



Reference: **345-20-520.2544**

Date: **27th April 2021**

Darlow Lloyd Construction Limited

8 Village Farm
Village Farm Industrial Estate
Pyle
CF33 6BL

For the attention of: **Mr Keeron Davies**

**GAS PROTECTION VALIDATION REPORT
SWANSEA BAY TECHNOLOGY CENTRE**

Dear Keeron,

Further to your subcontract order reference ECM 8414 dated 1st October 2020, we are pleased to present the verification report for the installation of gas protection measures for the above named site.

1.0 INTRODUCTION

The development comprises the construction of a new steel framed building with a lift shaft located in the central part of the building. The building is to be constructed with piled foundations and ring beam together with a 250mm thick reinforced suspended concrete slab placed over an insulation layer and gas membrane installed on suitably prepared existing ground.

The Remediation Strategy for the site has been produced by Terra Firma (Wales) Limited (Job Reference 15773, dated October 2020), which details the verification and validation process and requirements for the installation of the gas protection.

ASL were requested to undertake independent validation of the gas membrane installation which was installed by Darlow Lloyd Construction Limited an experienced general builder and groundworker.

The following measures have been incorporated into the construction scheme.

- Visqueen Gas Barrier membrane installed to reasonable levels of workmanship;
- CQA of installation works with independent validation;
- Integrity testing comprising air lance testing of seals.

These verification works have been completed based on the Remediation Strategy included in Appendix I. Specification drawings for the installation of the gas protection measures are included in Remediation Strategy.

2.0 VERIFICATION WORKS

The site was visited on three occasions namely the 15th December 2020 to view the installation of the self adhesive gas membrane to the lift shaft; on 1st April 2021 to visually inspect areas 1 and 2 and carry out air lance testing and on 8th April 2021 to visually inspect areas 2 and 3.



The works observed on visits 2 and 3 included the placement of the Visqueen gas membrane, the sealing of joints and sealing of penetrations through the membrane and the general standard of the installation works completed. Large parts of the installed membrane were inspected before and after the placement of the reinforcement.

All defects detected by the visual inspection and air lance integrity testing carried out by ASL were resealed by the installer using self-adhesive patches to the satisfaction of the verifier.

In accordance with the required verification, more than 50% of the membrane has been inspected (ASL have seen all of the installed membrane) and air lancing has been completed on at least 25% of joints.

3.0 INSPECTION FINDINGS

The findings of the inspections are as follows:

The membranes installed were a Visqueen Gas Barrier membrane and self adhesive gas membrane around columns and for detailing, the technical data sheets for which are included in the Remediation Strategy. The membrane has been installed to an appropriate standard with all joints and penetrations sealed. Photographs showing the general standard of the installations works are included in Appendix II. The gas validation inspection sheets are included in Appendix III.

The general standard of the installation works was high and care was being taken to protect the membrane during the installation works.

Further to these inspections we can confirm that the gas protection measures installed within the development meet the required standard.

We trust this meets with your requirements and please contact us with any queries.

Yours sincerely
for **ASL**

PETE WILTON
Principal Engineer

M: 07545 206 289
E: pete.wilton@aslenvironmental.co.uk
W: www.aslenvironmental.co.uk

Encl:
Appendix I Gas Verification Plan
Appendix II Photographs
Appendix III Site Inspection Sheets



APPENDIX I

GAS PROTECTION VERIFICATION PLAN



Remediation Strategy & Ground Gas Protection System Verification Plan

Prepared For: Morgan Sindall Construction & Infrastructure Ltd

Issue Date: October 2020

Job No: 15773

REPORT TITLE : Remediation Strategy & Ground Gas Protection System Verification Plan: Proposed Commercial Development, Swansea Bay Technology Centre, Central Avenue, Port Talbot

REPORT STATUS : Final

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Document Revision Record

Issue Number	Date	Revision Details
1	09/10/2020	Initial publication

	Name	Signature
Prepared	James Rhys-Williams BSc Geol. (Hons) FGS	
Checked	Mathew Lake MEng FGS Tech IOSH	
Approved	Gwyn Lake BSc (Hons). PhD, CGeol, FGS	

This document is reviewed annually and was last reviewed and authorised on _24/08/2020_

All amendments made to this document are detailed on the Document Revision & Amendment Register BMS-CR-002 and authorised by the appropriate personnel.



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SECTION 1 Introduction and Proposed Development

1.1 Introduction

Morgan Sindall Construction & Infrastructure Ltd (the Client) is proposing the commercial development of a mixed use three storey structure at Central Avenue, Port Talbot SA12 7AX.

Terra Firma (Wales) Limited have been commissioned by the Client to prepare a remediation strategy and ground gas protection system verification plan (Verification Plan) report for the site.

Previous investigations and assessments have identified that remediation of contamination is required for the development including the incorporation of a ground gas protection system. This report presents a Remediation Strategy for the site based on these previous investigations and assessments and a detailed Verification Plan.

1.2 Objectives

The objective of the Remediation Strategy and Verification Plan is to detail the remedial steps that are required to render the proposed development fit for its intended use and to provide a detailed methodology to facilitate the validation of the ground gas protection system installation.

In summary, the following remediation requirements have been identified and are covered in detail in this report.

- Installation of a ground gas protection system in the proposed structures

1.3 Previous Investigations and Assessments

The Remediation Strategy and Verification Plan is based on the findings of previous investigations and assessments. This report shall be read in conjunction with the following documents.

- Hydrock Consultants Ltd – Phase 1 Ground Conditions Desk Study, November 2019, Ref. 11852-HYD-XX-XX-RP-G-1001
- Terra Firma Wales Ltd – Geotechnical and Geoenvironmental Report, February 2020, Ref. 15773.
- Terra Firma Wales Ltd – Updated Detailed Ground Gas Risk Assessment, September 2020, Ref 15773

1.4 Roles and Responsibilities

Table 1.1 Roles and Responsibilities

Role	Organisation
Client	Morgan Sindall Construction & Infrastructure Ltd
Structural and Civil Engineer	Hydrock Consultants Ltd
Local Authority	Neath Port Talbot Council
Geotechnical & Geoenvironmental Consultant	Terra Firma Wales Ltd
Validator	Terra Firma Wales Ltd

1.5 Limitations and Exceptions

This report has been prepared for the sole internal reliance of the Client and its design and construction team. This report shall not be relied upon or transferred to any other parties

without the express written authorisation of Terra Firma (Wales) Limited. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill. The report represents the findings and opinions of experienced geo-environmental and geotechnical consultants. Terra Firma (Wales) Limited does not provide legal advice and the advice of lawyers may be required.

It is not within the scope of Terra Firma (Wales) Limited to:

- Provide Method Statements and Risk Assessments for the site remediation, preparation and development.

1.6 Quality Assurance

The quality and environmental aspects of the assessment and investigation comply with UKAS Accredited ISO 9001:2015 and ISO 14001:2015 standards.

1.7 Verification Officer Competency

The principal Verification Officer at Terra Firma (Wales) Ltd is Mr James Rhys-Williams.

Mr Rhys-Williams is currently enrolled on the ABBE Quality Accredited Level 4 NVQ Diploma in Verification of Ground Gas Protection Systems and has previously attended a one-day practical course on membrane installation and verification, conducted by Mr N. Salvidge at Capital Valley Plastics Ltd in 2018. Furthermore, he is a full member of the British Verification Council (BVC) with instant access to industry peers.

Mr Rhys-Williams has extensive experience in brownfield land investigation, risk assessment and site remediation gained while working for various geotechnical and geoenvironmental contractors and consultants since 2014.

Mr Rhys-Williams holds a bachelor honours degree in Geology obtained from the University of Bristol in 2010 and is a fellow of the Geological Society of London, maintaining regular industry related continuous professional development.

SECTION 2 Site Characteristics

The following subsection information has been summarised from previous investigation and assessments listed in **Section 1.3**.

2.1 Site Location and Description

The development site locates on a landscaped grassed area within the grounds of Baglan Bay Innovation centre building, positioned immediately to the east. The proposed structures centres on an approximate National Grid Reference of 274038 192972, occupying a total plan area of approximately 1.8 Hectares.

The site is currently accessed from Central Avenue to the southwest.

The site elevation is approximately 8m AOD and generally level.

The site location can be seen on **Figure 2.1** along with the proposed site layout in **Drawing 01**.



Figure 2.1 Site Location

2.2 Site History Summary

The development area is largely designated as marsh (saltings) until c.1977. From 1899 the Rhondda and Swansea Bay railway is shown crossing the site adjacent and parallel with the eastern boundary. Post 1977 the site situates towards the periphery of BP petrochemicals

plant on undeveloped ground and a railway branch line is shown to the northeast corner of the site. The adjacent Baglan Bay Innovation Centre and associated car park was constructed between 2006 and 2019 with the above mentioned railways dismantled prior to this.

2.3 Geology and Ground Conditions

The 1:50,000 scale geological map of the area (Sheet 247) was consulted for geology underlying the site. The site is shown to be underlain by the South Wales Middle Coal Measures which is Carboniferous in age. The rocks are grey coal bearing mudstone and sandstone with seatearth and minor sandstone.

Superficial deposits of Tidal Flat Deposits are recorded at the site.

Made ground is anticipated at the site.

The ground conditions encountered during the site investigation can in general be summarised as shown in **Table 2.1**.

Table 2.1 Summary of Ground Conditions

Depth (m)			Thickness (m)	Stratum
0.00	-	1.00/3.30	1.00/3.30	Variable MADE GROUND .
1.00/3.30	-	12.40/14.00	9.40/10.70	Very soft to soft dark grey locally peaty CLAY interbedded with loose to medium dense dark greyish brown SAND .
12.40/14.00	-	13.90/15.00	-	Dense to very dense dark grey sand sandstone GRAVEL. (PROBABLY WEATHERED BEDROCK)

2.4 Radon

The site is located in a lower probability radon affected area, as between 1% and 3% of properties are above the action level.

No radon protective measures are required for new developments on the investigation site.

2.5 Groundwater

Hydrock Consultants Limited (2019) report identifies the superficial Tidal Flat deposits to have a secondary undifferentiated aquifer. Secondary undifferentiated is assigned in case where it has not been possible to attribute either category A or B to the stratum. Bedrock is recorded to have a secondary A aquifer. Secondary A aquifers are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

Groundwater was recorded between 1.00m to 2.60m in exploratory holes during the investigation and subsequent monitoring.

2.6 Identified Contamination

2.6.1 Ground Gasses

Ground gas monitoring was undertaken by Terra Firma Wales Ltd as part of the investigation and detailed ground gas risk assessment at the site.

Methane derived from the decomposition of organic material in clay soils was recorded.

The findings of assessment categorised the site to have a gas characteristic situation 2 (CS2).

2.6.2 Groundwater

Elevated levels of Arsenic, Copper, TPH and Naphthalene were recorded in groundwater.

Given the benign contaminant nature of the overlying made ground and no obvious historical on-site source of contamination, it is considered the identified contaminants of concern are relicts of the industrial heritage of the area and derive from historical offsite sources.

The volatility of organic compounds was also assessed during the investigation, no significant volatiles were recorded.

SECTION 3 Sources of Contamination Requiring Remediation

The summary of the refined conceptual site model is presented in **Table 3.1** and based on findings of previous investigations and assessments, detailing significant pollutant linkages requiring remediation or mitigation.

Table 3.1 Summary of Significant Pollutant Linkages

Source	Pathway	Receptor
Methane – decomposition of organic material in soils	Horizontal migration through peaty clay soil, vertical migration along pile annulus/historical boreholes and indoor accumulation in confined spaces e.g. lift pit. Explosion and asphyxiation from depletion of oxygen	Future Site Users – Staff and Visitors
Groundwater – Arsenic, Copper, TPH, Naphthalene,	Dermal contact, Ingestion of contaminated waters	Construction & Maintenance Workers

SECTION 4 Proposed Remedial and Mitigating Measures

4.1 General

Based on the finding of previous investigations and assessments and the identified pollutant linkages the following remedial measures have been devised for the site.

Specific validation requirements for the proposed remedial measures are discussed in the following section.

4.2 Groundwater

4.2.1 Protection of Construction & Maintenance Workers

The exposure to groundwater contaminants during construction works presents a risk to construction and maintenance workers through, dermal contact or ingestion.

Identified pathways would be easily mitigated against with the appropriate implementation of personal protective equipment, details of which are to be presented in method statements and risk assessments prepared by site contractors.

It is therefore essential that the contractor puts in place adequate measures to ensure the safety of all workers.

Mitigation measures should be detailed in Contractor Risk Assessment and Method Statements as well as the Principle Contractor Construction Management Plan in accordance with CDM regulations.

4.3 Ground Gasses (Methane)

4.3.1 Protection of Future Site Users (Staff and Visitors)

Future site users are at risk of asphyxiation and explosion from the horizontal migration through strata and vertical migration along pile annuluses or redundant boreholes. Potentially resulting in the accumulation indoors of methane gasses in confined spaces.

Gas protection measures will be required at the site to effectively sever the link between the source and receptor.

The site has been classified as 'Gas Characteristic Situation 2' (CS2).

In accordance with Table 4 of BS8485:2015+A1:2019 a minimum gas protection score of 2.5 is required for a 'Type C' structure.

Building structure types are discussed in Section 7.1 of BS8485:2015+A1:2019, any variation to the above may require further assessment and the assignment of a new gas protection score.

To achieve a minimum gas protection score of 2.5 for the proposed construction methods, the following gas protection measures are itemised in **Table 4.1**.

Table 4.1 Gas Protection Score

Gas Protection Method	Score (BS8485)
Cast in-situ monolithic reinforced ground bearing floor slab with some penetrations.	1.0
Gas resistant membrane (satisfying BS8485:2015+A1:2019 Table 7 requirements)	2.0

Validation of gas protection measures will be required in accordance with CIRIA publication C735:2014.

SECTION 5 Validation of Remedial and Mitigating Measures

5.1 Introduction

The following remedial measure will require verification and inclusion within a Validation Report:

- Ground gas protection system (design and installation)

Mitigation measures to deal with groundwater contaminant pathways should be detailed in Contractor Risk Assessment and Method Statements as well as the Principle Contractor Construction Management Plan in accordance with CDM regulations. Formal submission of a validation report detailing these measures will not be required.

5.2 Ground Gas Protection System

Ground gas protection system installation will require verification and inclusion within a Validation Report.

Verification of the ground gas protection system will be carried out in accordance with CIRIA publication C735:2014.

Verification of the gas protection system will be carried out by an experienced, qualified, trained and independent verifier. Documents demonstrating the above shall be included in the Validation Report.

