#### JUTA UK LTD

#### PATRICK FLOOD



# 



Scottish Contaminated Land Forum

# ONE GAS MEMBRANE TO RULE THEM ALL

## AIMS





#### INCREASE AWARENESS OF MATERIAL OFFERING



# COMPANY PROFILE

#### **MANUFACTURING CAPABILITES**

- GEOMEMBRANES
- HDPE, LLDPE, FILMS
- GEOTEXTILE
- Woven and Non-woven
- GCL
- ENVIRONMENTAL AND WATERPROOFING
- GEOCOMPOSITES
- NET DRAINS AND CUSPATED CORES
- SYNTHETIC GRASS
- GEOGRIDS
- EROSION CONTROL MATTING





# COMPANY PROFILE

#### TITANS OF INDUSTRY

- BBA & NSAI Certifications
- DRIVING STANDARDS
- CONTINUOUS DEVELOPMENT
- CUSTOMER FOCUSED
- SOLUTION SALES





# THE ELEPHANT IN THE ROOM

#### **GROUND GAS**

Are we addressing ground gas appropriately through risk assessment and design?

Radon, Methane, Carbon Dioxide, VOC's?





**Applying common sense – BACK TO BASICS** 

#### **LEARNING FROM MISTAKES**

- COPY AND PASTE MENTALITY (Stifles innovation)
- EDUCATION CONTINUED PROFESSIONAL DEVELOPMENT (combat ignorance)
- THIRD PARTY CERTIFICATIONS (BBA) (Provides reassurance)





BS 8485

BS 8485 Gives guidance on determination of gas protection scope;

- an empirical, semi-quantitative approach; and/or
- a detailed quantitative assessment approach.

Understand influences to the GSV – Is it representative?

- Gas concentration
- Flow rate

'Routine approach' (points score) for sites with no VOC risks - is a simplified way of setting the scope of protective measures. Many 'factors of safety' built in, and generally working toward a 'worst case scenario'. Only for **NEW BUILD!** May also prove overly conservative on low risk sites – where Total Organic Carbon (TOC) risk assessment may be more suitable.

**DQRA** will assess in more detail the source potential over time as a 'factored risk', and would be required on high risk sites, and typically sites adjacent to/on historical landfill and/or mine works.

#### **INTERPRETATION and CONFIDENCE in the data collected**





## GAS PROTECTION DESIGN TO BS 8485

There is more to gas proofing design that just adding up points.





## GAS PROTECTION DESIGN TO BS 8485

WHAT IS DETAILED DESIGN?

SHOULD INCLUDE DESIGN, JUSTIFICATION & SPECIFICATION OF EACH ELEMENT OF GAS PROTECTION



post installation

outlets or fans



### MEMBRANES – BS 8485

- Sufficiently impervious to methane and carbon dioxide (GTR <40ml/m2/day/atm – ISO15105-1);</li>
- Capable after installation of providing a **complete barrier** to the entry of the relevant gas;
- Sufficiently durable to remain serviceable for the anticipated life of the building and duration of gas emissions;
- Sufficiently strong to withstand in service stresses;
- Sufficiently strong to withstand the installation process and following construction activities until covered ;
- **Chemically resistant** to degradation by other contaminants that may be present.

**INDEPENDENT VERIFICATION** 



## MEMBRANES

- Commodity End (doesn't want to know)
- Routine sites (have good knowledge)
- Specialist installs (detailed design with justifications in place)





## MEMBRANE GUIDANCE

#### 1993 – 2024

- BS8102:2009 Code of practice for protection of below ground structures from water in the ground
- BS 8485:2019 Code of practice for design of protective measures for methane and carbon dioxide ground gases for new buildings
- BRE 211:2023 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 ground gases to buildings.
- CIRIA C682:2009 VOC Handbook.
- CIRIA C716:2012 Remediating and mitigating risk from VOC vapours from contaminated land.
- CIRIA C735:2014 Good practice on testing and verification of protection systems to buildings from hazardous gases.
- CIRIA C748:2014 Guidance on the use of plastic membranes as VOC vapour barriers.
- NHBC RISK REPORT 2007: 'Traffic Light System'
- NHBC TECHNICAL STANDARDS 2017 supplemented by 'technical extra' notes.
- NF94...



