# Ground Gas Verification Report

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| Project Name – | 7 Chapel Street, M19 3QB |
| Project Number – | UKRS-0159-V1 |
| Date Prepared - | Monday, 27 January 2025 |

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The following report addresses this planning requirement and should be read in conjunction with the Ground Gas Risk Assessment, and/or investigation report.

This report has been undertaken in accordance with CIRIA C735 (2014), in line with best practice.

## SUPPORTING DOCUMENTS

| Document name | Description | Received by | Date received |
|---|---|---|---|
| **2024.10.10 - 30-201 - TECHNICAL SECTIONS AND DETAILS 01 - EXT WALL PLINTH DETAIL** | Drawing | Burke Developments | 17.01.2025 |
| **Document_250106_111337 (Martin Environmental Solutions Ltd Report Number 2843-2)** | SI Report | Burke Developments via SWC | 6.01.2025 |
| **Document_250106_111338** | Planning Conditions | Burke Developments via SWC | 6.01.2025 |
| **BS8485:2015+A1:2019** | British Standard | n/a | n/a |
| **CIRIA 735** | Industry Guidance | n/a | n/a |

## GROUND GAS RISK ASSESSMENT

A full ground gas risk assessment is contained in the Martin Environmental Solutions Ltd Report Number 2843-2.

A summary is presented below:

### Phase I and Initial Phase II findings

The site was first developed between 1849-1892 with a Mission Room in the centre of the site. By 1905-11 the site had been redeveloped with a smithy to the western section. By 1956 the site is an engineering works, later redeveloped between 1968-1981. Off site a reservoir was identified ~100m to the south of the site from 1893 until 1956 when the carpet mill was redeveloped into a saw mill and later a church. A house estate was erected on the northern section opposite the site in 2018. A large electricity sub-statin was located to the south 40m away on Elbow Street from 1907.

The initial phase II investigation consisted of a series of trail holes across the site. These identified elevated levels of contaminations in five areas as indicated in the report and the plan in figure 2.

### The Phase II additional Intrusive Investigation

A site visit was conducted on the 8th June 2024 to undertake an intrusive investigation. The site had been cleared at the time of the visit with previous buildings demolished. A sampling program of 18 sample locations, identified in Figure 2, spread across the site at approximately 10m centres were undertaken. Some of these were located adjacent to the previously sampled locations. Both rounds of sampling are shown on the plan in Figure 3.

The samples were sent to Chemtech environmental a UKAS and MCERTs laboratory and each analysed for heavy metals, Total Petroleum Hydrocarbons (TPH) and Polyaromatic Hydrocarbons (PAH), and Asbestos.

The demolition of the buildings on site had also seen the removal of the concrete hardstanding across the site.

Elevated levels of Arsenic were identified from the second round of monitoring in TP4a and TP11a, and in the first round at TP5a and 8a. TP4 & 5 were in similar locations to the southeast of the site.

In addition, elevated lead levels were encountered across the centre of the site (front to back) In TP5, 7-12 15 & 16 during the second investigation which mirrored the first round with the exception of the northwest corner where elevated lead was found in the first round.

Elevated Total Petroleum Hydrocarbons (TPH) were identified in TP6 during the first round and TP11, 13 & 15 in the second.

Elevated Polyaromatic Hydrocarbons levels were identified in TP1B, 3A, 5A and 6A (i.e. surface levels) during the first phase of investigation. During the second-round elevated levels were encountered in TP 4, 8-13, 16 & 18. These correspond to the first round plus some additional areas. Predominantly the central strip of the site to dorm the roadway and the western corners.

## Further Investigations

Since the above results were obtained further made ground has been removed from site, particularly across the centre of the site covering the above TP 5, 7-12, 15-16 locations. Confirmation of site levels and foundation designs have been made.

On the 2nd September 2024 a further site visit was made, the aim to verify removal of additional contaminated material in the centre of the site. A total of eight samples were taken from across the side walls and base of the excavation. These were sent to Chemtech Environmental Limited laboratories for analysis. The samples were tested for the heavy metals, Polyaromatic hydrocarbons, total petroleum hydrocarbons and asbestos.

Anecdotally the made ground had been removed down to clean clay.

The full sampling results are presented in Appendix 1, the sampling locations in Figure 4. The results have been compared against the LQM/CIEH S4UL's for a residential without homegrown produce scenario & the C4SL value for Lead. Soil organic matter varied across the site from 2.4-5.5%.

The results of the samples identified no asbestos fibres, no elevated levels of heavy metals, no elevated levels of total Petroleum Hydrocarbons.

No elevated levels of Polyaromatic hydrocarbons were identified with the exception of the very front entrance to the site (300mm from the boundary) under the proposed entrance road. when compared against the residential with home grown produce criterion.

## GAS MONITORING RESULTS

The preliminary desk study report identified infilled ground in the vicinity of the site from historically filled reservoirs, the last infilled in the 1950's, 70yrs previously. The report concluded that it was unlikely ground gas would still be produced after such an elapse of time and the risk from ground gas affecting the site was low. Additional research identified a recent planning application for a mill/engineering site to the south and on/adjacent to the former reservoir, redeveloped in the early 1950's. (Planning application 113618/FO/2016 & CDN/17/0092). Gas monitoring undertaken at this site identified no ground gas, no elevated levels of methane or carbon dioxide and a site characteristic gas situation of CS1 / Green was determined.

### Proposed Remediation

The proposed remediation plan has been formulated following the works undertaken on site, and detailed above and in accordance with the Councils technical guidance note.

### Ground Gas

Research into nearby development sites has identified no ground gas emissions, however the original phase I report did recommend precautionary ground gas protection measures. In addition, the further work undertaken in September resulted in the removal of some hydrocarbon contamination identified on site.

However, the precautionary inclusion of gas protection measures is still considered appropriate.

Excavations to remove contaminated soil from below the building footprints was undertaken in September and the clean clay was identified below the made ground across the site. The excavated areas were backfilled with clean imported hardcore.

## DESIGN OF GROUND GAS PROTECTION MEASURES – SI REPORT

Since the last report foundation designs have been changed and the dwelling will now be built with a beam and block floor. A minimum 200mm cavity will be left below the floor and sufficient air bricks will be provided to an equivalent 2000mm²/m. With a Visqueen Ultimate HC BLOK membrane installed over the beam and block floor, insulation and screen above.