5.3 Risk Assessment

In general accordance with CIRIA C735:2014 risk based verification approach the proposed development is considered to have an overall **Intermediate Risk**. This assessment is based on the perception of risk as summarised in **Table 5.1**.

Table 5.1 Perceived Risk Assessment

Risk Factors	Risk Level		
	1	2	3
Gas Regime – CS2	1	2	3
Design Complexity – Simple	1		3
Number of Buildings – Small	1	2	3
Installation Workforce – Skilled Installer	1		3
VOC – No	1		3
Notes: Classification of Risk – Low risk 5; Intermediate Risk 6-7; High Risk 8-15			

It is proposed to use a piled foundation. Piled foundations have the potential to create a vertical gas pathway risk.

Several boreholes were installed as part of the initial ground investigation. Historical borehole installation not decommissioned prior to development have the potential to create a preferential gas pathway to surface.

Groundwater is recorded at shallow depths of between 1.00-2.60m therefore will likely interact with the gas protection system within submerged features, such as the lift pit. It is anticipated the lift pit construction will be under hydrostatic water pressure.

5.4 Gas Protection Measure Construction Details

The development comprises 1No. 'Type C' commercial building. The structure is rectangular in shape and occupies a plan area of approximately 994m² and an external wall perimeter of approximately 144m.

The structure is approximately orientated along a southeast northwest axis.

Technical drawings showing the proposed gas protection measures in construction are presented in **Annex A**.

5.4.1 Structural Barrier

The structural barrier is to comprise a cast in-situ reinforced concrete slab with a minimum thickness of 250mm. Structural barriers of this nature provide very effective ground gas protection.

Key factors to consider are the sealing of construction joints between floor slab pours and sealing of all service entries through the slab.

5.4.2 Ventilation

Substructure ventilation measures are not required to meet the minimum score as directed by BS8485:2015+A1:2019.

5.4.3 Membrane

The membrane is to be installed by an experienced and qualified installer. All operatives are to be experienced and competent, with a minimum of one operative holding an NVQ L2 qualification in gas protection installation.

The Client has specified that Visqueen Gas Barrier membrane is to be used. Alternative products may be used providing they are suitably assessed and meet or surpass the performance specification for Visqueen Gas Barrier membrane.

The membrane is to be placed on a sand blinding layer (50mm) over a well compacted Type 1 material with a minimum thickness of 200mm. The membrane to be positioned beneath the reinforced slab structural barrier protected using Visqueen TreadGAURD 300. The membrane is to be taken up the external edge of the slab and incorporated below the damp proof course in the outer masonry wall. Detailed drawings showing the membrane in construction are shown in **Annex A**.

A polyform cavity fill or similar material to support the membrane should be used.

Table 5.2 Membrane Specification Compliancy

Visqueen Gas Barrier
BBA Certificate – 13/5069
Thickness – 0.4mm thick (between scrim) tested in accordance with BS EN 9863-1:2016+A1:2019. Overall thickness 0.66mm. Suitably thick , manufacture confirms material is suitable for heat welding by specialist installer.
Permeation Rates – Methane permeability rate of <0.15ml/m ² /d/atm tested in accordance with BS IS 15105-1:2007. Considered sufficiently impervious .
Tensile Strength & Elongation – Mass per unit area of 400g/m ² (Average 370g/m ²) tested in accordance with BS EN 1849-2:2019. Tensile yield MD 12.5kN/m, CD 7.3kN/m, Yield

elongation CD >19%, tested in accordance with. ASTM D4885-01/02/04. **Considered suitable strong**, membrane to be loosely laid to accommodate settlement.

Puncture/Impact Resistance – Tested in accordance with BS EN ISO 12236:2006. CBR Puncture resistance of 1114N. Impact resistance 200mm (hard surface), 1000mm (soft surface) BS EN 12691:2018. **Protection required.**

Tear Strength – Angle method B, MD 53.5N, CD 60.6N (BS ISO 34-1:2015). **Measures to be taken to avoid damage from wind and protected from follow on trades.**

Durability – Long exposure to UV light will likely reduce its effectiveness. It is considered suitably durable to remain serviceable for the anticipated life of the building.

Satisfies standards to be used as a damp protection. Building Regulation Part C.

CE marked EN13967:2017

It is considered that performance specification of Visqueen Gas Barrier complies with the performance specification in BS8485:2015+A1:2019 Table 7 and key performance properties reported in CIRIA C748:2014. However, additional measure are to be taken to protect the membrane from impact or puncture and tearing.

In addition, the membrane installation will need to be verified in accordance with CIRIA C735:2014 to fully satisfy the requirements of BS8485:2015+A1:2019 Table 7.

During storage membrane rolls must be stacked on a flat surface, kept under cover and protected from sunlight and mechanical damage.

The membrane should not be installed in temperatures below 5°C.

Prior to installation a sand blinding layer of 50mm nominal thickness is to be compacted. The substrate should be free from debris, voids or other protrusions which may compromise the gas protection system.

The membrane should be rolled out with the Blue side facing up.

It is recommended that all joints are heat welded where applicable. A suitably experienced installer should be appointed to undertake this skilled work. However, Visqueen Pro Double Sided Jointing Tape may also be used, providing membrane sheets are overlapped by at least 150mm and laps further sealed with Visqueen Foil Lap Tape. Visqueen Foil Lap Tape is only to be applied post Verification. Tapes will prove to be unsuitable in damp or wet conditions.

If the membrane is damaged a patch of the same material should be lapped at least 150mm beyond the limits of the damage bonded with Visqueen Pro Double Sided Jointing Tape and lap sealed with Visqueen Foil Lap Tape. Alternatively a patch may be heat welded. Where a puncture is minimal, a patch may be formed using Visqueen Pro Detailing Strip lapped at least 150mm beyond the extents of the puncture.

Membrane lap locations should be positioned away from proposed slab casting joints to avoid any vertical connectivity.

All direction changes should be detailed using Visqueen Pro Detailing Strip lapped at least 150mm beyond the nearest membrane joint.

Membrane and accessory data and technical sheets, certificates and installation guides are presented in **Annex B**.

Upon completion of membrane installation workmanship should be verified by a suitably experienced, qualified, trained and independent verifier.

It is recommended that Installers prepare a daily log sheet during the works which can conveniently be used to record progress made, materials used (batch ID etc), repairs or defects. This log sheet should be submitted to the verifier to aid in the verification process. An example daily log sheet is presented in **Annex C**.

The membrane is to be covered by Visqueen TreadGUARD 300 as soon as practicably possible post installation and post Verification. This woven fabric material is designed to protect the underlying membrane during the reinforcement mesh installation and slab pour. Extreme care is still to be taken during reinforcement placement.

Visqueen TreadGUARD 300 is to be overlapped by a minimum of 100mm and weighted down using clean bricks or secured to the underlying membrane using Visqueen Pro Double Sided Jointing tape. Once positioned, the concrete must be poured within 30 days.

Any rips, punctures or defects identified during the verification process will be recorded by the verifier, repaired by the installer and re-inspected at a later date to check for conformance.

5.4.4 Service Entries

All service penetrations should be detailed in accordance with the manufacturer specifications. Prefabricated Visqueen Ultimate Top Hat Units and Jubilee Clip are considered suitable. Top hat units may be heat welded or taped.

Service penetrations should be installed at least 50mm away from walls, obstructions and other penetrations to allow for the correct installation.

Ducting style service entries are considered a significant conduit for harmful gasses to enter properties. All service entry ducts are to be sealed in accordance with published guidance presented in BRE414:2001 Section 10.

Duct seals will need to be verified upon completion of the works.

Membrane and accessory data and technical sheets, certificates and installation guides are presented in **Annex B**.

5.4.5 Stanchions

All stanchion sealing should be detailed in accordance with the manufacturer recommendations.

Visqueen Pro Detailing Strip lapped at least 150mm horizontally and vertically is considered suitable.

Installation guides are presented in **Annex B**.

5.4.6 Lift Shaft

One lift shaft is to be incorporated into the proposed structure. Detailed drawings showing the protection elements in construction are shown in **Annex A**.

Ground gas protection measures comprise a combination of Visqueen Gas Barrier beneath the reinforced waterproof concrete lift shaft base and Visqueen Gas Resistant Self Adhesive Membrane secured to the external reinforced waterproof concrete shaft structure. Concrete joints are to be further sealed using Sikaswell 2010 Hydrophilic Stips.

Visqueen Gas Barrier membrane positioned beneath the lift shaft base will need to be sealed to the exposed pile caps. To form an effective sealed Visqueen Liquid Gas Membrane should be appropriately applied as per the manufacturer on-site usage technical datasheet (**Annex B**). A minimum of four coats is required and should be left to completely dry before application of successive coats.

To protect the membrane below the lift shaft concrete base from damage, heavy duty Visqueen TreadGuard 1500 should be placed above the membrane upon completion of the installation and Verification.

Visqueen Gas Resistant Self Adhesive Membrane should be installed as per the manufacture recommendations secured on the primed concrete surface. Priming should comprise Visqueen HP Tanking Primer. The primed surface should be covered with membrane within 24hrs of application.

Typical methods for sealing and connecting ground gas protection components are provided in **Annex B**.

Although these ground gas protection elements provide a degree of waterproofing, no risk assessment has been undertaken by the author for their effectiveness against groundwater ingress. Any waterproofing requirements as detailed in a risk assessment should be provided in addition to the ground gas protection measures stated.

Due to the presence of shallow groundwater, lift pit land drainage would prove ineffective in this scenario.

5.5 Proposed Development Programme

Construction of the substructure will be sequenced concurrently from west to east in 3 or 4 zones. **Table 5.3** summarises the process.

Table 5.3 Substructure Development Programme

Week	1	2	3	4	5	6	7 etc.
Blinding	Zone 1	Zone 2	Zone 3	Zone 4			
Columns		Zone 1	Zone 2	Zone 3	Zone 4		
Membrane			Zone 1	Zone 2	Zone 3	Zone 4	
Mesh			Zone 1	Zone 2	Zone 3	Zone 4	
Pour				Zone 1	Zone 2	Zone 3	Zone 4
Frame					Zone 1	Zone 2	Zone 3

Lift pit formation and construction will commence at an earlier stage in the development.

5.6 Maintaining the Integrity of Gas Protection Measures

In the intervening period between installation of the membrane, placement of reinforcement and pouring of concrete for the slab, membrane must be protected from high footfall traffic. To achieve this Site Management will put in place exclusions to limit access to plant and personnel to completed zones.

To protect the membrane from footfall and puncture during reinforcement placement Visqueen TreadGURAD 300 is to be installed above the membrane. Site Management is to strictly control this process to avoid damage to the membrane and report to the Verifier any damage that may occur.

During casting of the slab the membrane and protection layer is to be appropriately secured to the formwork without risk of damage.

Where the membrane may be exposed at level thresholds and subjected to high footfall during the superstructure construction phase, temporary protection should be placed on top of membrane. It is considered that thin plyboard sheets would be adequate for this purpose.

Follow on contractors should be made aware of the ground protection system in place. It is essential that the integrity of all gas protection measures is maintained post-verification and not damaged by any subsequent construction works.

Prior to the commencement of the membrane installation it is recommended a tool box talk on safeguard and upkeep measures should be undertaken. Site management along with membrane installers, ground workers the verifier and other subcontractors (if applicable) should be present.

Accidental damage to the membrane system should be reported to the verifier, rectified and re-inspected at a later date.

A final inspection may be required.

5.7 Required In-situ Integrity Testing & Evidence

With respect to the perceived risk assessment (**Table 5.1**) and in general accordance with CIRIA C735 Table A2 (**Intermediate risk**) the level of verification and integrity testing to be included within the Validation Report for the construction are presented.

Before commencement of the works, the installer contractor should produce a detailed installation plan including a method statement, CQA procedures and qualifications. On receipt of these documents' verification protocol could be increased or reduced.

Consideration will be given to the need for further integrity testing if concerns are raised by visual and air lance testing. If further integrity is carried out appropriate pro forma are to be produced by the Verifier.

It is recommended that the membrane Installer fill out a daily log sheet to be submitted to the Verifier on completion of the works.

5.7.1 Methodology

With reference to CIRIA C735 Table A2.

- **Groundworker** to provide Verifier photographic evidence of decommissioned boreholes.
- **Independent Verifier** to conduct a thorough visual verification of lift pit base membrane installation and pile cap sealing, including sub grade acceptance. Photographic evidence to be collected and inspection proforma to be prepared.
- **Independent Verifier** to air lance all lift pit base membrane joins to ASTM D4437. Results to be recorded on inspection proforma.
- **Groundworker** to provide Verifier photographic evidence of lift pit base membrane protection.
- **Groundworker** to provide Verifier photographic evidence of lift pit walls priming and self adhesive membrane installation.
- **Skilled Membrane Installer** to provide daily log sheets, or sign-off sheets to be submitted to the Verifier.

- **Independent Verifier** to conduct a thorough visual verification of the membrane prior to 50% of concrete pours (Zones 1 & 2), including sub grade acceptance. Photographic evidence to be collected and inspection proforma to be prepared.
- **Independent Verifier** to air lance 25% of all joins, pipe penetrations etc. to ASTM D4437 (Zone 1). Results to be recorded on inspection proforma. The remaining joints, pipe penetrations and corners etc. may be tested to a recognised standard by the Installer. Details of which are to be included in the Installer method statement and CQA plan (this needs to be submitted to the Verifier in advance of the works and approved). Alternatively the independent verifier is to initially air lance 50% of all joins, pipe penetrations etc. to ASTM D4437 (Zone 1 & 2) with potential of increasing this further depending on initial findings.
- **Independent Verifier** to consider further need for/scope of in-situ integrity testing based on inspection findings. Additional in-situ testing might include leak detection (i.e. smoke, tracer gas or dielectric). Testing to be undertaken initially on 10-25% of total area falling to 0-10% of total area if acceptable results obtained. Results to be recorded on inspection proforma.
- **Groundworker** to provide Verifier photographic evidence of protection fleece installation and post placement of reinforcement, for each zone.
- **Groundworker** to provide Verifier photographic evidence of service entry sealing to BRE Report 414 standards upon completion.

5.8 Validation Report

The Validation Report should present a detailed description of the ground gas protection measures applied and lines of evidence gathered during verification processes to confirm that protection measures have been installed as per the Verification Plan and satisfy the remedial objectives, severing the pathway between the source and receptor.

As a minimum the Validation Report should include.

