

NS/M4246/13163

29 May 2024

D H Welton & Co Limited  
Corn Street,  
Failsworth,  
Manchester,  
M35 0UE

*For the attention of Mr Adam Welton*

Dear Adam

**Re: Dean Trust Academy, Ardwick – Verification of Ground Gas Protection Measures, Fitness Suite**

We write to report on the verification of ground gas protection measures for the development at the above site.

*Background*

BSL has had extensive involvement in assisting the Dean Trust through their contaminated land planning conditions since the school, which was built in 2015, began to be extended in 2019 to facilitate its growing needs.

In 2019 a planning application was submitted for a new two storey extension and undercroft car parking, a single storey dining extension, and the removal of earth bunds for construction of new surface level car park and hard surfaced play areas. These have since been constructed at the site, and the school now proposes to construct a new fitness suite under the recently constructed classroom extension, in the area of the undercroft parking as shown on drawing ref. 5627-HMA-DTA-00-DR-A-00003 and 5627-HMA-00-00-DR-A-20101 appended. It is also proposed to build two covered cycle parking bays which is demonstrated on the proposed landscaping and fencing plan ref. 5627-HMA-DTA-00-DR-A-20105. No areas of soft landscaping are proposed. Planning for this has been granted in July 2023 (137058/FO/2023).

The following reports have been issued in relation to the development of the Fitness Suite ('the site') and should be read in conjunction with this Verification Report:

- 
- BSL, Phase II Geo-Environmental Risk Assessment Letter Report, reference NHA/M4246/12346, dated 8<sup>th</sup> September 2023; and,
  - BSL, Verification Plan for Ground Gas Protection Measures, reference CM/M4246/12358, dated September 2023.
- 

The Gas Risk Assessment Report, reference CM/M4246/12358, recommended ground gas protection measures are required for the redevelopment in accordance with Characteristic Situation 2 (CS2) as stated within CIRIA C665 'Assessing risks posed by hazardous ground gases to buildings' and BS 8485:2015+A1:2019.

*Methodology and Inspection Records*

Following the installation of the recommended protective measures, independent verification has been carried out in line with the requirements of the Verification Plan, BS 8485:2015+A1:2019 and CIRIA 735 (2014). The verification was undertaken by an engineer who is experienced in the verification of gas

mitigation measures and has undertaken the Verification of Gas Protection Systems course delivered by Neil Salvidge TD&A Ltd.

The gas protection system will be installed by experienced operatives from PA Geotechnical who have also completed an NVQ Level 2 in substructure work occupations (Installation of Gas Membranes – Construction). Copies of the NVQ certification are appended for reference.

BSL attended site between 17<sup>th</sup> April to 21<sup>st</sup> May 2024 to verify the installation of protection measures as per the design drawings, including a thorough visual inspection of membrane coverage, joints, laps, seals and service entries across the building footprint.

The membrane utilised was the Monarlex Gas-Resistant Membrane which BSL consider suitable for use for protection against carbon dioxide, methane, and radon. The data sheet for the membrane is appended in Appendix B. Protection measures included cast in situ reinforced floor slab.

The membrane and gas protection measures were visually inspected and all laps and seals were mechanically pick tested in accordance with ASTM standards. Copies of the records of gas membrane visual inspections are presented in Appendix C and a photographic record of the inspections are enclosed.

All laps and seals were also independently tested with an air lance in accordance with ASTM standards. The certificates are provided in Appendix D.

Where defects were observed these were immediately rectified by site staff.

A summary of the inspections is presented in the table below:

| Area           | Date (s) Inspected | Pass / Fail |
|----------------|--------------------|-------------|
| Perimeter Wall | 17/04/24           | Pass        |
| Perimeter Wall | 01/05/24           | Pass        |
| Slab Area      | 21/05/24           | Pass        |

#### *Summary*

Based on the inspections and testing undertaken, Brownfield Solutions Ltd confirm the installed ground gas protection measures in the above areas comply with the design and specification drawings and the Verification Plan.