The above design specification has been considered in respect to BS8485:2015 and for the proposed development, type A private dwelling the design provides a gas protection score of 4.5 suitable for a CS3 level of protection.

| Element | Details | Gas Protection Score |
|---|---|---|
| Structural Barrier | Beam & Block | 0.0 |
| Passive sub-floor dispersal layer | >200mm clear void | 2.5 |
| Gas resistant membrane | Visqueen Ultimate HC Blok, installed by specialist company | 2.0 |
| Total | | 4.5 (CS3) |

| DESIGN REQUIREMENTS AS VERIFIED | | |
|---|---|---|
| Type of Protection | Notes | Points |
| Structural Barrier | **A pre-cast suspended segmental subfloor (beam and block)**<br>This floor type contains many construction joints and discontinuities and can be affected by cracking. As such, it offers little resistance to the passage of ground gas and has high permeability. | 0 |
| Ventilation | **Passive sub floor dispersal layer 200mm clear void providing very good performance. Connected to telescopic vents terminating above ground level, acting as pressure relief.** | 2.5 |
| Membrane | **A ground gas resistant membrane**<br>To comply with BS8485 (2015) + A1 (2019) and to achieve the 2 points, the gas resistant membrane must:<br>• be made from virgin polymer and have a methane transmission rate of less than 40.0ml/day/m2 /atm (average);<br>• have welded or lapped and taped joints and 'top hats' around service penetrations (make allowance for jointing) – joint the membrane in accordance with the manufacturer's specification (typically 150mm laps with double sided tape);<br>• be chemically resistant to degradation by other contaminants that may be present;<br>• be sufficiently impervious, both in the sheet material and in the sealing of sheets and sealing around sheet penetrations, to prevent any significant passage of methane and/or carbon dioxide through the membrane;<br>• be sufficiently durable to remain serviceable for the anticipated life of the building and duration of gas emissions;<br>• be sufficiently strong to withstand the installation process and following trades until covered (e.g. penetration from steel fibres in fibre reinforced concrete, penetration of reinforcement ties, tearing due to working above it, dropping tools, etc); and to withstand in-service stresses (e.g. settlement if placed below a floor slab);<br>• be capable, after installation, of providing a complete barrier to the entry of the relevant gas; and be verified in accordance with CIRIA C735. | 2 |
| TOTAL | | 4.5 |

Total 4.5 points

## GROUND GAS MEMBRANE INSTALLATION GUIDANCE

For the purpose of the ground gas protection Visqueen were identified as a suitable gas membrane manufacturer, and Structural Waterproofing Contracts (SWC) were selected to carry out the installation of the membrane, using suitably experienced and qualified installers.

All suggested and named Visqueen products meet the above required specification. The datasheet and standard details for associated products are in Appendix 3.

## INSTALLATION ACCESSORIES WILL ALSO BE NECESSARY, INCLUDING:

- Heat welding equipment for welded joints
- Jointing tape for taped joints (double sided, gas resistant tape)
- Pre-formed top hats or onsite penetration detailing
- Jubilee clips
- Gas resistant 'detail tape' is an easy way to install complex joints such as corners and non-standard service entries.

All membrane installation must be undertaken to manufacturer's specification. An example of correct installation is shown in Appendix 1 – *it must be noted that this is a Manufacturer information sheet, however, whilst this is considered a good example, we do not endorse any specific brand and the methods can be applied to any membrane brand.*

All service entry points should be fitted with pre-formed gas resistant top hats. Top hats should be sealed to the pipe and gas membrane utilising double sided jointing tape and fixed with a jubilee clip. An example of the method of installation of these top hats is shown above.

Adequate ventilation through internal obstructions is to be installed in line with the above recommendations. Joints between sheets of gas membrane should be lapped (minimum overlap of 150mm 150mm) and taped between sheets with appropriate double-sided tape in accordance with the manufacturer's recommendations. A set of example photographs of good practice installation are contained in Appendix 1.

# VALIDATION PROCEDURE AND REPORT

## GAS PROTECTION VALIDATION PLAN

The exact construction company appointed to install the gas protection measures is unknown at the time of writing. The installers should be trained and experienced in the installation of ground gas resistant membranes.

In line with CIRIA 735 (2014), a suitably qualified verifier should independently verify the installation of the gas protection measures. A visual inspection method, including pick testing, is recommended to be carried out at the development. *This should be undertaken following the laying of the beam and block pre-cast floor units and laying of the gas membrane on top, but prior to laying insulation and finishes.*

The appointed verifier should:

- Identify that the correct membrane has been used, including sealing / jointing tape and preformed components e.g. top hats, corners.
- Inspect the general condition of the membrane for rips, tears and punctures.
- Check that all jointing has been carried out to the manufacturer's specification.
- Check that the membrane has been installed correctly across cavities, including correct jointing in these areas.
- Check that top hats have been correctly installed around service entries, including jubilee clips around the pipe and correct lapping and jointing to the membrane at the base.
- Check that vents have been installed around the perimeter of the building in sufficient number and in the correct locations, including inspecting the condition i.e., not blocked or otherwise restricted.
- Check the presence of a clear >150mm clear void, including measuring that this is of a sufficient depth and the void has not been filled or otherwise compromised. Check that internal sleeper walls are also vented to provide adequate flow-through within the void so that none of the walls are blocking off unvented sections within the void.
- Take photographs to provide evidence of the above.
- Make a suitable record of the validation, to be included within a validation report.

The appointed verifier will record the above information using a 'Ground Gas Resistant Membrane Inspection Record' sheet. An example of this is included in Appendix 2. The following information should be included within the Verification Report to demonstrate the successful installation of ground gas protection on the site:

- Objectives of the verification.
- A brief overview of the site conditions and summary of the ground gas regime.
- A description of the installation, including gas-resistant membrane manufacturer and type used (including sealing / jointing tape and pre-formed components e.g. top hats, corners). The manufacturer specification / datasheet shall be included.
- Installer and verifier and credentials of such organisations, i.e. level of competency of installer – NVQ Level 2 or general groundworker.
- Detailed description of any deviations from the specification provided in this report, with explanation and justification of such deviations.
- As-built construction drawings and product specifications of components used.
- A description of the verification approach – in this case visual inspection, including pick testing.
- Verification evidence – in this case photographic evidence.
- Any record of relevant communications with regulatory bodies.

- Verification conclusions, including any future monitoring or management requirements (anticipated none in this case due to passive approach), and limitations of the measures installed.

Unexpected Contamination If any visual or olfactory evidence of contamination is encountered during demolition or construction work, then the Local Authority Environmental Health Officer and Environment Agency should be contacted immediately to agree any necessary remediation measures, and when complete this should be appropriately documented in the Validation Report.

## VALIDATION / VERIFICATION REPORT

### PURPOSE

Jack Errington of UK Resilient Structures ltd attended site on 9th January 2024.

SWC were appointed to install ground gas protection to 7 Chapel Street. UK Resilient Structures were appointed by Burke Developments following an introduction made by SWC to carry out independent validation of the installation of the membrane on the site as per our terms of engagement.

The frequency of independent inspections has been determined by the client, comprehensive CQA should be forwarded by the installer to cover any data gaps for areas that have not been subjected to independent inspections.

The SOLE purpose of the works undertaken by UK Resilient Structures is to provide independent inspections and a factual report as and when requested to assist the client in gaining regulatory approval with regards to the gas membrane installation. This is as per the scope of work section within our term's engagement.