- Description of the as-built protection measures installed and any variation in design from the Verification Plan.
- Details of the Installer and relevant qualifications
- Details of the Verifier independency and relevant qualifications
- Verifier proformas and integrity testing results
- Visual inspection photographic evidence
- Installer daily log sheets
- Details of non-conformances and how they were rectified
- Statement based on the presentation of lines of evidences and review of the site conceptual model confirming that the discussed gas protection measures achieve the remedial objectives set out in the Verification Plan

SECTION 6 Working Practices

6.1 Protection of Construction Workers

In order that construction workers are protected during site works across the site the following should be adhered to:

1. Compliance with health and safety regulations
2. Provision of Method Statements and Risk Assessments
3. Compliance with Control of Substances Hazardous to Health (COSHH) Assessment
4. Good level of Personal Protection Equipment (PPE)
5. Good level of hygiene by site workers
6. Dust suppression measures
7. Emergency contingencies should be defined prior to commencement of site works

6.2 Protection of the Environment

During the remediation and construction periods, there is a risk to the environment and adjacent sites from de-watering, excavations, moving contaminated soil, drainage misconnections, discharges of perched groundwater to local surface waters or the ground, runoff from construction materials and/or exposed ground, wheel washing and oil or chemical spills.

A drainage plan should be devised, identifying manholes to prevent pollutants accidentally reaching surface water sewers. Temporary drainage measures may need to be put in place.

The contractor(s) must also strictly adhere to the Pollution Prevention Guidelines for Working at Construction and Demolition Sites (PPG6). This publication gives both advice and guidelines which should be followed with regards to the planning and preparation of site works, site drainage, delivery and storage of construction materials, the management of waste, good housekeeping in particular to prevent runoff of silt and other fines into nearby water courses, refuelling, concrete and what to do in the event of an emergency.

Within the documentation prepared by the contractor(s), the following information should be provided, but not limited to:

- Project Description
- Key participants/contractor(s)
- Technical procedures
- Phasing of works and approximate timescales
- Site plans to scale
- Details of consents or license needed
- Health and Safety, COSHH Assessment, Method Statements and Risk Assessments
- Emergency contingencies

In addition, the following precautions should also be taken.

- All potential chemicals and associated risks and emergency procedures for spills/leaks should be considered in the site risk assessment and the details provided to all site employees.
- Any potential pollutant materials or chemicals/detergents used on site should be adequately stored in suitable containers, with clear labelling.
- Any oil or hazardous substance containers and associated pipe works should be enclosed within a bund.
- Care taken during delivery of materials, with correct supervision and labelling detailing the substance and its quantities.
- All delivery drivers should be informed of procedures and restrictions.

- Any materials on delivery should be covered to ensure there is no spillage.
- Any detergents, paints, chemicals etc should not be allowed to be discharged into surface drains or water courses.
- Washing out and cleaning of concrete/cement plant should be carried out in a contained area with adequate measures to collect all run-off water.
- Security and prevention of vandalism, especially of oil drums/containers.

6.3 Management & Disposal of Soils

During site works excavations of the made ground are anticipated.

All materials excavated should be managed and stored appropriately in a controlled manner to ensure protection of site construction workers and neighbouring site users, and to prevent the transfer of contamination to other areas of the site.

If possible, and if levels allow, and excavated made ground should be retained on site and relocated beneath areas of hardstanding. This would provide the most sustainable approach and avoid landfill and haulage fees, disruption and aggravation of local residents caused by haulage lorries, and would avoid unnecessary CO₂ emissions.

Any movement and transfer of materials on site should be documented in materials management plan, in accordance with 'CL:AIRE Definition of Waste: Development Industry Code of Practice (DoW CoP)'.

Alternatively, excavated made ground may be disposed of at landfill. Prior to disposal classification of the material will need to be completed in accordance with Environment Agency protocol detailed in 'Technical Guidance WM3 – Waste Classification - Guidance on the Classification and Assessment of Waste'.

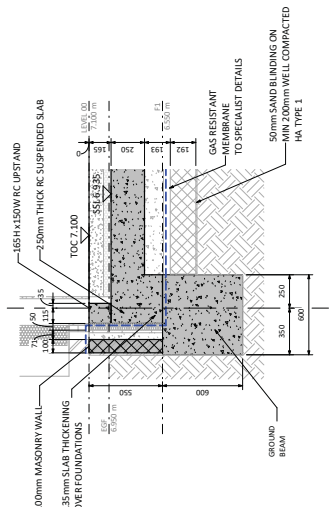
A contaminated land specialist should supervise and document any earthworks on site.

Waste transfer and disposal must be undertaken by an authorised person. A waste transfer note must accompany each load and records should be maintained for inspection if required

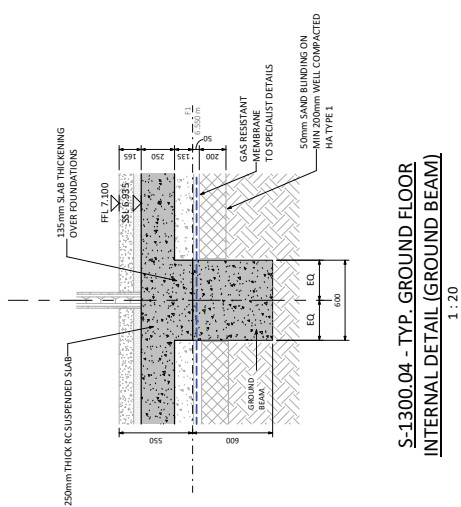
6.4 Groundwater Disposal

Groundwater resulting from dewatering on site will likely require offsite disposal as it was identified to be contaminated during prior investigations.

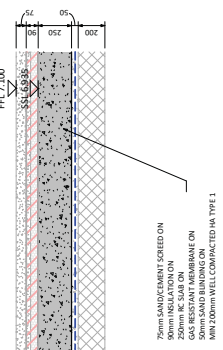
ANNEX A
Technical Drawings



S-1300.02 - TYP. GROUND FLOOR
PERIMETER DETAIL (GROUND BEAM)
1:20



S-1300.04 - TYP. GROUND FLOOR
INTERNAL DETAIL (GROUND BEAM)
1 : 20



S-1300.07 - TYP. GROUND FLOOR

P06	FOU	14/06/2020	MA	14/06/2020
P05	PROJECT DATA: SAFETY SHEET	24/06/2020	MA	24/06/2020
P04	FOODS AND DRINKS: 2019 AHSU - AHSU 1	01/07/2020	MA	01/07/2020
P03	SWAMP 4.0.0.0 - 03/07/2020	03/07/2020	MA	03/07/2020
P02	TENDER ISSUE	24/06/2020	MA	24/06/2020
P01	WORKER IN PROGRESS: TENDER ISSUE	14/06/2020	MA	14/06/2020
REV	WORKER IN PROGRESS: NOTIFICATIONS	31/07/2020	MA	31/07/2020
REVIEW	DATE	CHECKED BY	DATE	APPROVED BY

CLIENT	
PROJECT	SWANSEA BAY TECHNOLOGY CENTRE
TITLE	FOUNDATION & GROUND FLOOR DETAILS
PROJECT NO.	C-11852
SUBMITAL DESCRIPTION	As indicated
SUITABLE FOR COSTING	
ISSUING NO PROJECT	26X003-HYD-XX-ZZ-DR-S-20-1300
SUBMITAL	D1
	P06

ANNEX B
Manufacturer Data Sheets & Guides



Visqueen Gas Barrier

Features and benefits

- BBA certified - third party accreditation
- Complies with BS 8485:2015 + A1:2019 - industry standard for methane and carbon dioxide protection
- Flexible - easy to detail and install on site
- Multi functional - also acts as a radon and damp proof membrane
- Dual jointing methods - lap joints can be taped or heat welded

Product description

Visqueen Gas Barrier is a multi-layer reinforced polyethylene gas barrier with a 20 micron aluminium foil. The barrier is coloured blue on the upper surface and silver on the reverse. The product is supplied in single wound rolls (not folded), 2m x 50m.

Approvals and standards

- Third party accreditation (BBA 13/5069)
- Conforms to the specification requirements of BS 8485:2015 + A1:2019
- Suitable for all Characteristic Gas Situation (CS) ground gas regimes
- Conforms to the specification requirements of NHBC Amber 1 and Amber 2 applications
- Conforms to the specification requirements of BR 211:2015
- CE Mark EN 13967:2017
- Quality Management System ISO 9001:2015
- Occupational Health and Safety System ISO 18001:2007
- Environmental Management System ISO 14001:2015

Usage

Visqueen Gas Barrier is suitable for use in all types of buildings to prevent the ingress of harmful levels of ground gases e.g. methane, carbon dioxide and radon.

The barrier can be positioned above or below a solid concrete ground floor slab or above a precast suspended segmental ground floor system, e.g. beam and block floor.

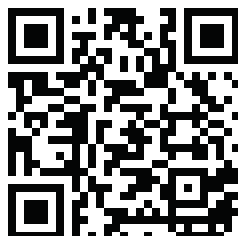
The barrier can also be used as a high performance radon membrane and/or damp proof membrane.

The product is not intended for use where there is a risk of hydrostatic pressure.

System components

- VisqueenPro Double Sided Jointing Tape, 50mm x 10m
- Visqueen Gas Resistant Foil Lap Tape, 75mm x 50m
- Visqueen Ultimate GR Lap Tape, 150mm x 10m
- Visqueen Ultimate Top Hat Units
- Visqueen Preformed Units
- VisqueenPro Detailing Strip, 300mm x 10m, 500mm x 10m
- Visqueen TreadGUARD 300, 2m x 75m
- Visqueen TreadGUARD 1500, 1m x 2m

Find your local stockist





Visqueen Gas Barrier

Storage and handling

Visqueen Gas Barrier should be stored horizontally, under cover in its original packaging.

Care should be taken when handling the product in line with current manual handling regulations.

Preparation

Visqueen Gas Barrier should be installed on a smooth continuous surface e.g. grouted beam and block floor, a compacted blinding layer e.g. 50mm thick sand blinding, or smooth concrete blinding. The substrate should be free from irregularities such as voids or protrusions.

The barrier can be cut with a sharp retractable safety knife or robust scissors.

Installation

Visqueen Gas Barrier should be loose laid on the substrate with the blue side up so as to avoid sunlight glare.

The barrier should be clean and dry at the time of jointing. It should be overlapped by at least 150mm, bonded with Visqueen Pro Double Sided Jointing Tape and sealed with Visqueen Foil Lap Tape. In demanding site conditions seal lap joints with Visqueen Ultimate GR Lap Tape.

Alternatively lap joints can be heat welded to achieve an effective seal. Welded lap joints can be less than 150mm provided the joint integrity is not compromised.

Airtight seals should be formed around all service entry points. Visqueen Preformed Top Hat Units should be used for sealing service entry pipes. The base of the top hat and the upstand should be bonded using Visqueen Pro Double Sided Jointing Tape and sealed with Visqueen Foil Lap Tape. The upstand should be secured with the supplied jubilee clip.

Forming an effective barrier to gases may give rise to complex three-dimensional detailing where, it is recommended Visqueen Preformed Units are used e.g. corners. Alternatively Visqueen Pro Detailing Strip can be used to seal awkward junctions.

If the barrier is punctured or perforated a patch of the same material should be lapped at least 150mm beyond the limits of the puncture and bonded with Visqueen Pro Double Sided Jointing Tape and sealed with Visqueen Foil Lap Tape. Alternatively a patch can be formed using Visqueen Pro Detailing Strip and lapped at least 150mm beyond the extents of the puncture.

The barrier should be covered by a protective layer as soon as possible after installation to prevent damage e.g. from following trades. Care should be taken to ensure that the membrane is not punctured, stretched or displaced when applying a screed or final floor covering. A minimum thickness of 50mm screed is recommended. When reinforced concrete is to be laid over the barrier the wire reinforcements and spacers must be prevented from puncturing the barrier. Where there is a high risk of potential damage, the barrier should be covered with Visqueen TreadGuard protection, screed, or other approved protection material before positioning the reinforcement.

Usable temperature range

It is recommended that Visqueen Gas Barrier and all associated system components should not be installed below 5°C.

Additional information

When used in accordance BS8485:2015 + A1:2019 a subfloor ventilation system or pressure relief maybe required
Where hydrocarbon or VOC contamination is present use Visqueen Ultimate VOC or HC Blok gas protection systems
To assist build sequencing, Visqueen GR DPC is available for gas protection through the wall constructions
For suspended beam and block floor detailing see GB-01
Visqueen Preformed Top Hat Units should be used at service pipe penetrations see GB-51
For internal and external corners Visqueen Ultimate Preformed Units should be used see PFU-553
To seal around steel columns use Visqueen Pro Detailing Strip see GB-52
For additional detailing information, contact Visqueen Technical Services +44 (0) 333 202 6800



Visqueen Gas Barrier

Property	Test method	Units	Compliance criteria	Result
Dimensions	EN 1848-2	m		2 x 50
Overall thickness including scrim mesh	EN 1849-2	mm		0.66
Effective thickness in between scrim mesh	EN 9863-1	mm		0.4
Mass	EN 1849-2	g/m ²	-0%/+5%	400
Tensile strength - MD	EN 12311	N	MLV	350
Tensile strength - CD	EN 12311	N	MLV	350
Tensile elongation - MD	EN 12311	%	MLV	20
Tensile elongation - CD	EN 12311	%	MLV	21
Joint strength	EN 12317-2	N	MLV	332
Watertightness 2kPa	EN 1928	-	Pass/Fail	Pass
Resistance to impact	EN 12691	mm	MLV	200
Dart impact	BS 2782	g	MDV	731
Low temperature flexibility	EN 495-5	°C	MDV	-40
Durability against ageing	EN 1296 and EN 1928	-	Pass/Fail	Pass
Durability chemical resistance	EN 1847	-	Pass/Fail	Pass
Resistance to tearing (nail shank) CD	EN 12310-1	N	MDV	358
Resistance to tearing (nail shank) MD	EN 12310-1	N	MDV	368
Resistance to static loading	EN 12730	kg	MLV	20
Water vapour transmission - resistance	EN 1931	MNs/g	MDV	7000
Water vapour transmission - permeability	EN 1931	g/m ² /d	MDV	0.03
Visible defects	EN 1850 -2	-	Pass/Fail	Pass
Reaction to fire	EN 13501-1	Class	MDV	F
BS 8485:2015 + A1:2019 testing requirements				
Mass	EN 1849-2	g/m ²	Average >370	400
Methane permeability	ISO 15105-1	mls/m ² /d/atm	Pass/Fail	<0.15
Puncture CBR	BS EN ISO 12236	N	MDV	1114
Impact resistance	EN 12691	mm	MDV	1000
Tensiles yield strength MD	ASTM D4885-01	kN/m	MDV	12.5
Tensiles yield strength CD	ASTM D4885-02	kN/m	MDV	7.3
Resistance to static loading	EN 12730	kg	>MLV	20
Yield elongation CD	ASTM D4885-04	%	MDV	19
Tear resistance - trouser method A - MD	BS ISO 34-1	kN/m	MDV	48.2
Tear resistance - trouser method A - CD	BS ISO 34-1	kN/m	MDV	44.8
Tear resistance - angle method B - MD	BS ISO 34-1	N	MDV	53.5
Tear resistance - angle method B - CD	BS ISO 34-1	N	MDV	60.6

Health and safety information

Refer to the Visqueen Gas Barrier material safety datasheet (MSDS).



