

3 Jan 2023

Jonathan Pritchard
Strid Treglown

By Email to : jonathanpritchard@stridetreglown.com

Dear Jonathan,

Neath Port Talbot Hospital – Gas membranes and discharge of conditions

Following receipt of your email with concerns from the Pollution Control Officer at Neath Port Talbot Council, I have outlined the various clarifications below.

The broad and conservative recommendations from the Geotechnical Engineers (Terraforma) was that the site should adhere to “Gas Characteristic Situation 2” (CS2) in line with the CIRIA C665 recommendations. This is explained in chapter 8.3 of the report that follows on from 8.2 where the gas concentrations are discussed. The relevant extracts are reproduced below:

8.2 Gas Screening Value

Three ground gas monitoring wells were installed in boreholes WS01 to WS03. Installation details are shown on the relevant log.

Two rounds of gas monitoring have been carried out to date. The installations were tested for carbon dioxide, methane, oxygen, carbon monoxide and hydrogen sulphide using a Gas Analyser GA5000.

Recorded gas concentrations are summarised in **Table 8.1**.

Table 8.1 Measured Gas Concentration Summary

Gas	Minimum (% V/V)	Maximum (% V/V)
Methane	0.2	10.5
Carbon Dioxide	0	0.5
Oxygen	17.3	21.5

The gas flow rate from the boreholes was also assessed, a maximum typical flow rate of 0.3l/hr was recorded.

Based on a flow rate of 0.3l/hr and the highest recorded methane concentration of 10.5%, a gas screening value of 0.0315l/hr is calculated, as follows:

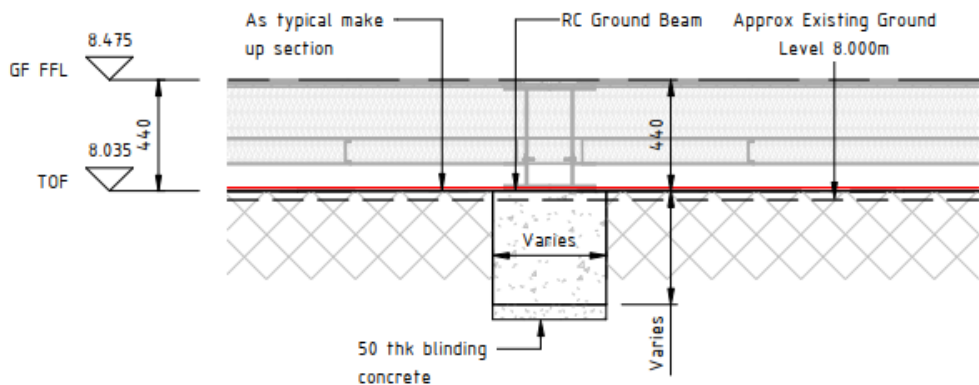
$$(10.5/100) \times 0.3 = 0.0315\text{l/hr}$$

The results to date are presented in **Annex J**.

8.3 Conclusion

When this monitoring result is compared with Table 8.5 of CIRIA report C665, the site is classified as ‘Gas Characteristic Situation 1’ (CS1). However, as the peak methane has significantly risen above 1%, it is recommended that ‘Gas Characteristic Situation 2’ (GS2) is applied to the site in line with recommendations provided in CIRIA C665.

I have also extracted below our foundation drawing below showing the broad details of how compliance with the recommendations has been achieved by the utilisation of a gas membrane with ventilation strips below. There is a further ventilated void above this barrier due to the method of modular construction which will also assist in dissipation, but this further ventilation is ignored from a gas membrane viewpoint.



2 Typical Section Through Ground Beam

1 : 25

The specialist (Geoshield), along with their consultant Neil McNamara are the specialist supplier, installer and verification provider for the CS2 gas system on this project. From a duty of care viewpoint, we have reviewed their proposals and find them suitable for their purpose.

Gas Membrane Proposals

The proposals are to install the following in accordance with BS 8485:2015+A1:2019 as CIRIA 665:

- FD6 Cusped Geocomposite 6mm thick ventilation layer 900mm wide @ 4m centres across building. (spec provided in enclosures).
- Gas membranes JUTA GP1 plus JUTA GP SAM membranes to be provided across the entire footprint of the building (spec provided in enclosures).
- PRECON Bitumen protection board to be provided at points where modular system bears onto membrane.