### LIMITATIONS

This report is limited to providing lines of evidence to the regulatory authority for the area's components inspected by UK RESILIENT STRUCTURES only in support of the discharging of the relevant planning conditions only and cannot be used or relied upon for any other purpose. No professional liability shall be extended to any other parties by UK RESILIENT STRUCTURES, the report should explicitly not be relied on by any future vendor or tenant as proof that the gas protection measures are sufficient for the site and functioning at the time of purchase or start of any tenancy. Gas protection systems are not solely reliant on the gas membrane as points are scored under BS8485 for the floor slab, membrane and venting, these components work collaboratively to provide a gas protection system. This is as per the conditions within our term's engagement.

The report has been provided on the assumption that no damage or works that may have compromised the components and integrity of the gas membrane have been made after our inspections, failure to report any such occurrences will invalidate any liability and render the report and contents invalid. This is as per the conditions within our term's engagement.

This report has been prepared in accordance with the best available practice and the relevant guidance documents listed below of which the author of the report was a contributor and member of the steering committees:

*Mallett H, Wilson S, Corban M (2014) "Good practice on the testing and verification of protection systems for buildings against hazardous ground gases". CIRIA Report C735*

## COMPLIANCE WITH REGULATION 7 OF BUILDING REGULATIONS

Regulation 7 of the building regulations requires that building work shall be carried out in a workmanlike manner. Approved document 7 suggests installation can comply with the regulation if workmanship is such that, where relevant, materials are adequately mixed or prepared and applied, used or fixed so as to perform adequately the functions for which they are intended.

A reasonable standard may be demonstrated by:

Compliance with a standard and independent certification - The relevant standard for gas protection measures is BS8485:2015 +A1:2019, Table 7 of the standard requires that gas membranes are verified as per CIRIA C735.

Past experience – The installers qualifications are checked by UK RESILIENT STRUCTURES to ensure that the installation supervisor holds the NVQ Level 2 in gas membrane installations.

Integrity Testing methods. – are carried out as prescribed in CIRIA C735, unless stated elsewhere Frequency of Visits – UK RESILIENT STRUCTURES have not been employed to prepare a validation plan for this project, the frequency of visits is as per the instructions of the client, in essence UK RESILIENT STRUCTURES inspected the available membrane that could be inspected each time an inspection visit was requested. The area inspected on each visit is noted on the survey sheets in appendix 1. This report should be read in conjunction with the installers CQA report.

## METHOD OF INSPECTION

All seams and non-seam areas of the available gas membrane were inspected/tested by the Validation Surveyor for identification of defects, protruding and penetrating objects, lack of subgrade support, overheating, holes, blisters, undispersed raw materials, scratches and gouges, and any sign of contamination by foreign matter.

Any portion of the gas membrane exhibiting a flaw or failing a visual inspection/testing was repaired. Several procedures exist for the repair of these areas. The final decision as to the appropriate repair procedure was agreed upon between the Validation Consultant and the Installer at the time of the repair and is noted in the survey sheets.

Major repairs are visually inspected/tested, repairs passing the inspection/testing were considered acceptable. In some cases, minor repairs maybe carried out under contractor CQA and photographic evidence supplied to the verifier for inclusion in the report.

## CONCLUSION

During our inspections we witnessed the installer carrying out the installation in a workmanlike manner, the materials were adequately prepared and applied, used and fixed so as to perform adequately the functions for which they are intended as per Regulation 7 of the building regulations. In instances were 100% of the installation has not been independently inspected/tested then this report should be read in conjunction with the gas membrane installers CQA records.

The installers onsite are deemed either suitable experienced and/or hold the NVQ Level 2 “Gas membrane Installations” qualification and as such UKRS are happy to accept the installers as qualified and experienced to carry out the works.

Enclosed are images taken from installation.

Best Regards



JACK ERRINGTON - CSSW
Director - UK Resilient Structures ltd

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## SITE VISIT DOCUMENTATION

| | | | |
|---|---|---|---|
| **Site Name –** | **1-8 Chapel Road** | **Date** | **9th Jan 2025** |
| **Site Address** | **Chapel Road, Manchester** | **Postcode** | **M19 3QB** |
| **Area Checked** | **Membrane Install Plots 1-8** | **Installer Name** | **SWC** |
| **Inspected by** | **Jack Errington** | **Weather** | **Overcast / Dry / Cold** |

| **Item** | **Comments** |
|---|---|
| **Sub-floor Void** | **n/a** |
| **Ventilation Inlets / Outlets** | **Visual inspection all looked to be installed correctly** |
| **Number of Vents** | **84 in total** |
| **Materials Used** | **Membrane - Yes**<br><br>**Post / Pre Applied –**<br>- **Pre applied – Visqueen Gas Barrier**<br><br>**Welded Joints by specialist –**<br><br>**Preformed Top Hats where appropriate otherwise made onsite by specialist**<br><br>**DPC – Visqueen Zedex CPT** |
| **Installation** (brief description of area/plots and list of defects/repairs identified) | **Floor slab – membrane installed to manufacturers guidance, welded and sealed to DPC running through cavity and protected by send DPC layer as per design.**<br><br>**DEFECTS – nonapplicable**<br><br>**REPAIRS – Some patch repairs from pin holes already carried out pre inspection** |
| **Approved Sub Grade** | **Contractor approved sub grade acceptance– Required for all verification visits. YES – sub grade approved by SWC prior to installation** |
| **Type of Joint** | ~~**Tape Joint Y/N**~~ **Auto Weld \|Yes Core Base** **Hand Weld Yes – detailing and corners** ~~**Extrusion Weld Y/N**~~ |

| | | |
|---|---|---|
| **Jointing/Detailing Testing (ASTM D4437)** | ~~**Air Lance Y/N**~~ | **Probe Test Yes** |
| **Laps, Welds, & detailing –** (Yes/No/NA) include notes for No | **Have all joints passed testing prior to assessor leaving site?** | **Yes** |
| | **Have all penetrations passed prior to assessor leaving site?** | **Yes** |
| | **Have all stanchions/columns passed testing prior to assessor leaving site?** | **n/a – no stanchions/columns to review** |
| | **Have all piles and pile caps passed testing prior to surveyor leaving site?** | **n/a** |
| | **Has all other detailing work passed testing prior to surveyor leaving site?** | **YES** |
| | **Photographic Evidence Taken** | **YES** |

| | |
|---|---|
| **Defects** (List any defects to detailing work and joints)<br><br>Include images | **n/a** |
| **Notes** | **Installation carried out by suitable experienced and qualified installers and deemed specialist gas installers by UKRS. Either holding NVQ2 in Gas Membrane install or Competent and Time Served.** |