Visqueen Gas Barrier

About Visqueen

The Visqueen name has long been recognised as one of the leading manufacturers of high quality advanced membrane technologies and design based solutions by specifiers, distributors, builders merchants and contractors throughout the UK and Europe.

For further guidance on the Visqueen services shown below, please refer to the relevant section of the Visqueen website (www.visqueen.com) or contact Visqueen Technical Services on +44 (0) 333 202 6800 or enquiries@visqueen.com

Complete Range, Complete Solution



Visqueen Technical Support

Visqueen combine an extensive product portfolio with industry leading levels of service and support which includes guidance over the phone, bespoke CAD drawings to help with complex detailing, electronic NBS specifications and access to a dedicated team of highly knowledgeable and experienced field based Technical Support Managers.

Visqueen Technical Support is available to all our customers including architects, specifiers, distributors, builders merchants, contractors and end users. All of our technical team have been awarded the industry recognised qualification Certificated Surveyor in Structural Waterproofing (CSSW).

Visqueen CPD Seminars

The Visqueen Continuing Professional Development (CPD) Seminars provide up-to-date information on changes within Building Regulations/Building Standards and nationally recognised industry guidance affecting damp proofing, water vapour control, hazardous ground gas protection and below ground structural waterproofing.

The one hour seminars have been produced for design specialists within the construction sector and are delivered by our team of Technical Support Managers.

Visqueen PI designs and special projects

From initial design to the completed project, Visqueen are with you every step of the way. Whether it be hazardous ground gas protection and/or below ground waterproofing protection employing barrier, structurally integral or drained systems, Visqueen can offer professional indemnity (PI) insurance for bespoke Visqueen design solutions.

Visqueen Technical Support Managers work with all stakeholders to provide cost effective Visqueen solutions offering complete peace of mind throughout the construction phase and beyond.

Visqueen Training Academy

Based at our manufacturing facility in Derbyshire, the Visqueen Training Academy is available to support Visqueen customers throughout the UK by providing a wide range of both theory and practical skills related training.

Courses include one day product awareness training for our distributors and builders merchants to help them in their day-to-day jobs, through to intensive three day courses giving detailed hands-on training in the practical skills required for safe and robust product installation.



Visqueen Gas Resistant Foil Lap Tape, 75mm x 50m

Features and benefits

- BBA certified jointing system - third party accreditation
- Complies with BS 8485:2015 + A1:2019 - industry standard for methane and carbon dioxide protection
- Good adhesion properties - provides an overlap seal to Visqueen gas protection membranes
- Joint integrity - stops poured concrete entering the lap joint
- Health and Safety - seals the exposed lap from risk of installer accidents

Product description

Visqueen Gas Resistant (GR) Foil Lap Tape is an overlap tape which has a solvent acrylic adhesive with a composite aluminium/PET carrier therefore it is resistant to alkaline which is present in cement and concrete. The tape also has a release film.

The product is supplied in roll format 75mm x 50m.

To be used in conjunction with Visqueen Pro Double Sided Jointing Tape 50mm x 10m.

Approvals and standards

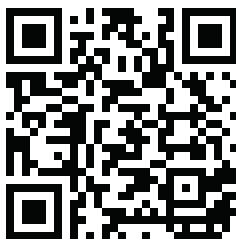
- Third party accreditation (BBA 13/5069)
- Conforms to the specification requirements of BS 8485:2015 + A1:2019
- Quality Management System ISO 9001:2015
- Occupational Health and Safety System ISO 18001:2007
- Environmental Management System ISO 14001:2015

Usage

Visqueen Gas Resistant Foil Lap Tape is used to bond lap joints on gas protection membranes. It can be used internally and externally and is suitable in compressed load applications.

System components

Find your local stockist



Visqueen Gas Resistant Foil Lap Tape, 75mm x 50m

Storage and handling

Store in warm, dry and clean environment in its current packaging. The tape should not be exposed to long periods of ultraviolet light. In very cold weather, prior to use ensure that the material is stored in warm conditions above 5°C.

Preparation

Ensure all surfaces are clean and dry. The membrane joint surfaces should be dry and free from contamination such as dust or sand. Ensure the surface and working area is not water logged. Avoid areas of unsupported jointing.

Installation

The membrane should be overlapped by at least 150mm, bonded with Visqueen Pro Double Sided Jointing Tape and sealed with Visqueen Gas Resistant Foil Lap Tape.

When using the GR Foil Lap tape, apply the tape equidistant over the lap area of the laid sheet and the overlap adjoining membrane. Apply pressure to the jointed area to ensure adhesion. Once the tape is applied, the completed lap should be well rolled with firm pressure to ensure a complete seal joint has occurred, and continuity with the adjacent sheet has been achieved.

Usable temperature range

It is recommended that the system components should be used above 5°C.

Additional information

In demanding site conditions seal lap joints with Visqueen Ultimate GR Lap Tape.

Visqueen Gas Resistant Foil Lap Tape, 75mm x 50m

Property	Result
Dimensions	75mm x 50m
Peel adhesion	750N/m
Adhesive type	Solvent acrylic

Health and safety information

Please refer to material safety datasheet.

Visqueen Gas Resistant Foil Lap Tape, 75mm x 50m

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Visqueen Gas Resistant Self Adhesive Membrane

Features and benefits

- BBA certified - third party accreditation
- Type A Barrier Membrane (Tanking Membrane) - resistant to ground water in accordance with BS 8102:2009
- Complies with BS 8485:2015 + A1:2019 - industry standard for methane and carbon dioxide protection
- Flexible - easy to detail and install on site
- Multi functional - also acts as a radon and damp proof membrane
- Self adhesive application - no jointing tapes required

Product description

Visqueen Gas Resistant Self Adhesive Membrane is a foil lined modified bitumen rubber membrane with a self adhesive coating protected by a removable polyethylene release film. The product is silver on the upper surface and supplied in rolls 1m x 20m.

Approvals and standards

- Third party accreditation (BBA 15/5208)
- Suitable for use as a Type A Barrier Membrane (Tanking Membrane) to BS 8102:2009
- Conforms to the specification requirements of BS 8485:2015 + A1:2019
- Conforms to the specification requirements of BR 211: 2015
- CE Mark EN 13969:2004
- Quality Management System ISO 9001:2015
- Occupational Health and Safety System ISO 18001:2007
- Environmental Management System ISO 14001:2015

Usage

Visqueen Gas Resistant Self Adhesive Membrane is a cold applied product, suitable for use as a Type A Barrier Membrane (Tanking Membrane) for above and below ground applications e.g. basements, retaining walls and lift pits.

It is also suitable for use in all types of buildings to prevent the ingress of harmful levels of ground gases e.g. methane, carbon dioxide and radon.

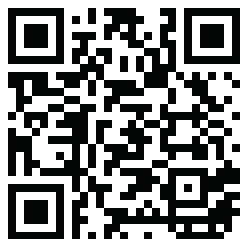
The membrane can be applied to a variety of substrates including concrete, blockwork, brickwork, particle boards and steelwork, in both vertical and horizontal applications.

The membrane can be used to achieve waterproofing to Grades 1, 2 and 3 as defined in BS 8102:2009.

System components

- Visqueen HP Tanking Primer, 5L
- Visqueen Ultimate Top Hat Units
- Visqueen TreadGUARD 1500, 1m x 2m
- Visqueen Protect&Drain
- Visqueen Pile Cap Sealer, 25kg
- Visqueen VX25 Waterstop, 20mm x 25mm x 5m

Find your local stockist



Visqueen Gas Resistant Self Adhesive Membrane

Storage and handling

Visqueen Gas Resistant Self Adhesive Membrane should be stored vertically under cover in its original packaging.

Care should be taken when handling the product in line with current manual handling regulations.

Preparation

All surfaces to which Visqueen Gas Resistant Self Adhesive Membrane are to be applied should be free from cavities or projections, have a smooth finish, be dry and free from dust, loose particles and frost. The surface should be sealed using Visqueen HP Tanking Primer and allowed to dry thoroughly.

When applying to blockwork or brickwork the joints must be flush pointed. In demanding applications the masonry face must be rendered prior to applying the membrane.

The membrane can be cut with a sharp retractable safety knife.

Installation

Visqueen Gas Resistant Self Adhesive Membrane lap joints should be a minimum of 150mm and should be pressed and rolled to form a continuous bond and to ensure watertightness.

At 90 degree changes of direction a Visqueen Axiom UniSeal fillet should be formed prior to membrane installation.

For vertical applications cut the membrane to a suitable length allowing an additional 150mm for laps. Position and peel back release film and apply the self adhesive face to the substrate. Apply pressure to ensure a full bond is achieved. Commence at the top of the wall and work downwards, progressively removing the release film.

For horizontal applications unroll the membrane where required allowing an additional 150mm for laps. Re-roll one half of the membrane and cut release film taking care not to damage the membrane. Roll out the membrane progressively removing the release film. Press the membrane onto the substrate e.g. using a soft broom to ensure full adhesion. Repeat for the other half of the roll.

Watertight seals should be formed around all service entry points. Visqueen Preformed Top Hat Units should be used for sealing service entry pipes.

If the membrane is punctured or perforated, a patch of the same material should be lapped at least 150mm beyond the extents of the puncture.

Where membrane protection is required e.g. when used externally on a retaining wall, the membrane should be protected from backfill with Visqueen Protect&Drain, which also provides a preferential pathway for ground gases.

When forming night joints, the upper edge of the membrane should be adequately secured e.g. bonding onto the top of the retaining wall, or if terminated on a vertical face, the upper edge should be secured with Visqueen Fixing Strip and Visqueen Fixings Pins for Masonry.

Usable temperature range

It is recommended that Visqueen Gas Resistant Self Adhesive Membrane and all associated system components should not be used below 5°C.

The membrane requires no additional bonding methods however during cold weather conditions the application of hot air to the self adhesive coating will aid adhesion.

Additional information

Where hazardous ground gases are not present use Visqueen Self Adhesive Membrane

Where concrete construction joints occur Visqueen VX25 Waterstop system should be incorporated see T-04

Where wall ties penetrate the membrane, seal with Visqueen Axiom UniSeal see T-41

When waterproof concrete is required, or for additional detailing information, contact Visqueen Technical Services +44 (0) 333 202 6800

Visqueen Gas Resistant Self Adhesive Membrane

Property	Test method	Units	Compliance criteria	Result
Length	EN 1848-2	m	-0%/+5%	20
Width	EN 1848-2	m	-5%/+5%	1
Thickness	EN 1849-2	mm	-5%/+10%	1
Mass	EN 1849-2	g/m ²	-10%/+10%	1100
Watertightness	EN 1928	kPa	MDV	60
Durability after artificial ageing	EN 1847	-	Pass/Fail	Pass
Durability against chemicals	EN 1847	-	Pass/Fail	Pass
Resistance to tearing (nail shank) MD	EN 12310-1	N	>	100
Resistance to tearing (nail shank) CD	EN 12310-1	N	>	100
Water vapour transmission properties	EN 1931	g/m ² /d	MDV	0.013
Resistance to static loading	EN 12730	kg	MLV	20
Resistance to Impact	EN 12691	mm	>	500
Reaction to fire	EN 13501-1		Class	F
Joint Resistance	EN 12317-1	N	>	30
Tensile properties - MD	EN 12311-2	N/mm ²	>	2
Tensile properties - CD	EN 12311-2	N/mm ²	>	2
Tensile elongation - MD	EN 12311-1	%	>	130
Tensile elongation - CD	EN 12311-2	%	>	130
Reaction to fire	EN 13501-1	Class	MDV	F
Methane permeability	ISO 15105-1	ml/m ² /d	MDV	<1
Radon transmission rate	SP RI.SE	m/s		4.7 x 10 ⁻⁹
Radon permeability	SP RI.SE	m ² /s		0.56 x 10 ⁻¹²

Health and safety information

Refer to the Visqueen Gas Resistant Self Adhesive Membrane material safety datasheet (MSDS).

Visqueen Gas Resistant Self Adhesive Membrane

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Visqueen HP Tanking Primer, 5L

Features and benefits

- No mixing required - use straight from the tin
- Rapid cure - quick and easy to install in one coat application
- Formulated primer - for below ground waterproofing membranes
- Adaptable - designed for horizontal and vertical applications
- Versatile - suitable for damp surfaces and green concrete

Product description

Visqueen High Performance (HP) Tanking Primer is a black elastomeric bituminous priming solution. The product is supplied in a 5 litre tin.

Approvals and standards

- BBA Certified with Visqueen Self Adhesive Membranes and TorchOn Tanking Membrane
- Quality Management System ISO 9001:2015
-

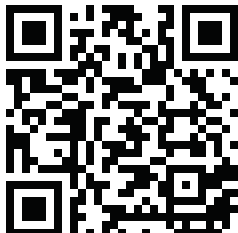
Usage

The primer can be used to prepare a variety of substrates including concrete, metal and masonry. It significantly improves the bond of the applied membrane.

It is designed to prepare surfaces prior to the applications of the Visqueen Self Adhesive Membranes and the Visqueen TorchOn Tanking Membrane.

System components

Find your local stockist





Visqueen HP Tanking Primer, 5L

Storage and handling

Store in an upright position, under cover and away from frost. Keep only in original container, in a cool, well ventilated space, away from heat sources. Keep the container closed when not in use.

Preparation

Inspect concrete surfaces for honeycombed areas and holes, if required bag-rub any irregularities or fill the surface with a suitable filler such as 3:1 mortar mix. All surfaces should be frost free, dry, smooth, clean, and free from oils, grease, condensation and other contamination. Remove areas of laitence or deleterious matter.

Installation

The High Performance Tanking Primer can be applied directly from the tin using a brush, or transferred to another suitable container and then applied by roller. Do not pour directly onto the surface.