- Membranes are DAMP PROOF MEMBRANES (DPM's) or Waterproofing Membranes
- 'GAS RESISTANCE' is outlined in BS 8485. (ISO 15105-1)





### British / European Standards

- <u>EN 13967 Flexible Sheets for</u> <u>Waterproofing</u>
- Harmonised application standard
- Sets the minimum testing criteria and declarations of performance by the manufacturer (CPR)
- UKCA/UKNI/CE





#### British / European Standards

- EN 13967 has two notations.
- A (above 2kPa test pressure EN1928)
  - 200mm Hydrostatic Head
- T (tank 60kPa test pressure EN1928)
  - 6m Hydrostatic Head
- A = Damp Proof Membrane
- T = Waterproofing Membrane

GP® TITANBOND	CE	UK CA UK NI		
	1213	17		
DOP no.	001CPR/6493/2017-05-15			
TYPE: A/T - Waterproofing Gas Membrane	Sort: Smooth/Backed			
Area weight: 650gsm	Standard: EN 13967:2012			
Roll Length: <b>25m</b>	Manufacuting date:			
11111/01				
11111				
20kg				



Material Warranties – based on application standards.

IE – if you are using a DPM in the ground, it will restrict the 'durability warranty' from the manufacturer for the application setting.

Warranties are generally limited to conditions of use.



Anticipated Design service life – For gas/waterproofing membranes = 60 years



### GAS MEMBRANE TEASER

Assessing two options – Carbon Dioxide Resistant DPM – Above Block and Beam (POLL)

Property	Product 1	Product 2
Weight (gsm)	500	370
Thickness (mm)	0.5	0.4
Length (m)	25	25
Width (m)	4	2
Puncture Resistance (kN)	2.2	2.0

Property	Product 1	Product 2
Raw Material	Recycled Polyethylene	Virgin Polyethylene
Carbon Dioxide Permeation Rate (ISO 15105-1)	<10 ml/m2/day/atm	15.7ml/m2/day/atm

Property	Product 1	Product 2
Durability	10 years	60 years



# HACKITT REPORT

'We have created a cultural issue across the sector, which can be described as a 'race to the bottom' caused either through ignorance, indifference, or because the system does not facilitate good practice. There is insufficient focus on delivering the best quality building possible, in order to ensure that residents are safe, and feel safe.'

#### The underlying message:

We must embrace CHANGE, through improvement in existing practices, and through INNOVATION if we are to achieve long term quality and sustainability aims. BSA - 2024





HOW A MANUFACTURER INTERPRETS 'LONG TERM QUALITY AND SUSTAINABILITY'

- SUITABLE FOR THE INTENDED APPLICATION FUNCTION
- FIT FOR PURPOSE
- DESIGNED TO LAST





## Gas Resistant DPM







Common gas barriers:

Monolithic polyolefin (sometimes recycled) Reinforced Polyethylene Alu-Foil reinforced Polyethylene Multi-layer polyolefins



#### LIMITATIONS!



## GAS MEMBRANES









#### **ALUMINIUM FOIL IS THE DEVIL!**

<u>MYTH</u> - where used correctly, and treated with care – it will function as intended.

However – we have become too reliant on 'aluminium foils' to do everything, everywhere.





## **Methods of Jointing**

NF94- Recommends that NVQ Level 2 qualified or appropriately experienced operatives are engaged for installation of gas protection membranes.

**Specialist Installer - Welded Laps** 



**Untrained operatives: Taped Laps** 





### Methods of Construction – NF94



Example of positioning barrier in user group A, B and C.

Close to receptor – performance is critical

Ground conditions are variable

Importance of Durability and Robustness



### WHAT TO LOOK FOR

- REASONED JUSTIFICATIONS
- **RELEVANT MATERIAL PROPERTIES**
- **REFERENCE TO COMPETENCY**
- **DETAILED DESIGN!**
- SPECIALIST INSTALLER



### Sense Check

- COMMON SENSE at all time
- SEEK the information
- MAKE INFORMED DECISIONS
- Complete Detailed Design It's worth it!