# APPENDIX 1 – GOOD PRACTICE INSTALLATION GUIDANCE AND EXAMPLES

## APPENDIX 2 – EXAMPLE 'GROUND GAS VALIDATION SITE VISIT' SHEET

| | |
|---|---|
| **Site Name** | **Date** |
| **Site Address** | **Postcode** |
| **Area Checked** | **Installer Name** |
| **Inspected by** | **Weather** |

| **Item** | **Comments** | | |
|---|---|---|---|
| **Sub-floor Void** | | | |
| **Ventilation Inlets / Outlets** | | | |
| **Number of Vents** | | | |
| **Materials Used** | **Membrane -**<br><br>**Post / Pre Applied -**<br><br>**Protection Fleece / Board -**<br><br>**Tapes**<br><br>**Preformed Top Hats /Corners** | | |
| **Installation** (brief description of area/plots and list of defects/repairs identified) | | | |
| **Approved Sub Grade** | **Contractor approved sub grade acceptance form – Required for all verification visits.** | | |
| **Type of Joint** | **Tape Joint Y/N** | **Auto Weld \|Y/N** | **Hand Weld Y/N** | **Extrusion Weld Y/N** |
| **Jointing/Detailing Testing (ASTM D4437)** | **Air Lance Y/N** | **Probe Test Y/N** | |
| **Laps, Welds, & detailing –** (Yes/No/NA) include notes for No | **Have all joints passed testing prior to assessor leaving site?** | | |
| | **Have all penetrations passed prior to assessor leaving site?** | | |
| | **Have all stanchions/columns passed testing prior to assessor leaving site?** | | |
| | **Have all piles and pile caps passed testing prior to surveyor leaving site?** | | |
| | **Has all other detailing work passed testing prior to surveyor leaving site?** | | |
| | **Notes** | | |
| **Defects** (List any defects to detailing work and joints)<br><br>Include images | | | |

| | |
|---|---|
| **Notes** | |

# APPENDIX 3 – ASSOCIATED PRODUCTS DATASHEETS AND CERTIFICATION

Technical Datasheet

# Visqueen Gas Barrier

## Features & benefits

- BBA certified - third party accreditation
- Complies with NHBC Foundation's NF94 guidance for use in Type A membrane locations
- Complies with the methane gas transmission rate, mass per unit area and thickness requirements of BS 8485:2015 + A1:2019 - industry standard for methane and carbon dioxide protection
- Also provides radon and damp proof membrane protection
- 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)
- Complies with the methane gas transmission rate, mass per unit area and thickness requirements of BS 8485:2015 + A1:2019
- Suitable for all Characteristic Gas Situation (CS) ground gas regimes
- Complies with NHBC Foundation's NF94 guidance for use in Type A membrane locations
- Conforms to the specification requirements of NHBC Amber 1 and Amber 2 applications
- Conforms to the specification requirements of BR 211:2023
- UKCA UKNI CE to EN 13967:2017
- Visqueen certified with Quality Management System ISO 9001:2015
- Visqueen certified with Occupational Health and Safety System ISO 45001:2018
- Visqueen certified with 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 reinforced cast in situ concrete floor slabs or above precast suspended segmental subfloors, e.g. beam and block floor.

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

Radon, carbon dioxide, and methane protection - NHBC NF94 guidance:
Visqueen Gas Barrier when installed with either taped or welded joints complies with NHBC Foundation's NF94 publication, Hazardous ground gas - an essential guide for housebuilders, in Type A membrane locations in precast suspended segmental subfloors and reinforced cast in situ concrete floor slabs (ground bearing, suspended or raft). For site or zone characteristic gas situations of CS4 and above, contact Visqueen Technical Services.

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
- VisqueenPro Detailing Strip, 300mm x 10m, 500mm x 10m
- Visqueen TreadGUARD 1500, 1m x 2m
- Visqueen TreadGUARD 300, 2m x 75m
- Visqueen Ultimate Top Hat Units
- Visqueen GR Lap Tape, 150mm x 10m

## 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.

When installing the membrane in demanding site conditions, use Visqueen GR Lap Tape in place of Visqueen Gas Resistant Foil Lap Tape.



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# Visqueen Gas Barrier

## 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 Gas Resistant Foil Lap Tape. Alternatively lap joints can be heat welded to achieve an effective seal. The overlap in the barrier is typically 100mm and when hand welding, a 35mm weld is normally achieved. When hand welding, a roller must be used.

Airtight seals should be formed around all service entry points. Visqueen Preformed Top Hat Units are recommended for sealing service entry pipes. The base of the top hat and the upstand should be bonded using VisqueenPro Double Sided Jointing Tape and sealed with Visqueen Gas Resistant Foil Lap Tape. The upstand should be secured with the supplied jubilee clip. Alternatively VisqueenPro Detailing Strip can be used to seal service entry points. The upstand should be secured with a 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 VisqueenPro 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 Gas Resistant Foil Lap Tape. Alternatively a patch can be formed using VisqueenPro Detailing Strip and lapped at least 150mm beyond the extents of the puncture.

Long periods of exposure to ultraviolet light will reduce the effectiveness of the membrane. The membrane should be covered by a protective layer immediately after installation to prevent damage from following trades, ultraviolet light, etc. 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 HC Blok or Ultimate GeoSeal gas protection systems
To assist build sequencing, Visqueen Ultimate Gas DPC is available for gas protection through the wall constructions
For additional detailing information, contact Visqueen Technical Services +44 (0) 333 202 6800

The information in this datasheet was correct at the time of publication. It is the user's responsibility to obtain the latest version of the datasheet as it is updated on a regular basis. The information contained in the latest datasheet supersedes all previously published editions.

| Property | Test method | Units | Compliance criteria | Result |
|---|---|---|---|---|
| Dimensions | BS EN 1848-2 | m | | 2 x 50 |
| Overall thickness including scrim mesh | BS EN 1849-2 | mm | +/-10% | 0.52 |
| Mass | BS EN 1849-2 | g/m² | -0%/+5% | 400 |
| Tensile strength - MD | BS EN 12311 | N/50mm | MLV | 350 |
| Tensile strength - CD | BS EN 12311 | N/50mm | MLV | 350 |
| Tensile elongation - MD | BS EN 12311 | % | MLV | 20 |
| Tensile elongation - CD | BS EN 12311 | % | MLV | 21 |
| Joint strength | BS EN 12317-2 | N | MLV | 332 |
| Watertightness at 2kPa for 24 hours | BS EN 1928 | - | Pass/Fail | Pass |
| Resistance to impact | BS EN 12691 | mm | MDV | 150 |
| Dart impact | BS EN 2782 | g | MDV | 731 |
| Low temperature flexibility | BS EN 495-5 | °C | MDV | -40 |



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# Visqueen Gas Barrier

| | | | | |
|---|---|---|---|---|
| Durability against ageing | BS EN 1296 and BS EN 1928 | - | Pass/Fail | Pass |
| Durability chemical resistance | BS EN 1847 | - | Pass/Fail | Pass |
| Resistance to tearing (nail shank) CD | BS EN 12310-1 | N | MDV | 358 |
| Resistance to tearing (nail shank) MD | BS EN 12310-1 | N | MDV | 368 |
| Resistance to static loading | BS EN 12730 | kg | MLV | 20 |
| Water vapour resistance | BS EN 1931 | MNs/g | MDV | 240,000 |
| Water vapour permeability | BS EN 1931 | g/m²/d | MDV | 0.0008658 |
| Water vapour resistance factor | BS EN 1931 | µ | MDV | 120,000,000 |
| Equivalent air layer thickness | BS EN 1931 | SD in m | MDV | 47,700 |
| BS 8485:2015 + A1:2019 testing requirements | | | | |
| Mass | BS EN 1849-2 | g/m² | Average >370 | 400 |
| Methane gas transmission rate | BS ISO 15105-1 | ml/m²/day/atm | MDV | <0.15 |
| Puncture CBR | BS EN 12236 | N | MDV | 1114 |
| 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 | BS 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 safety datasheet (SDS).