Apply 1 coat of Visqueen High Performance Tanking Primer at a coverage of 6/8m² per litre depending on the porosity of the surface. The primer will dry in 2-8 hours depending upon temperature, the primer should be covered by the membrane within 24 hours.

Usable temperature range

It is recommended that the Visqueen High Performance Tanking Primer is used above 5°C.

Additional information

Use gloves and suitable PPE during the application in a well ventilated area.

Health and safety information

Please refer to material safety datasheet.

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Visqueen Liquid Gas Membrane

Features and benefits

- Complies with BS 8485:2015 + A1:2019 - industry standard for methane and carbon dioxide protection
- Type A Barrier Membrane (Tanking Membrane) - resistant to ground water in accordance with BS 8102:2009
- No mixing required - use straight from the tin
- Versatile - ideal for complex detailing and difficult to reach areas
- Fully bonded system - self terminating at the perimeter of the installation
- Seamless application - no lap joints
- Can be applied to damp surfaces or green concrete - assists build sequencing

Product description

Visqueen Liquid Gas Membrane is a blue-grey, single component liquid damp proof, gas proof and waterproof membrane. It is supplied in 20kg tins.

Approvals and standards

- Conforms to the specification requirements of BS 8485:2015 + A1:2019
- Suitable for all Characteristic Gas Situation (CS) ground gas regimes
- Conforms to the specification requirements of NHBC Amber 1 and Amber 2 applications
- Conforms to the specification requirements of BR 211:2015
- CE Mark EN 13967:2017
- Quality Management System ISO 9001:2015
- Occupational Health and Safety System ISO 18001:2007
- Environmental Management System ISO 14001:2015

Usage

Visqueen Liquid Gas Membrane is suitable for damp proofing, gas proofing and waterproofing a variety of substrates including concrete, masonry and metal, above and below ground level including retaining walls, cast concrete, precast concrete and steelwork. The product is ideal for complex detailing and difficult to reach areas.

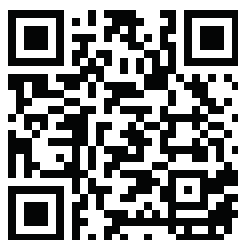
The liquid is suitable for use on insulated concrete formwork (ICF) as a priming solution to provide the optimum surface prior to the application of Visqueen Self Adhesive Membrane or Visqueen Gas Resistant Self Adhesive Membrane.

The product is not designed as a decorative coating.

System components

- Visqueen Liquid Gas Membrane Primer, 5L
- Visqueen Liquid Gas Membrane Reinforcing Strip, 300mm x 100m
- VisqueenPro Detailing Strip, 300mm x 10m, 500mm x 10m

Find your local stockist





Visqueen Liquid Gas Membrane

Storage and handling

Visqueen Liquid Gas Membrane should be stored upright, undercover and in its original packaging. Store at temperatures between 5°C and 35°C. Temperatures below 5°C will render the products unfit for use.

To avoid the risk of spillage, always store and transport in a secure upright position. The product has a minimum shelf life of 12 months.

Keep the container closed when not in use.

Care should be taken when handling the product in line with current manual handling regulations.

Preparation

Visqueen Liquid Gas Membrane system should be applied to substrates that are smooth, clean, and free from frost, dust, laitance, loose material and standing water. Any surface contamination e.g. oil, paint, mortar spots, fungal growth, etc must be removed. All substrate cracks, or surface irregularities must be repaired and filled prior to product application. Masonry units should be flush pointed.

Prime the substrate with Visqueen Liquid Gas Membrane Primer at a coverage rate of 0.25 litre/m² and allow to dry. The primer can be applied to damp surfaces or green concrete.

Visqueen Liquid Gas Membrane does not require mixing however the product should be stirred for 5 minutes before use and after every 2 hour period. Apply with a brush or roller. Brushes and rollers can be cleaned with water immediately after use. Brushes and rollers contaminated with dry product are not reusable and must be disposed appropriately after use.

The system should not be applied during rainfall or when rain is expected before the primer or membrane has fully dried.

Installation

Visqueen Liquid Gas Membrane can be applied directly from the tin using a roller or brush, or transferred to a more appropriate container and applied by roller. Do not pour directly onto the surface.

When used as a priming solution on insulated concrete formwork (ICF) apply one coat at a coverage rate of 0.5 litre/m² and allow to dry.

Construction joints and horizontal to vertical junctions should be reinforced by pre-treating with a coat of Visqueen Liquid Gas Membrane at a coverage rate of 0.5 litre/m² applied minimum 175mm either side of the joint or junction, and into which is fully bedded Visqueen Liquid Gas Membrane Reinforcing Strip. Allow to dry.

For waterproofing applications to both horizontal and vertical substrates, apply three coats at a coverage rate of 0.75 litre/m²/coat. Allow each coat to dry before application of the following coat.

For gas protection applications to both horizontal and vertical substrates, apply four coats at a coverage rate of 0.75 litre/m²/coat. Allow each coat to dry before application of the following coat.

Each coat of the product will dry in approximately 3-4 hours depending upon temperature, humidity and ventilation. Visually the membrane will turn black as it dries. Apply successive coats at right angles to the previous coat. To reduce risk of inter-layer contamination, apply successive coats within 24 hours.

In order to form an effective seal with adjacent sheet membranes e.g. Visqueen Gas Barrier, form a butt joint with the cured Visqueen Liquid Gas Membrane and seal the junction with Visqueen Pro Detailing Strip bonded 150mm onto each material.

Usable temperature range

It is recommended that Visqueen Liquid Gas Membrane and all associated system components should not be installed below 5°C or when temperatures can be expected to fall below 5°C before the primer or membrane has dried. Temperatures below 5°C will render the products unfit for use.

Additional information

Visqueen Liquid Gas Membrane is not designed for use as a gas or damp proof course (DPC) or to pass through structural zones where a concrete to concrete bond is required e.g. pile heads or shear walls

For additional information contact Visqueen Technical Services +44 (0) 333 202 6800

Visqueen Liquid Gas Membrane

Property	Test method	Units	Results
Tin size		kg	20
Colour when wet (dry)			Blue-grey (black)
Application temperature		°C	>5
Cured membrane			
Methane permeability	ISO 15105-1	ml/m ² /d/atm	<40
Adhesion to concrete		N/mm ²	1.1
Water penetration		3 bar pressure	Pass
Elongation	ASTM D2370	%	>100
Tensile strength	ASTM D2370	N/mm ²	11

Health and safety information

Refer to the Visqueen Liquid Gas Membrane material safety datasheet (MSDS).

Visqueen Liquid Gas Membrane

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Visqueen TreadGUARD 300, 2m x 75m

Features and benefits

- Good impact strength - Protects construction membranes from damage in light duty applications
- Woven structure - protection against rebars and following trades
- Large roll format - covers large areas fast

Product description

The Visqueen TreadGUARD 300 is a light duty PP non woven needle punched geotextile.

The product is supplied in 2m x 75m roll format.

Approvals and standards

- CE Mark EN14909
- Quality Management System ISO 9001

Usage

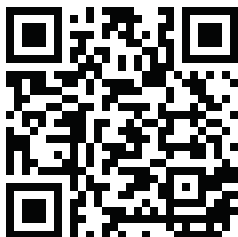
The Visqueen TreadGUARD 300 is used to protect construction membranes in light duty applications.

It is suitable in horizontal applications for the protection of dpm and gas membranes from rebars and following trades.

In heavy duty applications please use Visqueen TreadGUARD 1500.

System components

Find your local stockist





Visqueen TreadGUARD 300, 2m x 75m

Storage and handling

Store in a dry and clean environment in its current packaging. The Visqueen TreadGUARD 300 should not be exposed to long periods of ultraviolet light.

The product weighs 35kg therefore care should be taken when handling.

Preparation

Ensure the surface and working areas are not water logged and free from sharp protrusions.

Installation

Apply the TreadGUARD 300 by unrolling across the laid construction membrane and overlap by a minimum 100mm.

In windy weather conditions use the Visqueen Pro Double Sided Jointing tape to secure the TreadGUARD 300 and use bricks at perimeter edges to hold firmly in position.

Once applied the concrete floor slab or back fill must be poured over the exposed TreadGUARD 300 within 30 days.

Usable temperature range

The system is recommended to be used above 5°C.

Additional information

Care must be taken when lifting this product as the product is bulky and heavy, it weighs 35kg.



Visqueen TreadGUARD 300, 2m x 75m

Property	Value
Dimensions	2m x 75m
CBR Static Puncture	2000N
Tensile Strength MD	10 kN/m
Tensile Strength TD	10 kN/m
Elongation at break- MD	80%
Elongation at break- TD	80%

Health and safety information

Please refer to material safety datasheet.

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Visqueen TreadGUARD 1500, 1m x 2m

Features and benefits

- High impact strength - Protects construction membranes from damage in heavy duty applications
- Embossed - anti-slip surface
- Heavy duty - protection against rebars, wind uplift and following trades

Product description

The Visqueen TreadGUARD 1500 is a heavy duty HDPE ridged plastic protection board with an embossed upper surface.

The board is 1m x 2m printed Visqueen TreadGUARD1500 for ease of identification.

Approvals and standards

- Third party accreditation - BBA certified as a system component.
- Quality Management System ISO 9001:2015
- Occupational Health and Safety System ISO 18001:2007
- Environmental Management System ISO 14001:2015

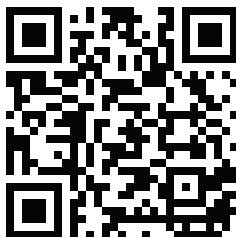
Usage

The Visqueen TreadGUARD 1500 is used to protect construction membranes in heavy duty applications.

It is suitable in horizontal applications for the protection of dpm and gas membranes from rebars and following trades.

System components

Find your local stockist





Visqueen TreadGUARD 1500, 1m x 2m

Storage and handling

Store in a dry and clean environment in its current packaging. The Visqueen TreadGUARD 1500 should not be exposed to long periods of ultraviolet light.

Preparation

Ensure the surface and working areas are not water logged and free from sharp protrusions.

Installation

Apply the TreadGUARD 1500 boards above the laid construction membrane and butt joint together. Joints can be taped with VisqueenPro Single Sided Jointing Tape applied equidistant over the junction. Apply pressure to the tape to ensure adhesion.

Usable temperature range

The system is recommended to be used between above 5°C.

Additional information

Ensure the membrane is free from sharp protrusions prior to using the board.



Visqueen TreadGUARD 1500, 1m x 2m

Property	Value
Dimesions	2m x 1m
Impact resistance BS EN 12691 (A)	>1000mm

Health and safety information

Please refer to material safety datasheet.

Visqueen TreadGUARD 1500, 1m x 2m

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Visqueen Ultimate Top Hat Units

Features and benefits

- Proven solution - provides a gas tight seal around service pipe entries
- Flexible - quick and easy to fit
- Ideal for drainage and service pipes

Product description

Visqueen Ultimate Top Hat Units are made from polyethylene consisting of a gas barrier core.

Available in standard sizes such as 110mm and 160mm. Can be made to a size that suits individual project requirements.

The units are supplied with metal jubilee clips.

Approvals and standards

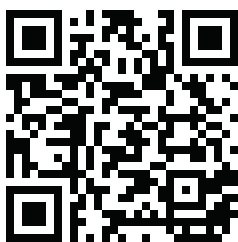
- Third party certification - BDA certified with Visqueen Ultimate and gas membranes
- Quality Management System ISO 9001:2015
- Occupational Health and Safety System ISO 18001:2007
- Environmental Management System ISO 14001:2015

Usage

The Visqueen Ultimate Top Hat Unit is suitable for all applications where a gas, VOC and damp proof seals are required to drainage and service pipes.

System components

Find your local stockist





Visqueen Ultimate Top Hat Units

Storage and handling

Store the Visqueen Ultimate Top Hats in warm, dry and clean environment in its current packaging. The units should not be exposed to long periods of ultraviolet light. In very cold weather, prior to use ensure that the material is stored in warm conditions above 5°C.

Preparation

Ensure all surfaces are clean, dry and free from contamination such as dust or sand. Ensure the surface and working area is not water logged. Avoid areas of unsupported jointing.

Installation

Cut a circular hole in the membrane as close as possible to the pipe, or pipe socket. Ensure that pipe penetrations do not occur at joints in the membrane. With the pipe in position, slide the Visqueen Ultimate Top Hat Unit over the pipe. Mark the extent of the square horizontal skirt over the membrane and also mark the line of the top of the Visqueen Ultimate Top Hat Unit around the pipe. Raise the Visqueen Ultimate Top Hat unit and cut four lengths of Visqueen Ultimate Double Sided Tape, one for each side of the horizontal skirt, allowing for an overlap at each corner. Release the quick release paper from each of the four lengths of double-sided tape. Lower the Visqueen Ultimate Top Hat Unit, ensuring that the free end of the release paper around the pipe is reachable, and seal the horizontal skirt to the membrane. Seal the junction of the horizontal skirt and the membrane with Visqueen Lap Tape. Seal around the collar of the Visqueen Ultimate Top Hat Unit with Visqueen Lap Tape ensuring that the tape seals around the collar and pipe to create an airtight seal. Complete the install with a jubilee clip around the collar of the pipe.

Usable temperature range

It is recommended that Visqueen Ultimate Top Hat and other system components should be used above 5°C.

Additional information

In some applications the Visqueen Ultimate Top Hat units can be site welded to the membrane.

Visqueen Ultimate Top Hat Units

Property	Test method	Units	Criteria	Result	
Colour				Gold/White	
Weight		kilos		49	
Drimensions		mm		110, 160*	
* bespoke sizes avaialable on request			-0/+10%		
BS8485:2015 - Methane testing	Test method	Units	Criteria	Result	
Methane permeability	ISO 15105-1	ml/m ² /d/atm	<40	1.3	
C748 - Permeation vapour tests - 100% concentration		Criteria	ml/m ² /d	mg/m ² /d	mg/m2/hr
benzene	ISO 15105-2	MDV	0.08	70	2.92
toluene	ISO 15105-2	MDV	0.09	78.5	3.27
ethyl benzene	ISO 15105-2	MDV	0.11	93.8	3.91
m,p xylene	ISO 15105-2	MDV	0.01	6.7	0.28
hexane	ISO 15105-2	MDV	gas	2.6	0.11
vinyl chloride	ISO 15105-2	MDV	0	6.4	0.27
tetrachloroethene (PCE)	ISO 15105-2	MDV	0	3.2	0.13
trichloroethene (TCE)	ISO 15105-2	MDV	solid	0.3	0.01
naphthalene	ISO 15105-2	MDV	0.03	19.7	0.82
C748 - Chemical immersion testing		weight %	Thickness %	Tensiles/elongation	
Pass is achieved if the aged membrane is within 25% of the fresh sample					
Benzene	EN14414	Pass	Pass	Pass	
Toluene	EN14414	Pass	Pass	Pass	
Ethyl benzene	EN14414	Pass	Pass	Pass	
(m,p, and o) xylenes	EN14414	Pass	Pass	Pass	
Hexane	EN14414	Pass	Pass	Pass	
Vinyl chloride	EN14414	Pass	Pass	Pass	
Tetrachlorororthene	EN14414	Pass	Pass	Pass	
Trichloroethene	EN14414	Pass	Pass	Pass	
Naphthalene	EN14414	Pass	Pass	Pass	

Health and safety information

Please refer to material safety datasheet.