This verification report should be presented to the Local Authority and warranty provider. We trust that this is sufficient to discharge planning conditions relating to the installation of ground gas protection measures within the above plots.

Should any future construction or repair works be undertaken, the integrity of gas protection measures should be maintained and where any damage is caused suitable repairs are carried out. Where any new service entries or features will penetrate the slab and gas protection system, then appropriate protection should be included.

#### *Limitations*

Brownfield Solutions Ltd (BSL) has prepared this report in accordance with the best available practice and the relevant guidance documents available at the time of issuing this report.

This report is limited to the verification that the gas protection measures are correctly installed at the time site inspection visits were carried out. Efforts should be made to ensure follow on works do not comprises the integrity of the installed ground gas protection measures and any damage should be suitably repaired. BSL have not carried out any design work in respect of the gas protection measures

prescribed for this site and therefore no professional liability is extended in respect of the gas protection design.

We trust the above meets requirements, however, if you have any queries please do not hesitate to contact the undersigned.

Yours sincerely

**For Brownfield Solutions Ltd**

**Written by:**



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**Checked and approved by:**



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Enc   Photographs  
      Appendix A - Drawings  
      Appendix B - Gas Membrane Datasheets  
      Appendix C - Gas Protection Measures Inspection Records  
      Appendix D - Air Lance Testing Certificates



## **APPENDIX A**

### **Drawings**

Column surround. Cut around pressed metal. Allow for timber and shaped ply former to retain cut edge