## About Visqueen

Visqueen is a leading provider of construction membrane technologies and design-based solutions for ground gas, structural waterproofing, damp proofing and fire protection.

We offer complete support at every stage of the specification, including the supply chain process. As the UK's principal technical authority, we are best placed to ensure that the principal designer and contractor specify the most technically suited, durable, and competitive solution to guarantee their project is protected for the lifetime of the building.

Visqueen is at the forefront of advanced membrane technology and innovation in the construction industry, earning the trust and loyalty of specifiers throughout the UK and Europe.

For more information, visit visqueen.com or contact our sales office at +44 (0) 333 202 6800 or enquiries@visqueen.com

## Complete Range, Complete Solution




Passive Fire Protection | Gas Protection | Damp Proof Membrane | Air and Vapor Control | Stormwater | Damp Proof Course | Temporary Protection

## Visqueen Technical Support



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# Visqueen Gas Barrier

Visqueen offer a comprehensive full nationwide technical support. Our team of CSSW qualified technical support managers provide on site design-based solutions for specifiers, contractors and builders merchants, and will ensure that from design stage to installation the project is fully risk assessed and the specification is approved by all stakeholders.

Our Technical Office, can design, prepare and manage CAD detailing, together with assisting in quantity take offs, while offering advice on technical installations and product selection.

## Competency & Design

Visqueen promotes competency in building design by ensuring that its technical team possesses the necessary skills, knowledge, experience, and ethical practices. The company adopts the "golden thread of information," ensuring all project data is digitally secure and accessible throughout a building's lifecycle. This approach aligns with the Building Safety Act and aims to foster accountability and compliance with evolving regulations, providing clients with confidence in the safety and reliability of their projects.

## Visqueen CPD Seminars

Visqueen's CPD Seminars offer insights into Building Regulations, Standards, and industry guidance related to damp proofing, hazardous ground gas protection, and structural waterproofing. These one-hour seminars are tailored for construction design professionals and delivered by our Technical Support Managers. Visit our website to book a free CPD.

## Visqueen Contract Design Services

Visqueen Contract Design Services offers a bespoke design service led by our team of Certified Surveyors in Structural Waterproofing (CSSW), providing experienced and specialised waterproofing design expertise for complex projects. We provide comprehensive support throughout the entire project, ensuring that all work meets the requirements of warranty providers and adheres to the highest standards of quality, reliability and current legislation.

## Visqueen Training Academy

Based at our Derbyshire facility, the Visqueen Training Academy offers a variety of training programs across the UK. These include one-day product awareness sessions for distributors and builders' merchants, and intensive two-day courses for hands-on product installation training. Contact us for more information.





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Technical Datasheet

# Visqueen Adjustable Z Vent and Airbrick

## Features & benefits

- Functional solution for exhausting ground gases from underfloor voids

## Product description

Visqueen Airbricks are manufactured from UV stabilized polypropylene and are available in Terracotta and Black. The airbrick replaces an external masonry brick. It incorporates a front mounted louvered grill to permit airflow while blocking out wind driven rain and prohibiting large insects from gaining access.

Visqueen Adjustable Z Vents are manufactured from black polypropylene and are designed to provide a clear airflow passage to the underfloor void.

Visqueen Extension Sleeves are manufactured from black polypropylene and are designed to extend the vents both vertically and horizontally.

The airbrick, vent and extension sleeve are sold separately.

When combined with the vent (with or without the extension sleeve), each airbrick provides a free air flow capacity of 6450mm².

## Approvals and standards

- Visqueen certified with Quality Management System ISO 9001:2015
- Visqueen certified with Occupational Health and Safety System ISO 45001:2018
- Visqueen certified with Environmental Management System ISO 14001:2015

## Usage

Visqueen Adjustable Z Vent and Airbrick system is used within external masonry cavity wall constructions to provide a clear airflow passage to the void beneath precast suspended segmental ground floors e.g. beam and block. The system is used to achieve a passive subfloor ventilation system in accordance with BS8485:2015 + A1:2019, effectively diluting any hazardous ground gases accumulating in the underfloor void.

The telescopic feature enables the vent to adjust vertically within the cavity to between three and five brick courses (225mm and 375mm).

The airbrick replaces individual masonry bricks in the external leaf.

The system includes a Visqueen Extension Sleeve which increases the adjustment of the vertical portion of the vent by a further two brick courses (150mm). Additional sleeves can be used to extend the coursing indefinitely. The extension sleeves can also be used to extend the horizontal portion of the vent e.g. for wider cavity applications.

## Storage and handling

Visqueen Adjustable Z Vents and Airbricks should be stored horizontally, under cover in the original packaging.

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

## Preparation

Visqueen Adjustable Z Vent and Airbrick fit within a 50mm wide cavity, but also suits wider cavities that are filled with insulation leaving only a 50mm gap. A Visqueen Extension Sleeve is necessary to extend the vent horizontally where cavities are in excess of 200mm.

## Installation

Visqueen Adjustable Z Vents and Airbricks should be installed during the normal course of bricklaying. A Visqueen Zedex CPT High Performance DPC cavity tray should be fitted above the vent.

Vents and airbricks should be fitted in at least two opposing walls to create a through flow of air. The vents and airbricks should be placed at centers as stipulated in BS8485:2015 + A1:2019 and within 450mm of each end of the wall. Bricklaying should then be completed as normal although care should be taken to keep the air flow passage clear from mortar droppings.

Where the vents require extending, Visqueen Extension Sleeves should be used.

## Usable temperature range

There are no temperature range restrictions for installing Visqueen Adjustable Z Vents, Airbricks and Extension Sleeves.



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# Visqueen Adjustable Z Vent and Airbrick

legislation.

## Visqueen Training Academy

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Technical Datasheet

# Visqueen Adjustable Z Vent and Airbrick

## Features & benefits

- Functional solution for exhausting ground gases from underfloor voids

## Product description

Visqueen Airbricks are manufactured from UV stabilized polypropylene and are available in Terracotta and Black. The airbrick replaces an external masonry brick. It incorporates a front mounted louvered grill to permit airflow while blocking out wind driven rain and prohibiting large insects from gaining access.

Visqueen Adjustable Z Vents are manufactured from black polypropylene and are designed to provide a clear airflow passage to the underfloor void.