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The one hour seminars have been produced for design specialists within the construction sector and are delivered by our team of Technical Support Managers.

Visqueen PI designs and special projects

From initial design to the completed project, Visqueen are with you every step of the way. Whether it be hazardous ground gas protection and/or below ground waterproofing protection employing barrier, structurally integral or drained systems, Visqueen can offer professional indemnity (PI) insurance for bespoke Visqueen design solutions.

Visqueen Technical Support Managers work with all stakeholders to provide cost effective Visqueen solutions offering complete peace of mind throughout the construction phase and beyond.

Visqueen Training Academy

Based at our manufacturing facility in Derbyshire, the Visqueen Training Academy is available to support Visqueen customers throughout the UK by providing a wide range of both theory and practical skills related training.

Courses include one day product awareness training for our distributors and builders merchants to help them in their day-to-day jobs, through to intensive three day courses giving detailed hands-on training in the practical skills required for safe and robust product installation.



VisqueenPro Detailing Strip, 300mm x 10m, 500mm x 10m

Features and benefits

- Utilises Visqueen's Advanced Adhesion Technology - twice the adhesion in cold weather
- Complete system - use with Visqueen HP Tanking Primer to obtain best performance
- Flexible - can be cut and shaped to various applications
- Multi-use - ideal for complex junctions, stanchions, patchwork and terminations
- Aluminium core - gas resistant in accordance with BS8485:2015+A1:2019

Product description

VisqueenPro Detailing Strip is a composite of PET/aluminium and a high performance cold weather butyl compound. It is available in roll format, 300mm x 10m and 500mm x 10m.

Approvals and standards

- Third party accreditation - BBA certification
- Conforms to the specification requirements of BS 8485:2015 + A1:2019
- Suitable for all Characteristic Gas Situation (CS) ground gas regimes
- Conforms to the specification requirements of NHBC Amber 1 and Amber 2 applications
- Conforms to the specification requirements of BR 211:2015
- Quality Management System ISO 9001:2015
- Occupational Health and Safety System ISO 18001:2007
- Environmental Management System ISO 14001:2015

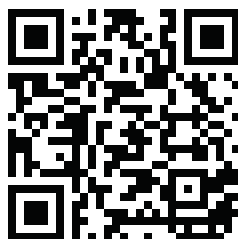
Usage

Visqueen ProDetailing Strip can be used for gas protection systems, waterproofing system, and damp proofing systems for use on concrete, blockwork, brickwork, particle boards, steel work, steel stanchions and wooden structures for both vertical and horizontal application.

VisqueenPro Detailing Strip is post applied against the structure, steel stanchions and forms complex detailing. It forms a 2-part system with the Visqueen HP Tanking Primer. The Visqueen HP Tanking Primer is a single component primer, for use see separate datasheet.

System components

Find your local stockist





VisqueenPro Detailing Strip, 300mm x 10m, 500mm x 10m

Storage and handling

Store in warm (above 5°C), dry and clean environment in its current packaging. The product must be stored upright.

Preparation

Surfaces must be smooth and free from sharp protrusions, ensure the surface and working area is not water logged and is frost free. When applying to blockwork or brickwork the joints must be flush pointed, in demanding applications the masonry face must be rendered prior to applying the Visqueen Pro Detailing Strip. Prior to applications the surface should be sealed using Visqueen HP Tanking Primer and allowed to dry thoroughly. The Visqueen HP Tanking Primer must not be used on Insulation or ICF systems, please contact Visqueen Technical Department.

Installation

All lap joints should be a minimum of 150mm and must be pressed and rolled to form a continuous bond to ensure gas and water tightness.

For complex detailing the detailing strip can easily be cut, shaped and formed around the area.

For patch work - when membranes are punctured, VisqueenPro Detailing Strip can be lapped at least 150mm beyond the extents of the puncture.

Usable temperature range

It is recommended that Visqueen membranes and system components should be used above 5°C

Additional information

When applying to blockwork or brickwork the joints must be flush pointed, in demanding applications the masonry face must be rendered prior to applying the Visqueen Pro detailing Strip. The Visqueen HP Tanking Primer must not be used on Insulation or ICF systems, please contact Visqueen Technical Department.

VisqueenPro Detailing Strip, 300mm x 10m, 500mm x 10m

Property	Value
Width	300mm
Length	10m
Application temperature range	-5°C to 40°C
Peel Adhesion EN12316; Steel ASTM D1000 @ 5oC	N/cm
Polyethylene	20.7
PE with no static charge	21.2
Steel	26.9
Concrete	28.8

Health and safety information

Please refer to material safety datasheet

VisqueenPro Detailing Strip, 300mm x 10m, 500mm x 10m

About Visqueen

The Visqueen name has long been recognised as one of the leading manufacturers of high quality advanced membrane technologies and design based solutions by specifiers, distributors, builders merchants and contractors throughout the UK and Europe.

For further guidance on the Visqueen services shown below, please refer to the relevant section of the Visqueen website (www.visqueen.com) or contact Visqueen Technical Services on +44 (0) 333 202 6800 or enquiries@visqueen.com

Complete Range, Complete Solution



Visqueen Technical Support

Visqueen combine an extensive product portfolio with industry leading levels of service and support which includes guidance over the phone, bespoke CAD drawings to help with complex detailing, electronic NBS specifications and access to a dedicated team of highly knowledgeable and experienced field based Technical Support Managers.

Visqueen Technical Support is available to all our customers including architects, specifiers, distributors, builders merchants, contractors and end users. All of our technical team have been awarded the industry recognised qualification Certificated Surveyor in Structural Waterproofing (CSSW).

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VisqueenPro Double Sided Jointing Tape, 50mm x 10m

Features and benefits

- Third party certification - part of a dpm/ gas protection BBA approved jointing system
- Gas resistant - provides excellent resistance to harmful bulk gases ingress and moisture ingress
- Excellent adhesion - to gas and damp proof membranes

Product description

VisqueenPro Double Sided Jointing Tape is a double sided butyl based compound with an oversize quick release film. It is available in roll format 50mm x 10m.

To complete the joint use the Visqueen Gas Resistant Foil Tape for gas applications and use the Visqueen Pro Single Sided Tape for damp applications.

Approvals and standards

- Third party accreditation - BBA certification
- Conforms to the specification requirements of BS 8485:2015 + A1:2019
- Quality Management System ISO 9001:2015
- Occupational Health and Safety System ISO 18001:2007
- Environmental Management System ISO 14001:2015

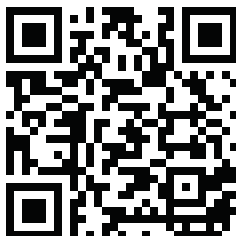
Usage

VisqueenPro Double Sided Jointing Tape is used to bond membranes (gas or damp) together along the appropriate sheet lap ends. It can also be used for patch work where the membrane is punctured, creating airtight seals around pipe penetrations and bonding the floor membrane to the damp proof course at the horizontal plane.

To complete the joint use the Visqueen Gas Resistant Foil Tape for gas applications or use the Visqueen Pro Single Sided Tape for damp proof membranes.

System components

Find your local stockist





VisqueenPro Double Sided Jointing Tape, 50mm x 10m

Storage and handling

Store in warm, dry and clean environment in its current packaging. The tape should not be exposed to long periods of ultraviolet light. In very cold weather, prior to use ensure that the material is stored in warm conditions above 5°C.

Preparation

Ensure all surfaces are clean and dry. The membrane joint surfaces should be dry and free from contamination such as dust or sand. Ensure the surface and working area is not water logged. Avoid areas of unsupported jointing.

Installation

Apply VisqueenPro Double Sided Jointing Tape to the lap area of the laid sheet starting approximately 50mm from the membrane edge. Apply pressure to the tape to ensure the tape has adhered to the membrane. Remove quick release paper from the tape and overlap the adjoining membrane by minimum 150mm. For Visqueen damp proof membranes and gas protection membranes lap joints should then be sealed using the appropriate Visqueen lap tape. Once the tape is applied, the completed lap should be well rolled with firm pressure to ensure a complete seal joint has occurred, and continuity with the adjacent sheet has been achieved.

If the membrane is punctured or perforated a patch of the same material should be lapped at least 150mm beyond the limits of the puncture and bonded with VisqueenPro Double Sided Jointing Tape and sealed with the appropriate lap tape.

Airtight seals should be formed around all service entry points. Visqueen Preformed Top Hat Units should be used for sealing service entry pipes. The base of the top hat and the upstand should be bonded using Visqueen Pro Double Sided Jointing Tape and sealed with Visqueen Foil Lap Tape. The upstand should be secured with the supplied jubilee clip.

Usable temperature range

It is recommended that VisqueenPro Double Sided Jointing Tape and other system components should be used above 5°C.

Additional information

VisqueenPro Double Sided Jointing Tape, 50mm x 10m

Property	Result
Width	50mm
Length	10m
Colour	Blue
Adhesive type	Butyl
Dynamic Shear Adhesion	14 N/cm ²
Dynamic Tensile Adhesion	18 N/cm ²
180° Peel Adhesion	11 N/cm ²
Moisture Vapour Transmission Rate	0.24 g/m ² /d
Service Temperature Range	-40 to 90°C
Application temperature	>5°C

Health and safety information

Please refer to material safety datasheet.

VisqueenPro Double Sided Jointing Tape, 50mm x 10m

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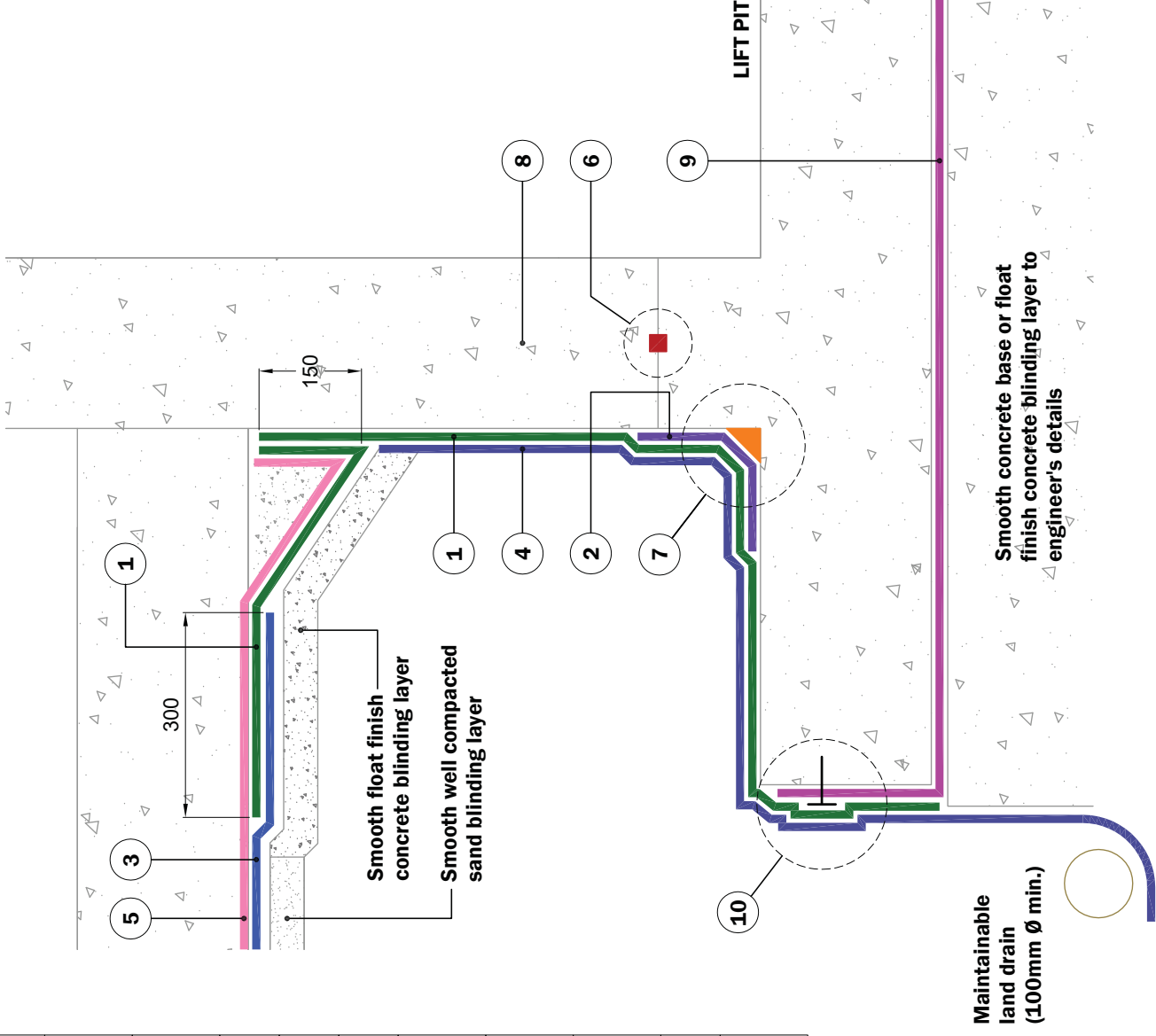
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KEY TO MATERIALS :-	
1	Visqueen GR SAM on Visqueen HP Tanking Primer.
2	Visqueen 300mm / 500mm Detailing Strip on Visqueen HP Tanking Primer.
3	Visqueen Gas Barrier.
4	Visqueen Protect&Drain 12mm.
5	Visqueen TreadGUARD 1500.
6	Visqueen VX25 Waterstops at construction joints.
7	Visqueen Axiom UniSeal Angle Fillet (20mm x 20mm).
8	Waterproof concrete system by specialist.
9	Visqueen Ultimate GeoSeal.
10	Visqueen Retaining Discs @ 400mm centres.



