

VOC & Ground Gas Protection



Cordek's solution helps to protect East London development from harmful VOCs and ground gases

innovative solutions for construction

You're on safe ground with Cordek solutions

Cordek provides technical solutions for a range of construction requirements. Innovative thinking, engineering expertise, and state-of-the-art manufacturing equipment, enable Cordek to solve a wide range of engineering problems.

We are committed to supplying the best quality, value solutions, which are supported by the highest levels of personal service.

Cordek is at the forefront of VOC and Ground Gas Protection and has developed a range of venting and protection systems which have evolved through extensive research and development.

Contents

Risks related to VOCs and ground gases	3
Membrane Systems & Accessories	4
Passive Venting Systems & Accessories	5
Gas Venting Outlets	6
Technical Support Services	7



Peat bogs can be a naturally occurring form of methane production

Risks related to VOCs and ground gases

When designing and constructing new buildings, in line with Building Regulations Part C, it is important to consider the potential risks associated with ground gases, VOCs and contaminants.

Pressure differentials and concentration gradients that may exist between the internal and external areas of buildings, can result in ground gases and other contaminants ingressing into a structure typically through construction joints, gaps around service entries, wall cavities and general poor workmanship.

The most common hazardous substances can be summarised as follows:

VOCs including Hydrocarbons

These are usually associated with the leakage, spillage or unlicensed disposal of industrial waste, fuels and solvents, typically as part of the former use of a site. Hydrocarbons within the ground, if in significant concentrations, pose a flammable or explosive hazard.

Elevated levels of VOCs are usually strong in odour; they can also pose health risks to inhabitants.

Methane

Methane is a colourless, odourless, asphyxiating gas that can form flammable and potentially explosive mixtures in

air when ignited. This occurs at concentrations between 5% and 15% by volume in air.

Methane generally forms where below-ground degradation of organic materials takes place and is associated with landfills, sewage treatment works, mining activity and natural strata such as peat.

Carbon Dioxide

Carbon Dioxide is a colourless, odourless, asphyxiating gas that forms during the oxidation of carbon compounds and from some natural strata.

At concentrations of 3% it causes headaches and shortness of breath, 11% causes unconsciousness and 22% is fatal due to asphyxiation.

Radon

Radon is a radioactive gas which occurs naturally in all soil and rocks, to varying degrees, depending on the local geology. Radon gas has no taste, odour or colour and is formed from the decay of uranium within the ground. Long term exposure to elevated levels of radon can lead to lung tissue damage and, in extreme cases, lung cancer.

An action level of 200 BQ/m³ was set by the NRPB (now Public Health England) – www.ukradon.org



Brownfield sites can be contaminated by hazardous gases and VOCs

Membrane Systems & Accessories

Gas Membranes

In order to provide a wide choice of VOC and Ground Gas Protection solutions, Cordek has a comprehensive range of construction membranes and associated accessories that provide resistance to a variety of contaminants, ground gases and damp ingress.

To select the most appropriate membrane, it is important to understand the type of contaminant that the proposed building requires protection from. When this has been determined the selection table below confirms the suitability of each product based upon the hazard identified.



Membrane being installed

Membrane Selection

Product name	VOCs including Hydrocarbons	Methane	Carbon Dioxide	Radon
Puraflex VOC Membrane	✓	✓	✓	✓
Puraflex Tank VOC Membrane	✓	✓	✓	✓
Tri-Gas Membrane	✗	✓	✓	✓
Gas Resistant Self Adhesive Membrane	✗	✓	✓	✓
Radon Membrane	✗	✗	✗	✓

Note: All membrane types also provide damp proofing protection, however should there be the additional risk posed by hydrostatic water pressure, please contact a member of the Cordek Technical Team for additional advice.

Gas Membrane Accessories

When the membrane type has been identified, it is important to specify and detail, where required, the correct accessories. Cordek also provides:

- VOC and Ground Gas Resistant DPCs
- Protection Board Systems
- Preformed Top Hats for pipe and service penetrations
- Jointing Tapes
- Primers for Self-Adhesive Membrane types
- Self-Adhesive Detailing Strips
- Preformed Corners

Passive Venting Systems & Accessories

Passive Venting Layers

It has become common practice within the construction industry to utilise a passive ventilation system beneath the footprint of the structure, in addition to an appropriate membrane, to facilitate the dilution and subsequent dispersal to the atmosphere of ground gases and vapours.