Visqueen Extension Sleeves are manufactured from black polypropylene and are designed to extend the vents both vertically and horizontally.

The airbrick, vent and extension sleeve are sold separately.

When combined with the vent (with or without the extension sleeve), each airbrick provides a free air flow capacity of 6450mm².

## Approvals and standards

- Visqueen certified with Quality Management System ISO 9001:2015
- Visqueen certified with Occupational Health and Safety System ISO 45001:2018
- Visqueen certified with Environmental Management System ISO 14001:2015

## Usage

Visqueen Adjustable Z Vent and Airbrick system is used within external masonry cavity wall constructions to provide a clear airflow passage to the void beneath precast suspended segmental ground floors e.g. beam and block. The system is used to achieve a passive subfloor ventilation system in accordance with BS8485:2015 + A1:2019, effectively diluting any hazardous ground gases accumulating in the underfloor void.

The telescopic feature enables the vent to adjust vertically within the cavity to between three and five brick courses (225mm and 375mm).

The airbrick replaces individual masonry bricks in the external leaf.

The system includes a Visqueen Extension Sleeve which increases the adjustment of the vertical portion of the vent by a further two brick courses (150mm). Additional sleeves can be used to extend the coursing indefinitely. The extension sleeves can also be used to extend the horizontal portion of the vent e.g. for wider cavity applications.

## Storage and handling

Visqueen Adjustable Z Vents and Airbricks should be stored horizontally, under cover in the original packaging.

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

## Preparation

Visqueen Adjustable Z Vent and Airbrick fit within a 50mm wide cavity, but also suits wider cavities that are filled with insulation leaving only a 50mm gap. A Visqueen Extension Sleeve is necessary to extend the vent horizontally where cavities are in excess of 200mm.

## Installation

Visqueen Adjustable Z Vents and Airbricks should be installed during the normal course of bricklaying. A Visqueen Zedex CPT High Performance DPC cavity tray should be fitted above the vent.

Vents and airbricks should be fitted in at least two opposing walls to create a through flow of air. The vents and airbricks should be placed at centers as stipulated in BS8485:2015 + A1:2019 and within 450mm of each end of the wall. Bricklaying should then be completed as normal although care should be taken to keep the air flow passage clear from mortar droppings.

Where the vents require extending, Visqueen Extension Sleeves should be used.

## Usable temperature range

There are no temperature range restrictions for installing Visqueen Adjustable Z Vents, Airbricks and Extension Sleeves.

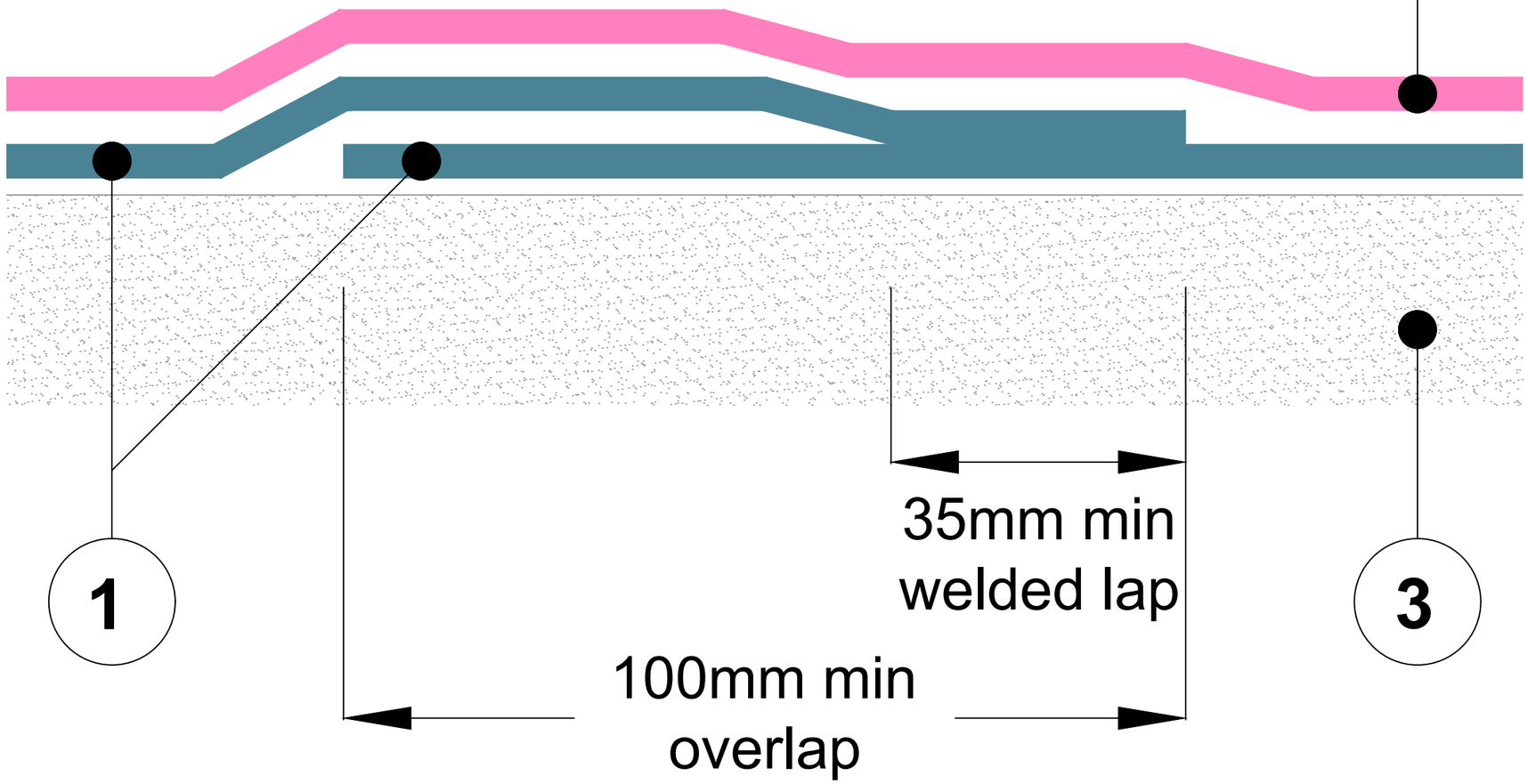


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## APPENDIX 4 - STANDARD DETAILS

https://visqueen.com/technical-downloads/#detail-library

| | |
|---|---|
| 1 | **Visqueen membrane as specified. On-site heat weldable membranes include the following:**<br><br>- **Visqueen High Performance Damp Proof Membrane**<br>- **Visqueen Radon R400 Membrane**<br>- **Visqueen Ultimate RadonBlok 400**<br>- **Visqueen Ultimate RadonBlok 600**<br>- **Visqueen Low Permeability Gas Membrane**<br>- **Visqueen Gas Barrier**<br>- **Visqueen Ultimate HC Blok**<br>- **Visqueen High Performance Urban Drainage Geomembrane** |
| 2 | **Visqueen TreadGUARD protection where specified** |
| 3 | **Smooth substrate e.g. sand blinding** |