Typical Lift Pit Detail 3 - External Tanking.

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Detail issued for Guidance Only. Designer's Approval Required.

Site construction sequencing should be assessed before the appropriate Visqueen Standard Detail is selected & approved by the Designer.

In order to develop a robust design for protecting a structure against groundwater, a Risk Assessment must be carried out in line with the guidance given in BS8102:2009.

The Designer may need to specify one or a combination of waterproofing measures.

All Visqueen materials must be installed in strict accordance with the manufacturer's instructions. Refer to the current Visqueen datasheets.

Do Not Scale - Use Figured Dimensions Only.

Standard Detail

www.visqueen.com

Scale : NTS

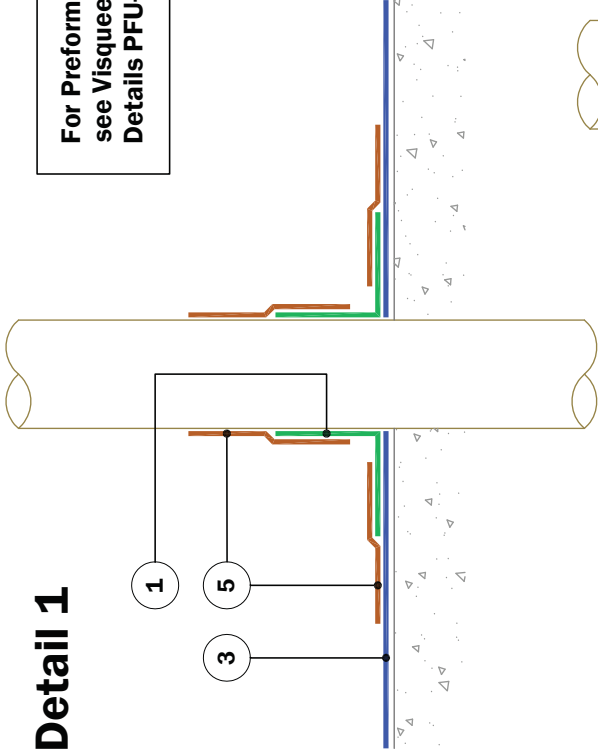
Date : Feb.2020

Drawing No : GB-33

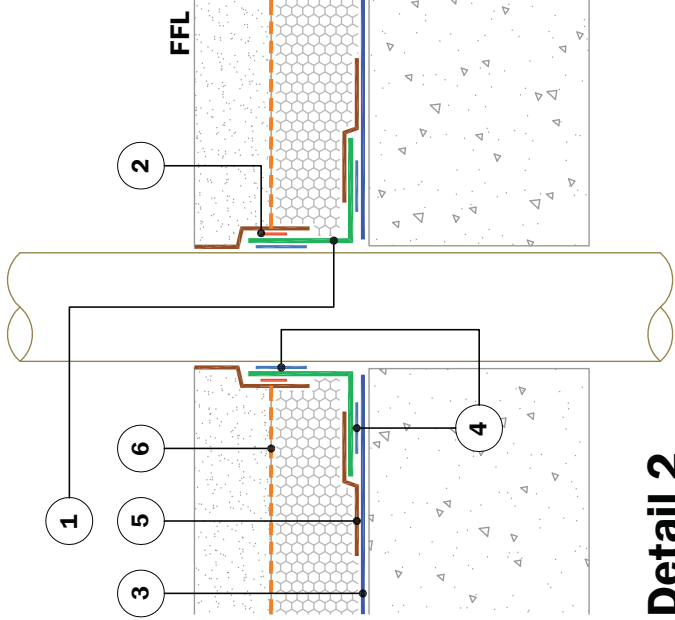
VISQUEEN
0333 202 6800
www.visqueen.com
enquiries@visqueen.com

KEY TO MATERIALS :-	
1	Visqueen Ultimate Preformed Top Hat.
2	Jubilee clip.
3	Visqueen Gas Barrier.
4	Visqueen Double Sided Tape (10m x 50mm).
5	Visqueen Gas Resistant Foil Tape.
6	Visqueen Vapour Barrier or HP Vapour Barrier.
7	Visqueen TreadGUARD 1500.

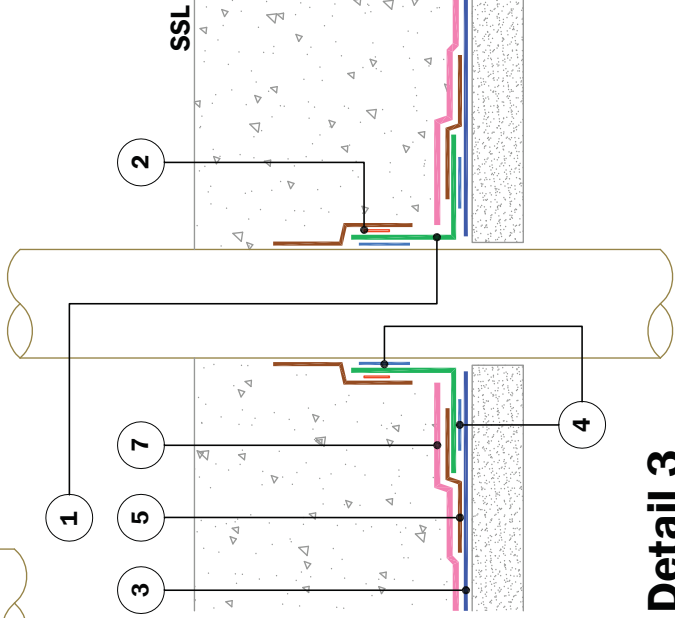
Detail 1



For Preformed Top Hats see Visqueen Standard Details PFU-203 & 204



Detail 2



Detail 3

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Detail Issued for Guidance Only. Designer's Approval Required.

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Standard Detail



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Scale : NTS

Date : Dec.2018

Drawing No : GB-51

Typical Pipe Sleeve Details (Top Hat).



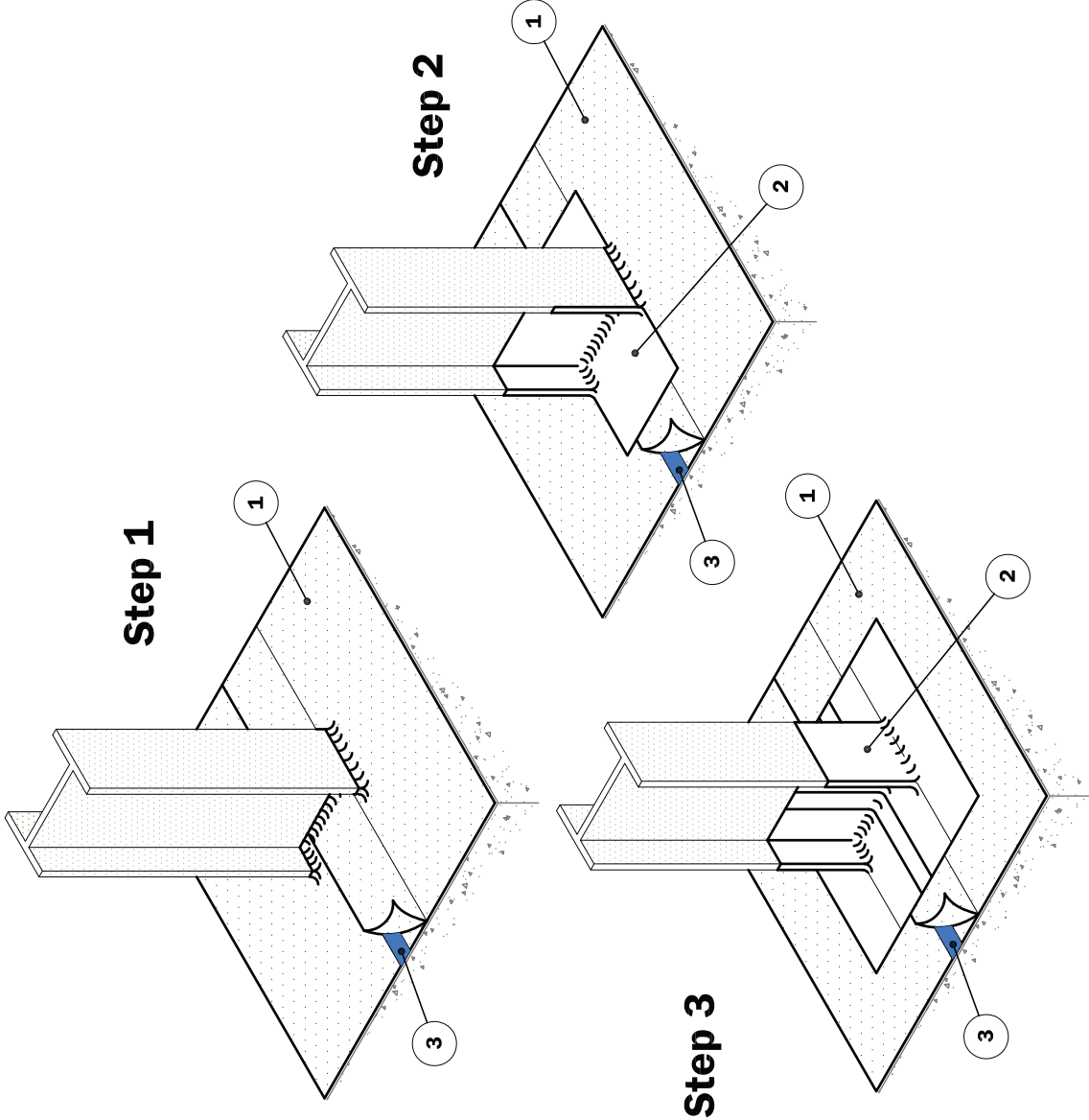
VISQUEEN
0333 202 6800
www.visqueen.com
enquiries@visqueen.com

KEY TO MATERIALS :-	
1	Visqueen Gas Barrier.
2	Visqueen 300mm / 500mm Detailing Strip.
3	Visqueen Double Sided Tape (10m x 50mm).

Step 1.
Install Visqueen Gas Barrier DPM on a suitable smooth & well compacted blinding layer. All laps to be 150mm minimum & fully sealed using Visqueen Double Sided Tape & Visqueen Gas Resistant Foil Tape. Neatly cut the DPM around the profile of the steel column.

Step 2.
Ensure steelwork is clean & dry before applying Visqueen Detailing Strip (300mm or 500mm). Ensure that the Detailing Strip extends 150mm minimum horizontally onto the DPM & 150mm minimum vertically onto the steel column. Ensure all laps are fully sealed.

Step 3.
Apply more Detailing Strip to the remaining exposed steel flanges ensuring all laps are 150mm in all directions & fully sealed.



Typical Internal Steel Column
Sealing Details (Slab Junctions Only).

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Detail issued for Guidance Only. Designer's Approval Required.

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The Designer may need to specify one or a combination of waterproofing measures.

All Visqueen materials must be installed in strict accordance with the manufacturer's instructions. Refer to the current Visqueen datasheets.

Do Not Scale - Use Figured Dimensions Only.

Standard Detail



www.visqueen.com

Scale : NTS

Date : Dec.2018

Drawing No : GB-52

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ANNEX C
Installer Daily Log Sheet

Installer Daily Log



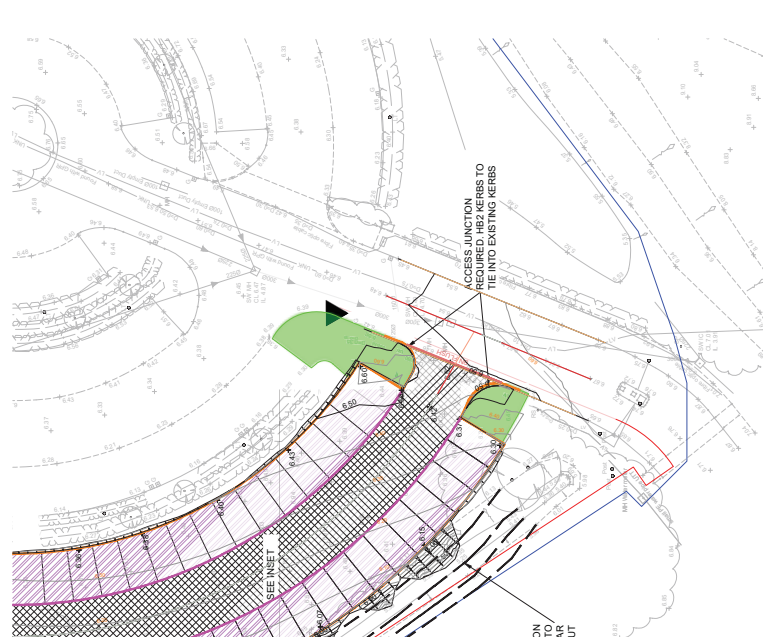
(Prepare one installer log sheet per day per plot)

Site Name:	Phase:
Date:	Plot Number:
Weather:	Housing Style:
Installers:	
Progress (End of day) : In-progress, Completed	
Weather Condition:	

(Delete as appropriate)

No.	Item	Comments
1. Tasks		
	<i>Example (product type)</i>	<i>Example (Manufacturer, location, number of, serial number, reasons for repair etc.)</i>
1.1	Membrane	
1.2	Seals	
1.3	Penetrations	
1.4	Internal Corners	
1.5	External Corners	
1.6	Repairs	
1.7	Other	
Additional Notes:		

DRAWINGS



Rev	Date	Description	By	Ckd
				
		Hydrex		
		 FIRST FLOOR EAST LIBRARY'S EAST WING S. CONVENT ROAD EAST CAMBRIDGE CB7 1 9AB TEL: +44 (0) 2030 021666 e: info@hydrex.co.uk		

PROJECT
SWANSEA BAY TECHNOLOGY CENTRE

TITLE
CIVIL ENGINEERING LAYOUT

HYDROCK PRODUCT NO.	SCALE @ A1	
C-11852-C	AS SHOWN	
STATUS DESCRIPTION		STATUS
COSTING		D1
DRAWING NO.	PROJECT CODE ORIGINATOR, DRAWING LEVEL, PROJECT NUMBER	REVISION
26X0003-HYD-XX-XX-DR-C-90-0500		P04



Terra Firma (Wales) Ltd. 5 Deryn Court, Wharfedale Road, Pentwyn, Cardiff CF23 7HA
Tel: 029 2073 5354 **Fax:** 029 2073 5433 **Email:** info@terrafirmawales.co.uk www.terrafirmawales.co.uk



APPENDIX II

PHOTOGRAPHS

Plate 1 Lift Shaft - Visit 1 (15/12/2020)