We have inspected the ongoing installation and found it to be satisfactory and have inserted one of our site photos overleaf:



Site photo showing membrane installation

The specialist Geoshield will be providing the full validation and verification report of the installation in due course and this final remaining item will be forwarded to you once available from them.

No further remedial strategy or monitoring is required in our professional opinion and the gas measures provided are suitable and robust mitigation to ensure the ongoing health of occupants during use of the proposed building.

We trust the information contained within this letter is sufficient to discharge any remaining planning condition relating to pollution, remediation and ground gas and would ask that this letter is forwarded to the Pollution Control Officer at the Planning Department in order to ensure compliance with the legislation.

Yours sincerely



Pierre Grigorian BEng(Hons) CEng FStructE FICE

Director

PHG Consulting Engineers Ltd

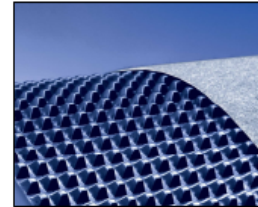
(+ Encs – Membrane and vent details from Geoshield specialist)

GEofabrics®

FC6 Cuspate Geocomposite

ES0070-2021-03-05

- 1. Description** 6mm HDPE cusped drainage board with a PP geotextile filter/separator bonded to a single side.
- 2. Applications** Geofabrics FC6 geocomposite has been designed to provide a passive venting system for gasses and liquids.
- 3. Features**
 - Optimised for maximum strength and performance
 - UV stabilised
 - Very high crush resistance
 - Excellent flow rate



	Test Standard	Unit	Mean Values		
4. Mechanical Properties – Geocomposite					
Compressive strength	EN ISO 25619-2	kPa	800		
5. Mechanical Properties – Geotextile Filter					
Tensile strength (MD/CMD)	EN ISO 10319	kN/m	9		
Static puncture (CBR)	EN ISO 12236	kN	1.4		
6. Hydraulic Properties – Geotextile Filter					
Water permeability V_{H50}	EN ISO 11058	l/(m ² ·s)	100		
Apparent opening size	EN ISO 12956	µm	80		
7. Hydraulic Properties – Geocomposite					
In plane flow capacity (rigid/rigid)	EN ISO 12958	l/(m·s)	i = 1	i = 0.5	i = 0.1
@ 20kPa			2.0	1.5	0.65
@ 100kPa			2.0	1.5	0.60
@ 200kPa			2.0	1.5	0.55
8. Physical Properties – Geocomposite					
Thickness @ 20kPa	EN ISO 9863-1	mm	7		
Standard colour – Cuspate			Black		
Polymer – Cuspate			HDPE		
Polymer – Geotextile			PP		

Notes:

- a) Mean values indicate the arithmetic mean derived from the samples taken for any one test as defined in the standard – usually an overall mean of five samples. Mean values are subject to tolerances based on 95% confidence limits as published on the product CE declaration of performance.

- 9. Testing** All materials are tested every 6000m² in an UKAS accredited ISO 17025 laboratory to all mechanical properties prior to release.
- 10. Storage** The geocomposites are supplied in packaging designed to protect the product from damage during handling, storage, and degradation as a result of UV exposure. The product should be kept in appropriate packaging until such time that it is required for installation. The product is clearly and indelibly marked with the product name along the edge of the roll at regular intervals no greater than 5m. The packaging is labelled clearly to identify the product supplied in accordance with EN ISO 10320: Geotextile and Geotextile related products – Identification on site. Use slings where provided. Product weights are given on roll tickets. Use equipment appropriate to weight and dimension. Store and handle in accordance with good occupational hygiene and safety practice.

	Unit	Values
11. Dimensions		
Standard roll length	m	100
Standard roll width	m	0.97
Approximate roll weight	Kg	115

Geofabrics Limited, Skelton Grange Road, Stourton, Leeds LS10 1RZ, United Kingdom

+44 0113 202 5678

info@geofabrics.com

www.geofabrics.com

GP[®] 1

Rev: June 2019

Ground Gas Protection

Juta GP[®] 1 – Gas Barrier is a multi-layer, low density polyethylene membrane, reinforced with a polypropylene reinforcing grid with an integral aluminium foil. GP[®] 1 is specifically designed and manufactured to perform as a Methane, Carbon Dioxide, Radon, Ground Gas, VOC/Hydrocarbon vapors, air & moisture protection system.