## CRITICAL GUIDANCE NOTES

**Visqueen Guidance Details are for illustration purposes only. It is the lead designer's responsibility to ensure Guidance Details are incorporated correctly into construction drawings.**

**Visqueen take no project design liability, or responsibility for the use of Guidance Details. Visqueen have no control over the situation in which the products are installed. Visqueen provide a Contract Design Service where project specific drawings can be produced. Contact Visqueen Technical Services for further information.**

**Site construction sequencing should be assessed before the appropriate Guidance Detail is selected and approved by the lead designer.**

**All Visqueen materials must be installed in strict accordance with the Visqueen Product Datasheets and applicable third party certificates.**

**This detail relates to the formation of a sealed lap joint using a hot air hand welder and roller. Other lap joint heat welding techniques are suitable including wedge welding.**

**Drawing not to scale, use figured dimensions only. All figured dimensions are in millimetres.**

**Guidance Detail**

**Date: September 2023**

**Drawing No: JD-08**

**Revision: A** | **Drawn by: JR**

**Approved by: SD**

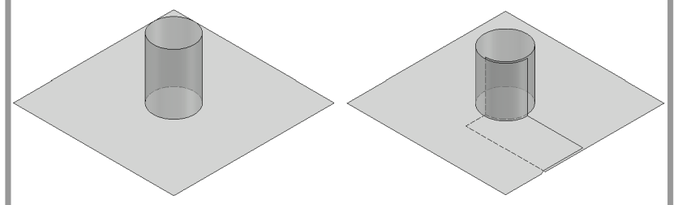
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# HAND WELDED LAP JOINT DETAIL

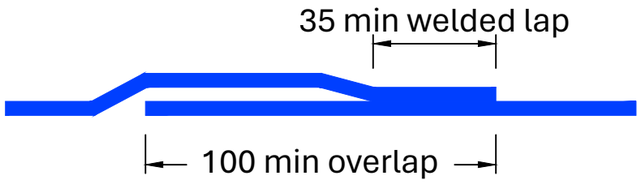
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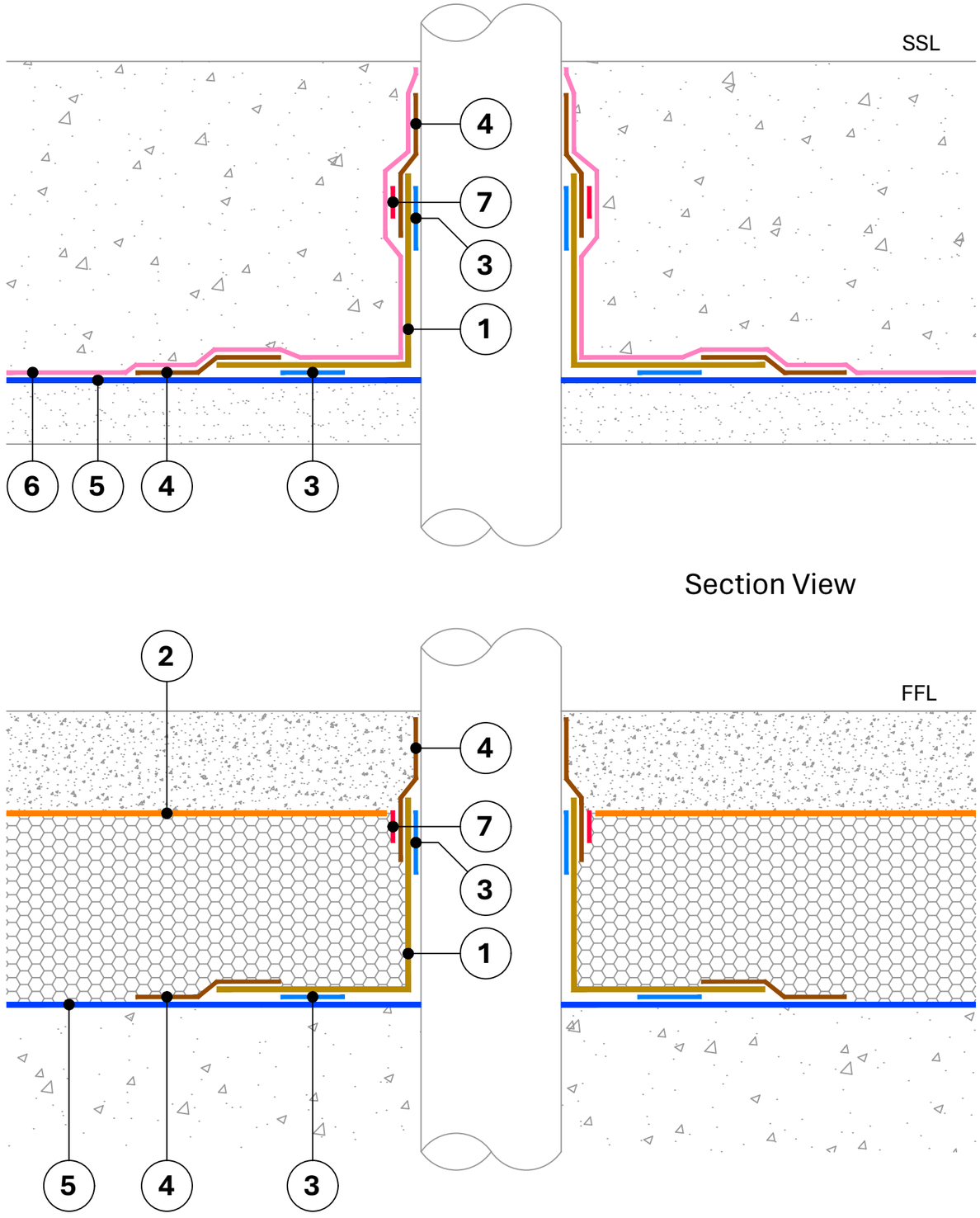
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## Key to materials:

| | |
|---|---|
| 1 | **Visqueen Ultimate Preformed Pipe Sleeve (Top Hat)**<br><br>**PFU-203** **PFU-205** |
| 2 | **Visqueen Vapour Check or Visqueen Vapour Barrier** |
| 3 | **VisqueenPro Double Sided Jointing Tape** |
| 4 | **Visqueen Gas Resistant Foil Lap Tape** |
| 5 | **Visqueen Gas Barrier** |
| 6 | **Visqueen TreadGUARD** |
| 7 | **Jubilee clip** |

**Gas Barrier Welded Joint**




## CRITICAL GUIDANCE NOTES

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Drawing not to scale, use figured dimensions only. All figured dimensions are in millimetres.

British Standards are regularly updated. Visqueens' Guidance Details meet recommendations in place on date drawn.

Protection such as pressure relief or ventilation measures (not shown) may be necessary to meet the requirements of British Standards and industry guidance.

Some Visqueen membranes can be installed with welded lap joints.