Ventilation Selection

Cordek offers a unique range of gas ventilation products developed from extensive research, development and testing. These include:

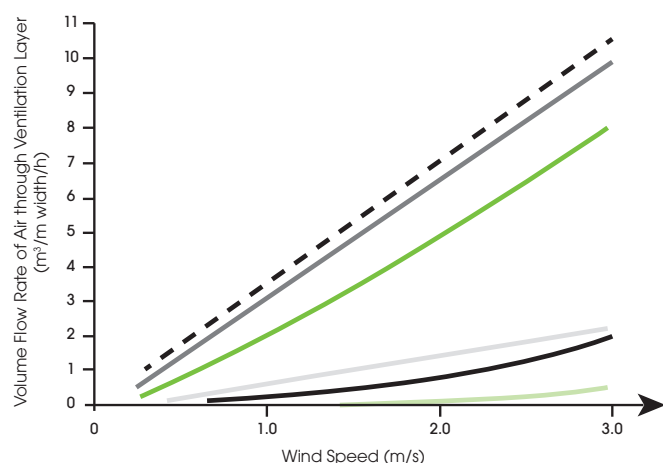
Ventform

Panels that are moulded from expanded polystyrene (EPS). In addition to being a highly efficient venting medium Ventform also provides thermal insulation, as EPS has a BREEAM rating of A+. The Ventform panels are moulded in a flame retardant material and available in different depths and grades to suit the majority of project requirements.

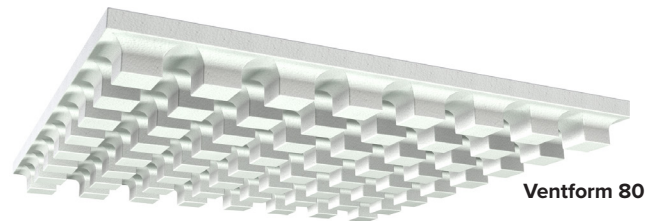
Cellvent

A combination product designed to provide both a passive ventilation layer and to also protect buildings from ground heave. This is achieved by combining the properties of Ventform and Cordek's ground heave product Cellcore HX.

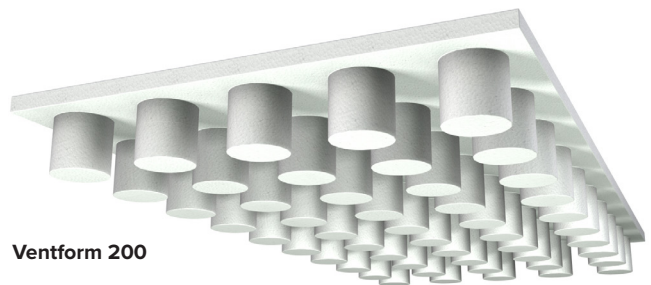
CFD Modelling Graph



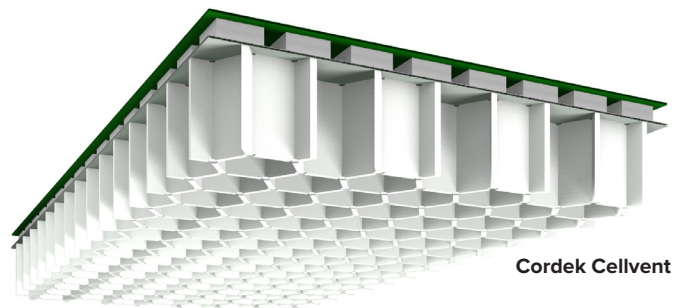
Note: Results are based on a 30m wide foundation



Ventform 80



Ventform 200



Cordek Cellvent

Independent research has been carried out by Arup Environmental, in partnership with the DOE which compares the performance of Ventform with alternative ventilation layers. The graph (left) demonstrates how much more effective Ventform is when compared with the other alternatives tested.

- Open Void 200mm
- VENTFORM 80
- VENTFORM 200
- 20mm Gravel Blanket, 400mm thick with pipes @ 3m alternate centres (Model 5)
- 40mm Geocomposite Drainage Product
- 20mm Gravel Blanket, 400mm thick



Gas Venting Outlets

Venting Outlet Selection

To ensure the passive ventilation layer effectively dilutes and disperses the hazardous gases it is essential to connect the venting medium to the atmosphere with an adequate number of vents suitably positioned around the perimeter of the building.