JUTA GP [®] 1			
Characteristics	Test Method	Unit	JUTA GP [®] 1
Physical Properties			
Thickness	EN 1849-2	mm	0.6
Thickness - Between Scrim	BS EN ISO 9863-1:2016	Mm	0.4
Width	EN 1849-2	m	Various
Length	EN 1849-2	m	Various
Weight	EN 1849-2	G/M ²	370
Hydraulic Properties			
Thickness	EN 20811	-	>300
Resistance to Water Penetration	EN 13967, EN 1928	-	Pass
Water Tightness	EN 1296, EN 1367, EN 1928	-	Pass
Hydraulic Properties			
Resistance to Static Load	EN 12730-B	Kg	20
Tensile Strength (MD)	EN 12311-1	N/50mm	600
Tensile Strength (CMD)	EN 12311-1	N/50mm	480
Tensile Elongation (MD)	EN 12310-1	%	20
Tensile Elongation (CMD)	EN 12310-1	%	20
Puncture Resistance	EN 12236	kN	1.25
Resistance to Tearing (Nail Shank) MD	EN 12310-1	N	330
Resistance to Tearing (Nail Shank) CMD	EN 12310-1	N	400
Durability and Chemical Resistance			
Transmission Rate of Volatile Liquids - Diesel	ISO 6179:2010 (B)	g/m ² /h	0.246
Transmission Rate of Volatile Liquids - Xylene	ISO 6179:2010 (B)	g/m ² /h	0.571
Transmission Rate of Volatile Liquids - Toluene	ISO 6179:2010 (B)	g/m ² /h	0.583
Transmission Rate of Volatile Liquids - Petrol	ISO 6179:2010 (B)	g/m ² /h	0.135
Gas Permeability			
Methane Permeability	BS EN ISO 15105-1	ml/m ² /day/atm	<0.09
Carbon Dioxide Permeability	BS EN ISO 15105-1	ml/m ² /day/atm	<0.09
Radon Permeability	K124/02/95	m ² /s	8.0 x 10 ⁻¹⁵
Compliance and Certification			
CE Mark - EN13967:2012			
NHBC Standards Compliant			
BS 8485:2015 + A1 2019 Accordant			
BBA Certified - Certificate No. 12/4912			

Contact us to find out more information.
info@juta.co.uk | 01772 754177 | JUTA.CO.UK
Melton Grove Works, Church Road, Lytham, FY8 5PL



JUTA



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product
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GP® SAM



**Ground Gas
Protection**

JUTA GP® SAM - Gas Protection - Self Adhesive Membrane, is a bituminous gas proof and water proof sheet, composed of self-adhesive SBS polymer modified bitumen incorporating an aluminium foil with an upper surface finish of white cross laminated HDPE, and a lower surface finish of siliconized paper release film. JUTA GP® SAM is used for the gas/waterproofing of underground structures where harmful ground gasses are anticipated.



JUTA GP® SAM			
Characteristic	Test Method	Unit	GP® SAM
Physical Properties			
Thickness	EN 1849-2	mm	1.00
Width	EN 1849-2	M	0.3 or 1
Length	EN 1849-2	M	20
Weight	EN 1849-2	g/m²	1100
Hydraulic Properties			
Watertightness	EN 1928	-	PA55
Water Vapour Transmission	EN 1931	g/m²/day	0.013
Mechanical Properties			
Tensile Strength (MD/CMD)	EN12311-2	N/mm²	3
Elongation (MD/CMD)	EN 12311-2	%	>120
Resistance to Static Load	EN 12370	kg	20kg
Joint Strength	EN 12317-2	N	>30
Durability and Water tightness (ageing and chemicals)	EN 1847	-	PA55
Resistance to Nail Tear (MD/CMD)	EN 12310-1	N	>100
Reaction to Fire	EN 13501	Euro Class	F
Gas Permeability			
Methane Permeability	B5 EN ISO 15105 - 1	ml/m²/day/atm	< 0.53
Carbon Dioxide Permeability	B5 EN ISO 15105 - 1	ml/m²/day/atm	< 0.53
Radon Permeability	K124/02/95	m²/s	5.0 x 10 ⁻¹⁴

JUTA GP® SAM complies with the latest codes of practice as published by BRE, CIRIA and BSI (BS 8485:2015).