H11/110 Curtain Walling

Curtain Walling overlaps brick by 30mm

Aluminium Cill

F30/361 Single leaf DPC  
min 150 above ground

60mm Kooltherm M10/290

F10/111 Brickwork below FFL

Proposed Air Tightness line

Silicone Sealant

P20/201 Cill Board

F30/361 DPC lapped and sealed to DPM

K10/185 Plasterboard on dabs

Uprand as per SE design

Aerofil M10/115

M10/290 Polythene slip membrane

Floor finish - Refer to finishes plan

M10/115 70mm Screed

M10/290 60mm Kooltherm

DPM J40/141 Gas membrane

Foundation to SE design

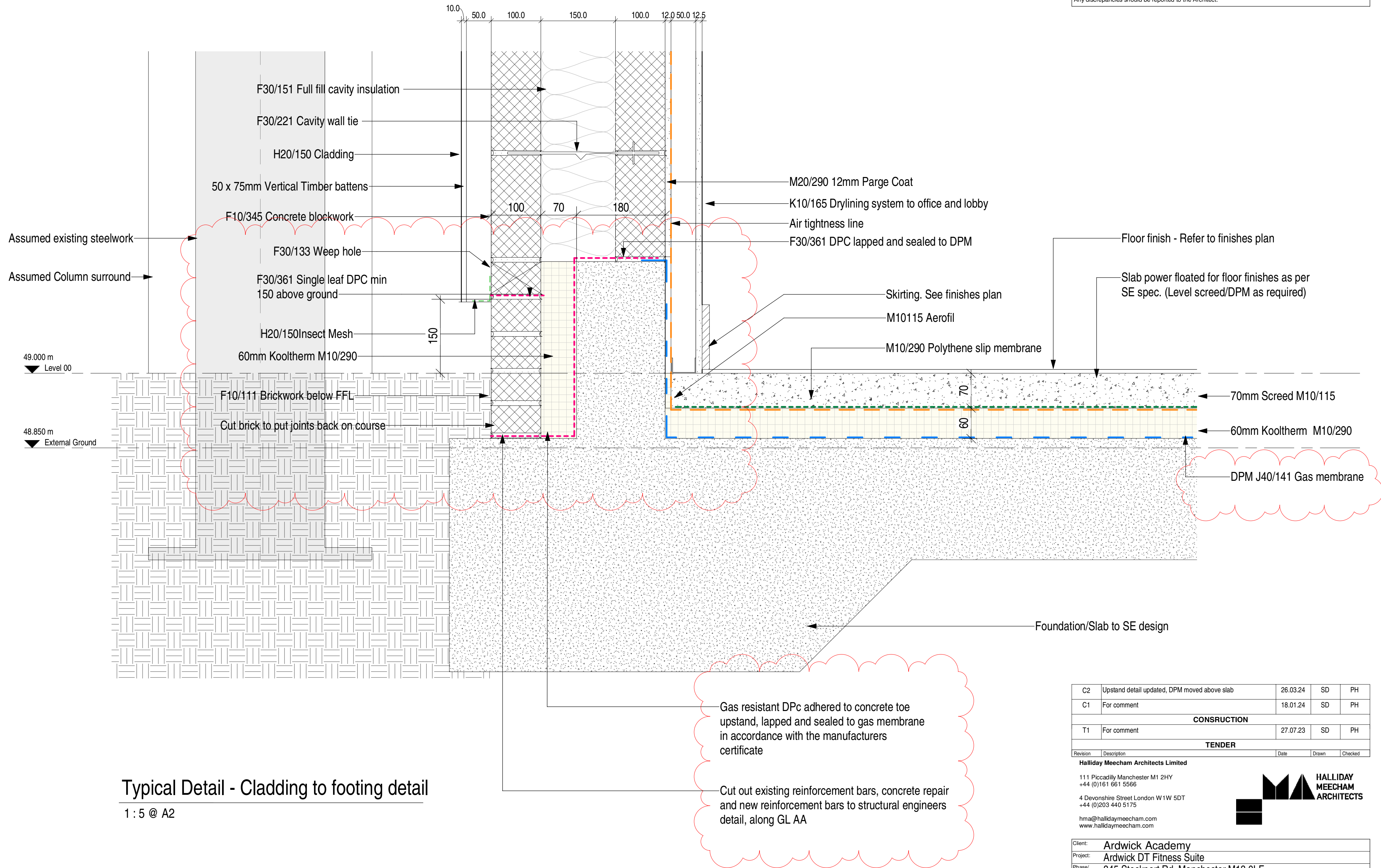
Gas resistant DPC adhered to concrete toe upstand, lapped and sealed to gas membrane in accordance with the manufacturers certificate

Cut brick to put joints back on course

Typical Detail - Curtain wall to footing

1 : 5 @ A3

|                                                           |                                    |           |              |              |
|-----------------------------------------------------------|------------------------------------|-----------|--------------|--------------|
| C2                                                        | Updated ground level, DPM membrane | 26.03.24  | SD           | PH           |
| C1                                                        | For comment                        | 18.01.23  | SD           | PH           |
| CONSTRUCTION                                              |                                    |           |              |              |
| T1                                                        | For comment                        | 27.07.23  | SD           | PH           |
| TENDER                                                    |                                    |           |              |              |
| Revision                                                  | Description                        | Date      | Drawn        | Checked      |
| Halliday Meecham Architects Limited                       |                                    |           |              |              |
| 111 Piccadilly Manchester M1 2HY<br>+44 (0)161 661 5566   |                                    |           |              |              |
| 4 Devonshire Street London W1W 5DT<br>+44 (0)203 440 5175 |                                    |           |              |              |
| hma@hallidaymeecham.com<br>www.hallidaymeecham.com        |                                    |           |              |              |
| Client: Ardwick Academy                                   |                                    |           |              |              |
| Project: Ardwick DT Fitness Suite                         |                                    |           |              |              |
| Phase/ Location: 345 Stockport Rd, Manchester M13 0LF     |                                    |           |              |              |
| Drawing: Typical Detail - Curtain Wall to footing         |                                    |           |              |              |
| Scale @ A3                                                | Date: 07/03/23                     | Drawn: SD | Checked: PEH | Job No. 5627 |
| Drawing Ref.                                              | 5627-HMA-DTA-XX-DR-A-21206         |           |              | Revision C2  |