**Contact Visqueen Technical Services for further information.**

## Guidance Detail

**Drawing No: GB-51**

**Drawn by: JR**

**Approved: SD**

**Date drawn: September 2024**

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VISQUEEN GAS BARRIER

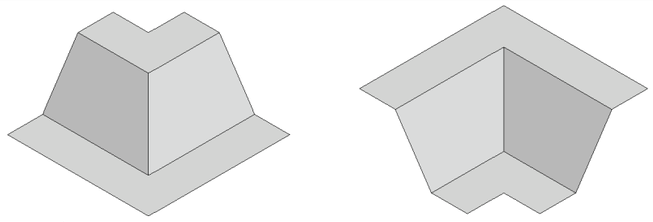
# BARRIER BELOW & ABOVE SLAB PIPE SLEEVE DETAILS

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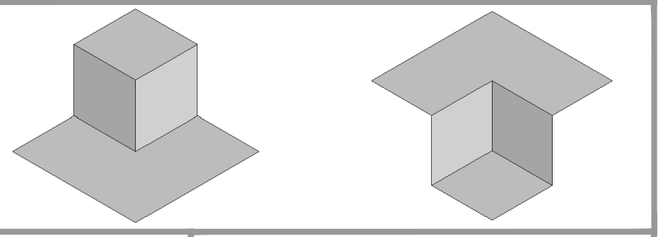
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## Key to materials:

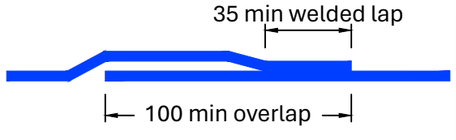
| | |
|---|---|
| 1 | Visqueen Zedex CPT High Performance Damp Proof Course |
| 2 | Visqueen Ultimate Gas Damp Proof Course |
| 3 | Visqueen Vapour Check or Visqueen Vapour Barrier |
| 4 | VisqueenPro Double Sided Jointing Tape |
| 5 | Visqueen Gas Resistant Foil Lap Tape |
| 6 | Visqueen Gas Barrier |
| 7 | Visqueen Adjustable Z Vent & Airbrick |
| A | PFU-501 Preformed Units at corners |

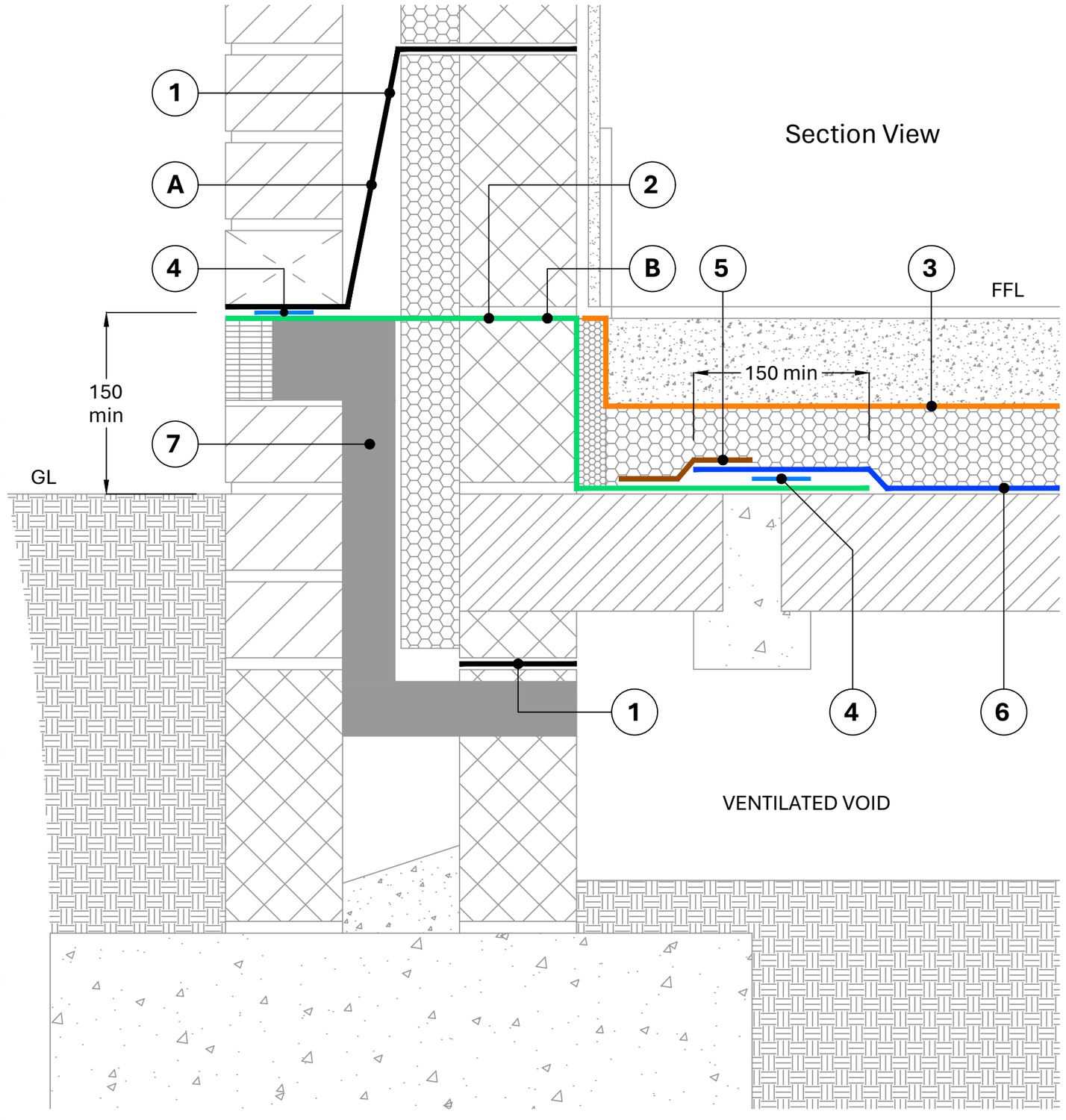


| | |
|---|---|
| B | PFU-553 Preformed Units at corners |



**Gas Barrier Welded Joint**




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Visqueen take no project design liability, or responsibility for the use of Guidance Details.

Drawing not to scale, use figured dimensions only. All figured dimensions are in millimetres.

British Standards are regularly updated. Visqueens' Guidance Details meet recommendations in place on date drawn.

Some Visqueen membranes can be installed with welded lap joints.

Visqueen Preformed Units are available to assist complex detailing, such as internal and external corners.

**Contact Visqueen Technical Services for further information.**

## Guidance Detail

**Drawing No: GB-04**

**Drawn by: JR**

**Approved: SD**

**Date drawn: September 2024**

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VISQUEEN GAS BARRIER

# BARRIER ABOVE SLAB, BEAM & BLOCK FLOOR, EXTERNAL MASONRY CAVITY WALL AT TELESCOPIC VENT LOCATION

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