Contact us to find out more information.
info@juta.co.uk | 01772 754177 | JUTA.CO.UK
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JUTA

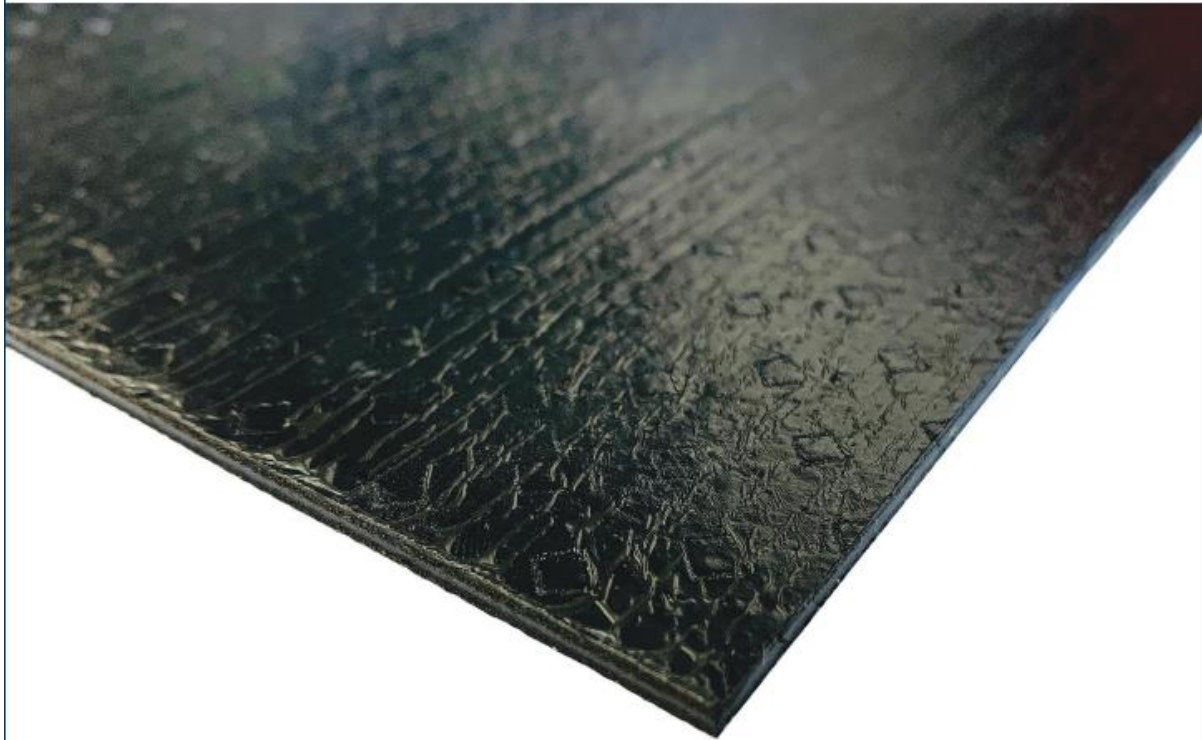


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PRECON PROTECTION BOARD



PRECON PROTECTION BOARD is a tough, high quality, semi flexible modified bituminous board used as a protection layer for various waterproofing systems.

PRECON PROTECTION BOARD consists of a modified bitumen compound, embedded between two layers of saturated reinforcements such as fibreglass or composite mat, providing a robust protection board with superior resistance to damage and deviation.



KEY FEATURES

- Semi flexible yet robust.
- High tolerance to normal soil and structural movements.
- Resistant to penetration of backfilling materials and accidental damages from site operations.
- Water resistant towards wet soil conditions.
- Cost saving by eliminating the need for screed, masonry protection.
- Compatible with most waterproofing systems, especially bituminous systems.
- Time saving and easy to install.
- Resistant to chemicals and salts found in soil.

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