Plate 2 Lift Shaft – Visit 1 (15/12/2020)



Plate 3 Sealed Joint – Visit 2 (01/04/2021)



Plate 4 Column and Pipe Detailing – Visit 2 (01/04/2021)



Plate 5 Membrane Installation – Visit 2 (01/04/2021)

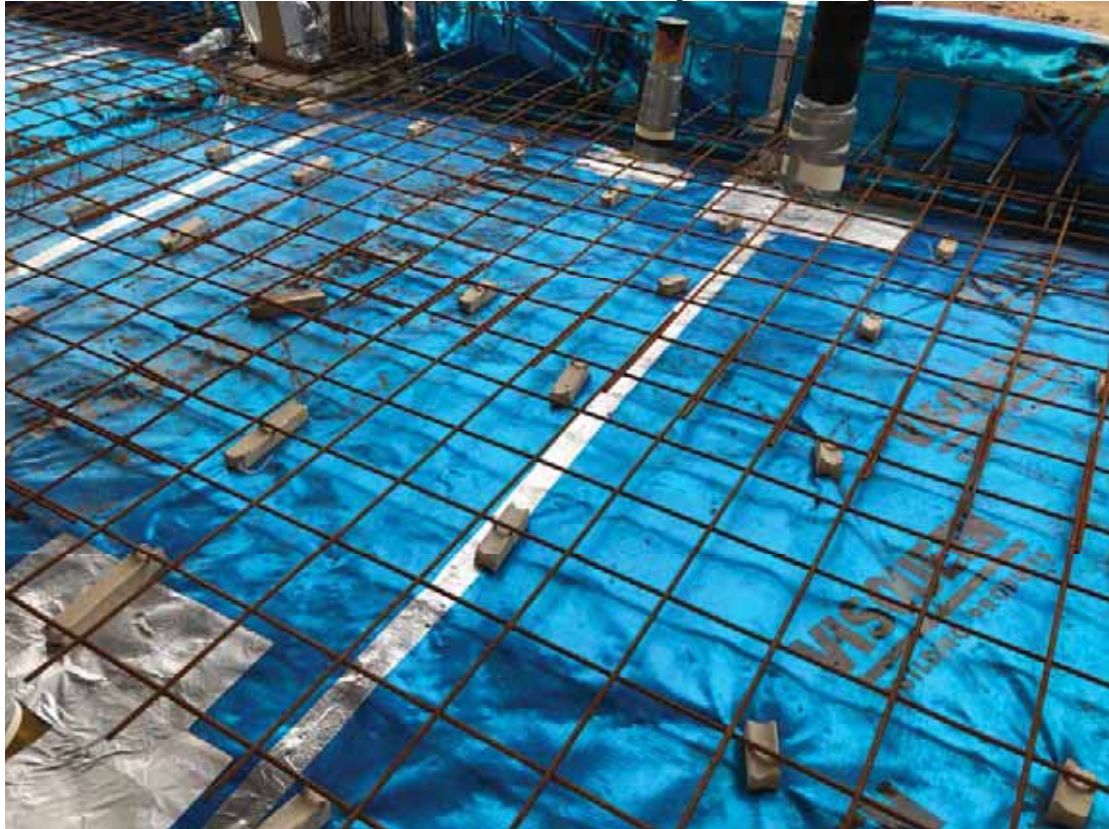


Plate 6 Membrane Installation – Visit 2 (01/04/2021)



Plate 7 Sealed Penetrations – Visit 2 (01/04/2021)



Plate 8 Column Detailing - Visit 2 (01/04/2021)



Plate 9 Membrane Seal – Visit 2 (01/04/2021)



Plate 10 Membrane Installation with Repairs– Visit 2 (01/04/2021)



Plate 11 Membrane Installation – Visit 3 (08/04/2021)



Plate 12 Column Detailing – Visit 3 (08/04/2021)



Plate 13 Membrane and Pipe Detailing – Visit 3 (08/04/2021)



Plate 14 Sealed Penetrations – Visit 3 (08/04/2021)



Plate 15 Membrane Installation – Visit 3 (08/04/2021)

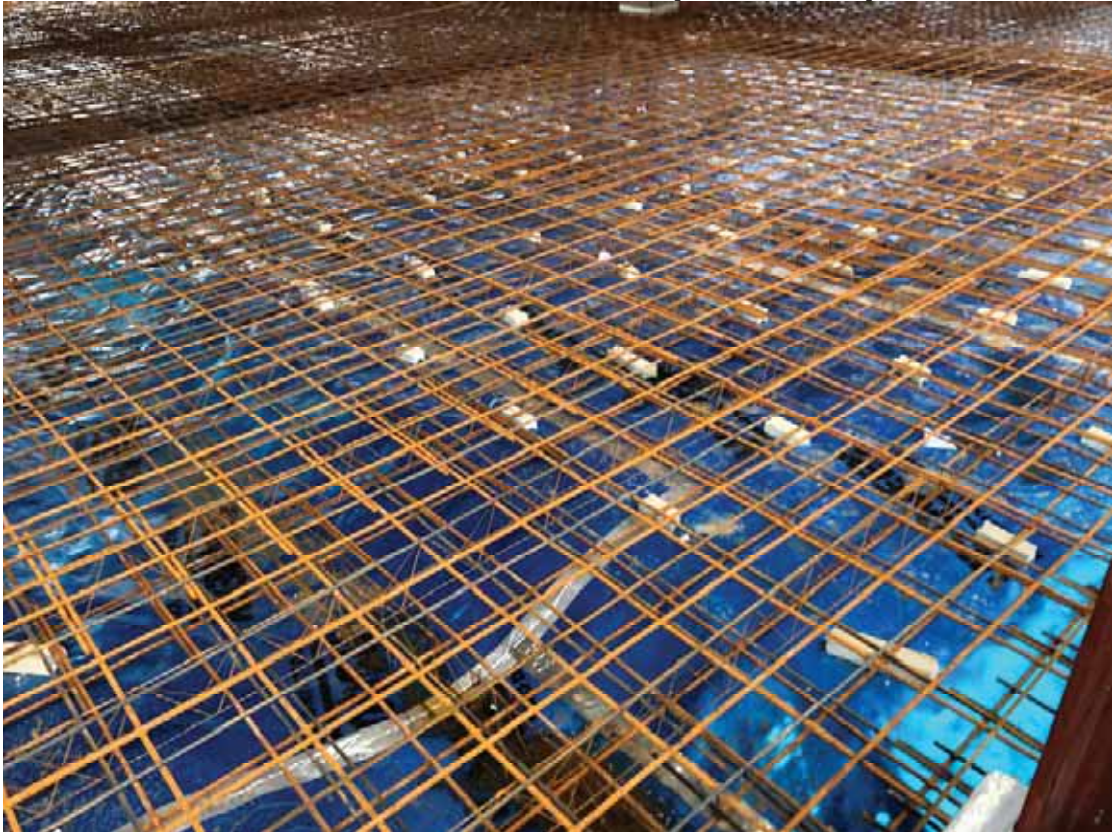


Plate 16 Sealed Joint – Visit 3 (08/04/2021)

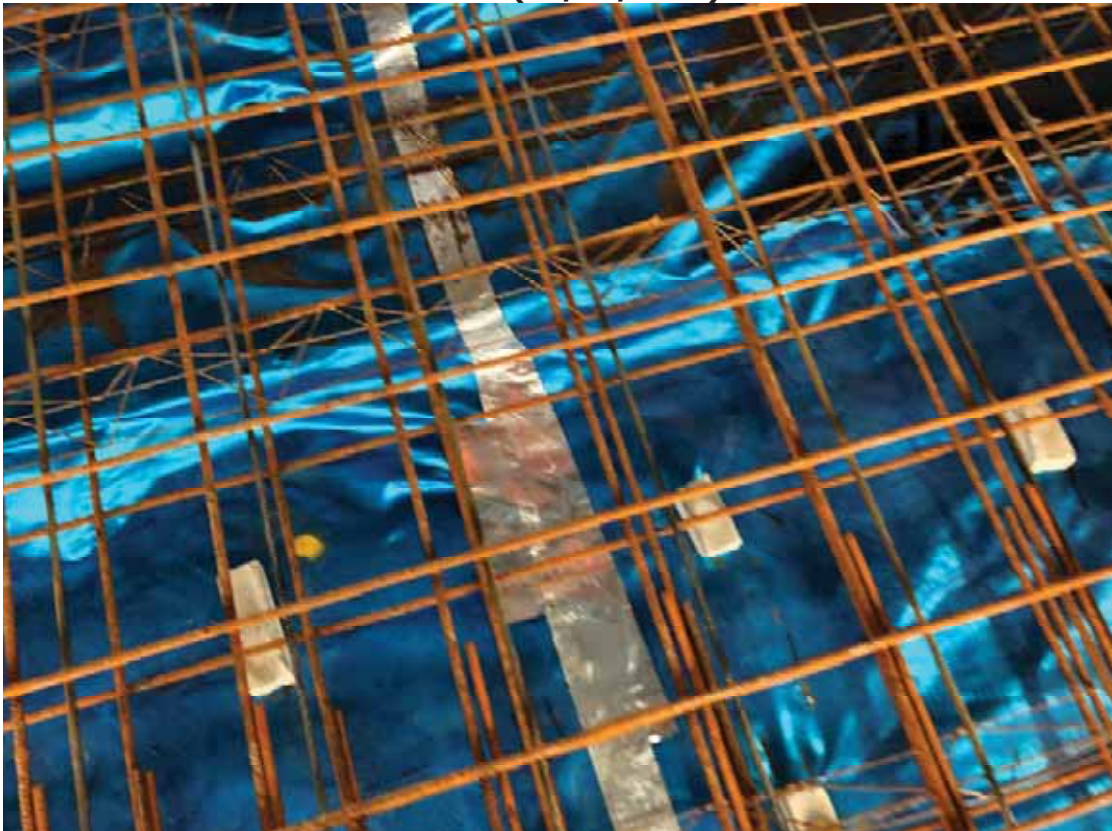


Plate 17 Membrane and Column Detail – Visit 3 (08/04/2021)



Plate 18 Membrane – Visit 3 (08/04/2021)





APPENDIX III

GAS VALIDATION INSPECTION SHEETS

GAS PROTECTION MEASURES VALIDATION AND VERIFICATION TEST REPORT

Project Name: SUNSHINE BAL TECHNOLOGY CENTRE
 Project No. 345-20-520
 Inspection carried out by: P. Williams

Plot(s): LIFT SHAFT

Date: 18.12.20

Reason for Gas Protection (if known):
Methane

Level of Gas Protection Required or Gas Protection to be Validated:
CS2

Installer	<u>DLC</u>
Gas Membrane Product	<u>VISQUEEN SAGM</u>
Gas Membrane Condition	<u>Excellent</u>
Joints Double Taped or Welded	<u>SAGM - STUCK</u>
Penetrations Sealed	Yes/No <u>N/A</u>
Repairs required?	☒ Yes/No
Ventilation Installed	☒ Yes/No
Type of Ventilation	<u>N/A</u>
Vent Spacing	<u>N/A</u>
Membrane Installed across Cavity	Yes No Not Seen <u>(N/A)</u>
Integrity Testing required	☒ Yes/No
Air Lance Testing	☒ Yes/No
Tracer Gas Testing	☒ Yes/No

General Comments:
JAGM Stuck well. In good condition. Sealed to base

Verifier Signature B. Williams
 Installer Representative Name S. Williams Signed S. Williams Company DLC
 Site Representative Name _____ Signed _____ Company _____

GAS PROTECTION MEASURES VALIDATION AND VERIFICATION TEST REPORT

Project Name: Sunsea Bay Technology Centre
 Project No. 345-20-520
 Inspection carried out by: Ashley Mchugh

Plot(s): Plot 1 (visual) & Plot 2 (partial & air tested)

Date: 01/04/21

Reason for Gas Protection (if known):
Methane

Level of Gas Protection Required or Gas Protection to be Validated:
CS2

Installer	<u>Darlow Lloyd Construction</u>				
Gas Membrane Product	<u>Visqueen Gas Barrier & GRSAM</u>				
Gas Membrane Condition	<u>Good</u>				
Joints Double Taped or Welded	<u>Double Taped</u>				
Penetrations Sealed	<u>Yes/No</u>				
Repairs required?	<u>Yes/No</u>				
Ventilation Installed	<u>Yes/No</u>				
Type of Ventilation	<u>N/A</u>				
Vent Spacing	<u>N/A</u>				
Membrane Installed across Cavity	<table border="0"> <tr> <td>Yes</td> <td>No</td> <td>Not Seen</td> <td><u>N/A</u></td> </tr> </table>	Yes	No	Not Seen	<u>N/A</u>
Yes	No	Not Seen	<u>N/A</u>		
Integrity Testing required	<u>Yes/No</u>				
Air Lance Testing	<u>Yes/No Plot 2 only</u>				
Tracer Gas Testing	<u>Yes/No</u>				

General Comments:
Membrane in generally good condition, repairs to edges & due to shell placement. Repair carried out by Darlow Lloyd. Not air tested. Plot 1 due to shell reinforcement. Plot 2 partially complete & air tested.

Verifier Signature: [Signature]
 Installer Representative Name: S. WILLIAMS Signed: [Signature] Company: DLC
 Site Representative Name: S. WILLIAMS Signed: [Signature] Company: DLC

GAS PROTECTION MEASURES VALIDATION AND VERIFICATION TEST REPORT

Project Name: Snarey Bay Technology Centre
 Project No. 345-20-520
 Inspection carried out by: JS

Plot(s): Pow 3

Date: 8/4/21

Reason for Gas Protection (if known):
Methane

Level of Gas Protection Required or Gas Protection to be Validated:
CSL

Installer Barlow 11/12/2020

Gas Membrane Product Vitacore Gas Barrier

Gas Membrane Condition Good install

Joints Double Taped or Welded Taped

Penetrations Sealed Yes/No

Repairs required? Yes/No

Ventilation Installed Yes/No

Type of Ventilation N/A

Vent Spacing N/A

Membrane Installed across Cavity Yes No Not Seen (N/A)

Integrity Testing required Yes/No (No)

Air Lance Testing Yes/No (No) - Due to Steel reinforcement

Tracer Gas Testing Yes/No (No)

General Comments:
Good install, several repairs needed due to steel piercing & a couple of taped joints needed re taping due to water.

Verifier Signature J. Taylor

Installer Representative Name W. Taylor Signed W. Taylor Company DLG

Site Representative Name W. Taylor Signed W. Taylor Company DLG