp protection**

Provide combined gas and damp protection to ground floors to comply with Building Regulations Approved Document C by means of: Z-Led Protect GDB10 membrane (methane, carbon dioxide, radon) / Protect Radon Shield membrane (radon only) Z-Led Edge and Cavity Protection System Z-Led Underfloor and cavity wall vents all supplied by Z-LED Ltd, Plymouth Avenue, Brookhill Industrial Estate, Pinxton, Nottingham NG16 6NS, Tel: 01773 814113, Fax: 01773 814115, Email: info@z-led.com.

Z-Led Protect GDB10 membrane / Protect Radon Shield membrane Lay membrane directly on a suitable blinded substrate. Overlap joints by a minimum of 150mm and seal using Z-Led 50mm wide double-sided Gas Jointing Tape. Protect the exposed edge of the joint by taping to the underlying layer using Z-Led 50mm wide foil-faced Joint Protection Tape. Sleeve service pipe penetrations using Z-Led RPS1 pipe seals, lapped and sealed to the membrane as above.

**Z-Led Edge and Cavity Protection System**

Ensure continuity of gas and damp barrier at all external walls by installing Z-Led Slab Edge Protection Tray sealed to the membrane using Z-Led 50mm wide double-sided Gas Jointing Tape. Provide continuous gas and damp protection in the wall cavity by installing Z-Led polypropylene Cavity Barrier and combined Cavity Tray. Seal Z-Led Slab Edge Protection Tray to the top of the Cavity Barrier tray using Z-Led 12mm wide double-sided Gas Jointing Tape. Site Z-Led MV650 universal weep ventilators directly on the Cavity Barrier tray in the external masonry leaf at maximum 450mm centres around the building perimeter.

**Z-Led Underfloor and cavity wall vents**

Provide ventilation to underfloor voids by means of Z-Led Underfloor and cavity wall vents installed in accordance with manufacturer's instructions.

**Z-Led Radon Sump**

Install Z-Led Radon Sump within porous underfloor fill material with vertical pipe venting in accordance with manufacturer's recommendations.

## FURTHER INFORMATION

### Environment / Operational Information

As part of our commitment to minimising our impact on the environment, and to continuous improvement in our methods of operation, Z-Led is accredited to ISO14001 Environmental Management, OHSAS 18001 Health and Safety Management and ISO 9001 Quality Management Systems.

### Technical support

Z-Led offer a full technical advisory and estimating service. Contact our Technical Services Department on 01773 814113 for further information or to request a complete schedule and quotation covering all products required.

### Other Products

Z-Led market a range of other products including:

Cavity Trays, Preformed DPCs and AluFlash Flashings

Insulated Cavity Closers

Horizontal and Vertical Cavity Barriers

Capawal GRP Coping System

### Z-Led Limited

Plymouth Avenue, Brookhill Industrial Estate, Pinxton, Nottingham NG16 6NS

Telephone: 01773 814113 Fax: 01773 814115

Email: [info@z-led.com](mailto:info@z-led.com) Web: [www.z-led.com](http://www.z-led.com)

Z-Led Limited maintains a policy of continuous development and reserves the right to amend product specifications without notice.

**BPD**

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