Typical Detail - Cladding to footing detail

1 : 5 @ A2

|              |                                              |          |       |         |
|--------------|----------------------------------------------|----------|-------|---------|
| C2           | Upstand detail updated, DPM moved above slab | 26.03.24 | SD    | PH      |
| C1           | For comment                                  | 18.01.24 | SD    | PH      |
| CONSTRUCTION |                                              |          |       |         |
| T1           | For comment                                  | 27.07.23 | SD    | PH      |
| TENDER       |                                              |          |       |         |
| Revision     | Description                                  | Date     | Drawn | Checked |

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|                 |                                      |                |                   |              |
|-----------------|--------------------------------------|----------------|-------------------|--------------|
| Client:         | Ardwick Academy                      |                |                   |              |
| Project:        | Ardwick DT Fitness Suite             |                |                   |              |
| Phase/Location: | 345 Stockport Rd, Manchester M13 0LF |                |                   |              |
| Drawing:        | Typical Detail - Cladding to Footing |                |                   |              |
| Scale @ A2      | Scale @ A3                           | Date: 07/03/23 | Drawn: SD         | Checked: PEH |
|                 |                                      | Job No: 5627   | Drawing No: 21201 |              |
| Drawing Ref:    | 5627-HMA-DTA-XX-DR-A-21201           |                |                   | Revision C2  |

## **APPENDIX B**

### **Gas Membrane Data Sheets**

## Icopal Ltd

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Milton Keynes MK11 3LW

Tel: 01908 015760

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## Agrément Certificate

00/3668

Product Sheet 1

### MONARFLEX GAS-RESISTANT MEMBRANES

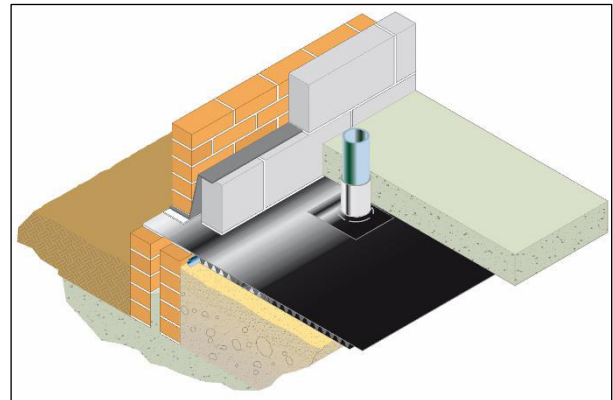
#### MONARFLEX REFLEX SUPER GAS-RESISTANT MEMBRANE

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to Monarflex Reflex Super Gas-Resistant Membrane, for use above or below concrete ground floor slabs not subject to hydrostatic pressure, as a gas barrier and damp-proof membrane (dpm) to protect the building against moisture, radon, methane and carbon dioxide from the ground.

(1) Hereinafter referred to as 'Certificate'.

#### CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



#### KEY FACTORS ASSESSED

**Resistance to water and water vapour** — the membrane provides an effective barrier to the passage of liquid water and water vapour from the ground (see section 6).

**Resistance to underground gases** — the membrane is capable of restricting the ingress of radon, methane and carbon dioxide into the building (see section 7).

**Resistance to puncture** — the membrane has a high resistance to puncture and on a smooth or blinded surface will not be damaged by foot or site traffic (see section 8).

**Durability** — under normal service conditions, the membrane will remain effective against the ingress of water and water vapour, and will restrict the ingress of radon, methane and carbon dioxide during the lifetime of the flooring construction in which it is installed (see section 12).



The BBA has awarded this Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of Sixth issue: 24 June 2020

Originally certificated on 18 February 2000

Hardy Giesler  
Chief Executive Officer

The BBA is a UKAS accredited certification body – Number 113.

The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at [www.bbacerts.co.uk](http://www.bbacerts.co.uk)  
Readers MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.

Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

#### British Board of Agrément

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## Regulations

In the opinion of the BBA, Monarflex Reflex Super Gas-Resistant Membrane, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



### The Building Regulations 2010 (England and Wales) (as amended)

|                     |              |                                                                                                                                                                                                                                                   |
|---------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Requirement:</b> | <b>C1(2)</b> | <b>Preparation of site and resistance to contaminants</b>                                                                                                                                                                                         |
| <b>Comment:</b>     |              | The product can contribute to a structure satisfying this Requirement. See section 7.1 of this Certificate.                                                                                                                                       |
| <b>Requirement:</b> | <b>C2(a)</b> | <b>Resistance to moisture</b>                                                                                                                                                                                                                     |
| <b>Comment:</b>     |              | When properly installed in a correctly designed structure, the product forms an effective barrier to the movement of water within the ground floor slab, enabling compliance with this Requirement. See sections 6.1 and 6.2 of this Certificate. |
| <b>Regulation:</b>  | <b>7(1)</b>  | <b>Materials and workmanship</b>                                                                                                                                                                                                                  |
| <b>Comment:</b>     |              | The product is acceptable. See section 12.1 and the <i>Installation</i> part of this Certificate.                                                                                                                                                 |



### The Building (Scotland) Regulations 2004 (as amended)

|                    |               |                                                                                                                                                                                                                                                                                                                                         |
|--------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Regulation:</b> | <b>8(1)</b>   | <b>Durability, workmanship and fitness of materials</b>                                                                                                                                                                                                                                                                                 |
| <b>Comment:</b>    |               | The use of the product satisfies the requirements of this Regulation. See section 12.1 and the <i>Installation</i> part of this Certificate.                                                                                                                                                                                            |
| <b>Regulation:</b> | <b>9</b>      | <b>Building standards applicable to construction</b>                                                                                                                                                                                                                                                                                    |
| <b>Standard:</b>   | <b>3.1</b>    | Site preparation – harmful and dangerous substances                                                                                                                                                                                                                                                                                     |
| <b>Standard:</b>   | <b>3.2</b>    | Site preparation – protection from radon gas                                                                                                                                                                                                                                                                                            |
| <b>Comment:</b>    |               | The product will enable a floor to satisfy the requirements of these Standards, with reference to clauses 3.1.2 <sup>(1)(2)</sup> , 3.1.6 <sup>(1)(2)</sup> , 3.1.7 <sup>(1)(2)</sup> , 3.1.8 <sup>(1)(2)</sup> and 3.2.2 <sup>(1)(2)</sup> . See section 7.1 of this Certificate.                                                      |
| <b>Standard:</b>   | <b>3.4</b>    | Moisture from the ground                                                                                                                                                                                                                                                                                                                |
| <b>Comment:</b>    |               | When properly installed in a correctly designed structure, the product forms an effective barrier to the movement of water within the ground-floor slab, enabling compliance with clauses 3.4.2 <sup>(1)(2)</sup> , 3.4.4 <sup>(1)(2)</sup> and 3.4.6 <sup>(1)(2)</sup> of this Standard. See sections 6.1 and 6.2 of this Certificate. |
| <b>Standard:</b>   | <b>7.1(a)</b> | Statement of sustainability                                                                                                                                                                                                                                                                                                             |
| <b>Comment:</b>    |               | The product can contribute to meeting the relevant requirements of Regulation 9, Standards 1 to 6 and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.                                                                                                                 |
| <b>Regulation:</b> | <b>12</b>     | <b>Building standards applicable to conversions</b>                                                                                                                                                                                                                                                                                     |
| <b>Comment:</b>    |               | All comments given for the product under Regulation 9, Standards 1 to 6 also apply to this Regulation, with reference to clause 0.12.1 <sup>(1)(2)</sup> and Schedule 6 <sup>(1)(2)</sup> .                                                                                                                                             |

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).