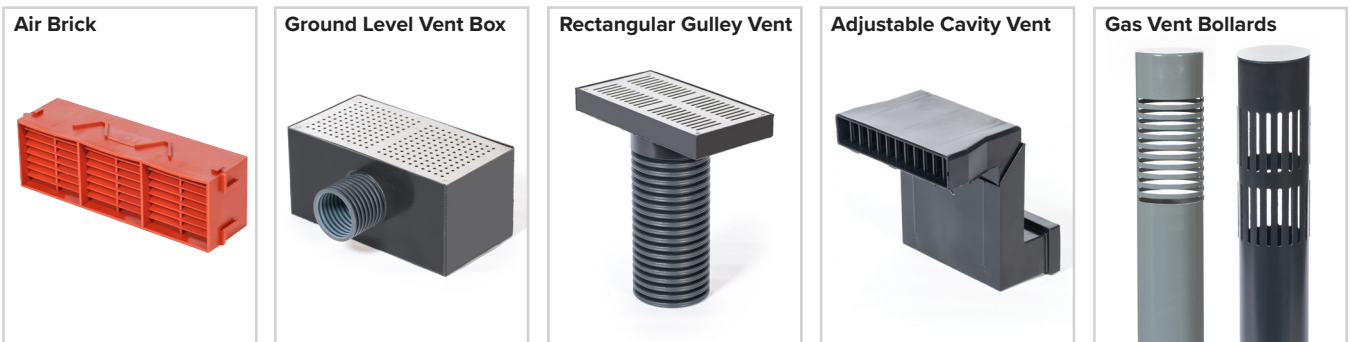
Cordek offers a wide range of vent options which include:

- Air bricks available in various colours to match the chosen external masonry
- A flood resilient vent box designed to resist the potential ingress of surface water
- Both circular and rectangular gulley vents with various lid types and finishes

- Adjustable cavity vents designed to connect the sub-floor void to perimeter air bricks
- Vent bollards manufactured from various materials including plastic, powder coated and stainless steel

A full range of venting accessories, which provide robust connections between the venting system and perimeter vents are available.

Please see the Cordek Gas Venting System Accessories Data Sheet for further information, or contact our Technical Team on 01403 799600 for further assistance.



Gas Venting System Accessories

In addition to the venting mediums and outlets provided by Cordek, a range of accessories is also offered in order to provide a complete gas venting system.

The gas venting accessories are required to ensure a robust connection between the selected venting system and the vent outlets positioned at the perimeter of the building.

Cordek's gas venting accessory range includes:

- Vent connectors to allow a secure connection on to the Cordek venting system e.g. Ventform, Cellvent etc beneath the building footprint

- A range of pipework, couplers, bends and end caps to ensure that the connection between the venting system and the perimeter vent outlets can be achieved as safely and economically as possible

- Additional gas venting accessories such as radon sumps which can be used to provide a 'full' radon protection system with the additional use of a suitable radon resistant membrane (please see Selection Table on page 4 of this guide)

Technical Support Services

Technical Documentation

Technical support for all Cordek products, including the VOC & Ground Gas Protection Range, is available via our dedicated technical team who can provide assistance with design, detailing and installation, utilising the following tools:

- Standard Construction Details
- Product Data Sheets
- Installation Guides
- NBS Specifications
- Material Safety Data Sheets (MSDS)
- BIM Objects

If you would like to speak with one of our technical team please contact us on 01403 799600 or alternatively visit our website at www.cordek.com.

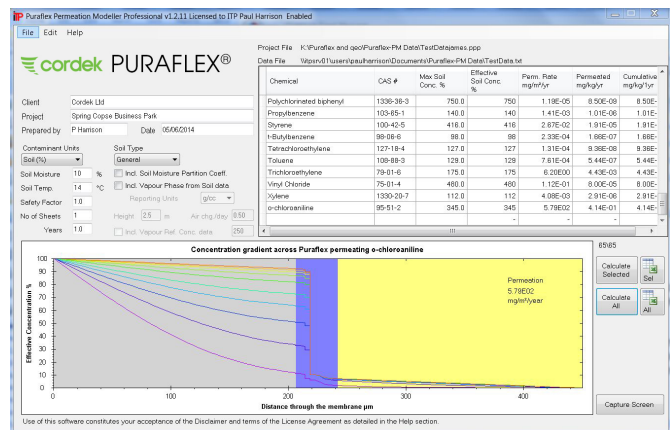


Puraflex Permeation Tool

This analytical software simplifies the complex process of determining the potential effects of VOCs on building occupants and the subsequent design of appropriate protection measures.

Reporting on over 200 hydrocarbons and toxic chemicals, the software calculates permeation rates for soil contaminants. These can be imported directly into environmental risk assessment modelling software.

This service is provided by Cordek free of charge, with the provision of a detailed report upon completion.



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