



Industry Voices

PRODUCT CERTIFICATION

Ground gas protection and the use of brownfield sites

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In collaboration with





Ground gas protection and the use of brownfield sites

Are you planning properly for the future?

With the ever-increasing demand for new houses and the ever-decreasing availability of suitable greenbelt land, developers are looking to reclaim previously used land, utilising the space beneath our feet with basement constructions. This has led to an increase in competition for the sourcing and use of brownfield sites which are popular candidates for land development. These sites can present challenges in the form of ground pollutants, particularly in a densely populated country like the UK and our industrial heritage.



Radon Sump Suspended Slab-residential schematic.

These aggressive ground conditions present issues with durability of 'standard' construction materials used in the built environment, which are more often than not only tested and proven to survive favourable ground conditions. As our understanding of material science increases, so does our knowledge of the long-term effects on human health from exposure to contaminants. These contaminants can be carcinogenic; therefore it becomes more important to future proof our developments so we can protect workers and, later, residents who live on these sites.



Waterproofing gas membrane.

“This leads to a ‘copy and paste’ culture from previous specifications, which can be the cause of considerable issues further down the line.”

Developing a long-lasting solution

Over the last few years, a good deal of work and research has gone into the development of multi-layer thermoplastic membranes that are resistant to ground gases and volatile organic compounds (VOC). Materials such as these membranes utilised on potentially contaminated brownfield land can provide a barrier to prevent migration of harmful contaminants and ground gases into the habitable areas. These membranes, which need to be chemically resistant to other chemicals that they are likely to come into contact with, must be robust enough to make them sufficiently durable so that they are not damaged during installation or in service. As a result of these considerations, guidance for the provision of suitable materials is constantly evolving as our understanding changes, and unsuitable practices and materials have been seen to fail.

The ‘copy and paste’ problem

As an industry we tend to lean on previous project knowledge during the design process; ‘It worked last time, we’ll use that again’, ‘We’ve never been asked that before’, ‘It’s never really been an issue’. This leads to a ‘copy and paste’ culture from previous specifications, which can be the cause of considerable issues further down the line. Therefore, we must always seek to continue our education of current practices and common issues that the industry faces. That’s why the level of self-regulation is ever more pressing in today’s busy world.



Gas protection.



Gas membrane.

The need for independent testing and assessment expert guidance

For over 50 years the BBA has been assessing ‘innovative’ products for use in construction and has built up considerable experience in the assessment of membranes for use in waterproofing and gas control applications.

This is why, when working with JUTA Ltd to assess their range of membranes designed for use in applications where chemical resistance, gas control and damp-proofing/waterproofing are key performance criteria, we were able to combine current knowledge with historical data to determine the efficacy of the product. This process required an extensive review of design data on ground gas / VOC transmission and chemical resistance, ensuring that the products developed can be specified and used with confidence that they have been through a robust assessment process - particularly in relation to performance, installation and durability.

The Hackitt Report

To embrace the change demanded in the Hackitt Report, we must look to innovative solutions which address the needs of today, and the demands of tomorrow; innovation is born from the desire to improve, build on what we already know and to bring forward the next generation of construction materials. It is necessary that construction companies work with experts such as the BBA to validate these new products, as good innovation will not only bring better quality and performing materials, but also offer cost savings over the life cycle of a project.

As Dame Judith Hackitt reported on the Building Regulations following the Grenfell review; ‘The system is broken, and things will change.’ Improving the system will be better for clients, owners, occupiers, developers - and the planet.



Titanbond

Full compliance for a brighter future

While compliance across the full range of standards and guidance documents is difficult, the good news is that the new generation of products entering the market place allow specifiers to be compliant across the board. As such, they are able to provide comfort and assurance to end users that the materials are suitable, fit-for-purpose and designed to go the distance for today’s requirements and future-proofed for the foreseeable future.

Useful documentation

Although not exhaustive, information and guidance related to the design of protective measures for new builds is included in the following guidance documents:

- **BS 8102:2009** – Code of practice for protection of below ground structures from water in the ground
- **BS 8485:2015** – Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings
- **BRE 211:2015** – Guidance on protective measures for new buildings. (RADON)
- **BRE 414:2001** – Protective measures for housing on gas contaminated land.
- **CIRIA C665:2007** – Assessing risks posed by hazardous ground gases to buildings.
- **CIRIA C682:2009** – The VOCs Handbook.
- **CIRIA C716:2012** – Remediating and mitigating risk from VOC vapours from land affected by contamination.
- **CIRIA C735:2014** – Good practice on the testing and verification of protection systems for buildings against hazardous ground gases.
- **CIRIA C748:2014** – Guidance on the use of plastic membranes as VOC vapour barriers.
- **NHBCREPORT 2007** - Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present, and updated guidance in NHBC Technical Extra, Issue 20 April 2016



Facebook first data centre.

Meet the authors



Patrick Flood

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Technical Director at JUTA, Patrick has over 15 years of research, design and practical experience in geotechnical engineering within civil engineering construction. Patrick moved into Technical Sales and supported geosynthetic manufacturers which allowed him to be involved in many unique projects across the globe. These projects include remediation of old unpermitted landfill sites in Lithuania, Gold Mine design to optimise mineral recovery in Turkey, and Civils projects throughout Africa and the Middle East.



Jack Georgiou

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Jack Georgiou is a 16 year veteran Project Manager in the Construction Products division of the BBA, specialising in certification for sealants and other waterproofing materials. Jack's expertise lies in the assessment of waterproofing products used in roofing, below ground (tanking and damp proofing), car park deck systems, bridge deck waterproofing, gas/VOC membranes and highway surfacing products. Before joining the BBA, he spent 18 years working for Expandite Ltd (now Fosroc Ltd) where he was a Development Chemist, a Section Leader and Laboratory Manager. He was involved in the development of products like sealants, membranes and epoxy mortars for use in the construction industry

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