### The Building Regulations (Northern Ireland) 2012 (as amended)

|                    |                    |                                                                                                   |
|--------------------|--------------------|---------------------------------------------------------------------------------------------------|
| <b>Regulation:</b> | <b>23(a)(i)</b>    | <b>Fitness of materials and workmanship</b>                                                       |
| <b>Comment:</b>    | <b>(iii)(b)(i)</b> | The product is acceptable. See section 12.1 and the <i>Installation</i> part of this Certificate. |

|                    |              |                                                                                                                                                                                                                                                  |
|--------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Regulation:</b> | <b>26(2)</b> | <b>Site preparation and resistance to contaminants</b>                                                                                                                                                                                           |
| <b>Comment:</b>    |              | The product can contribute to a structure satisfying the requirements of this Regulation. See section 7.1 of this Certificate.                                                                                                                   |
| <b>Regulation:</b> | <b>28(a)</b> | <b>Resistance to moisture and weather</b>                                                                                                                                                                                                        |
| <b>Comment:</b>    |              | When properly installed in a correctly designed structure, the product forms an effective barrier to the movement of water within the ground floor slab, enabling compliance with this Regulation. See sections 6.1 and 6.2 of this Certificate. |

## Construction (Design and Management) Regulations 2015

## Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See section: 1 *Description* (1.3) of this Certificate.

### Additional Information

#### NHBC Standards 2020

In the opinion of the BBA, Monarflex Reflex Super Gas-Resistant Membrane, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapters 4.1 *Land quality – managing ground conditions* and 5.1 *Substructure and ground bearing floors*.

#### CE marking

The Certificate holder has taken the responsibility of CE marking the product in accordance with harmonised European Standard EN 13967 : 2012.

### Technical Specification

#### 1 Description

1.1 Monarflex Reflex Super Gas-Resistant Membrane is a gas barrier and dpm used to protect against moisture, radon, methane and carbon dioxide from the ground, comprising a composite six-layer polyethylene membrane encapsulating an aluminium foil and reinforcement grid. The membrane has a thickness of 0.4 mm (excluding the reinforcement grid) and total product thickness of 0.6 mm (including the reinforcement grid).

1.2 The top surface is sand-coloured and ribbed, while the underside is silver with a smooth finish.

1.3 The membrane is manufactured to the nominal characteristics of:

|                                         |                               |
|-----------------------------------------|-------------------------------|
| Total Product Thickness (mm)            | 0.6 (including reinforcement) |
| Effective thickness (mm)                | 0.4                           |
| Width (m)                               | 2.05                          |
| Roll length (m)                         | 25, 50                        |
| Roll weight (kg) <sup>(1)</sup>         | 23, 46                        |
| Mass per unit area (g·m <sup>-2</sup> ) | 440                           |
| Tensile strength (N per 50 mm)          |                               |
| MD                                      | ≥550                          |
| CD                                      | ≥550                          |
| Elongation (%)                          |                               |
| MD                                      | ≥15                           |
| CD                                      | ≥12                           |
| Nail tear resistance (N)                |                               |
| MD                                      | ≥300                          |

|                              |               |
|------------------------------|---------------|
| CD                           | ≥300          |
| Resistance to liquid water   | Pass at 2 kPa |
| Joint strength (N per 50 mm) |               |
| tape Monobond                | ≥50           |
| welding                      | ≥100.         |

(1) Pre-welded sheets are available to order.

1.4 Ancillary items for use with the product include:

- Monobond — a 70 mm wide, double-sided gas barrier sealant tape, for joining side and end overlaps
- MonarSeal MRX — a self-adhesive gas membrane for three-dimensional sealing and patching.

## 2 Manufacture

2.1 The product is manufactured by extrusion and lamination processes.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The management systems of the manufacturer have been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by TÜV SUD Slovakia s.r.o. (Certificate Q 1243-3).

## 3 Delivery and site handling

3.1 Rolls and pre-welded sheets are wrapped in clear polythene film, marked with a label bearing the product name, width and length, and the Certificate holder's address and phone number. The BBA logo incorporating the number of this Certificate is printed on the wrapper.

3.2 Rolls must be stacked on a flat surface, kept under cover and protected from mechanical damage.

## Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Monarflex Reflex Super Gas-Resistant Membrane.

## Design Considerations

## 4 Use

4.1 Monarflex Reflex Super Gas-Resistant Membrane is satisfactory for use as a gas-resistant barrier to restrict the ingress of radon, methane and carbon dioxide into buildings from landfill and naturally occurring sources.

4.2 Buildings in areas of risk should be constructed in accordance with the recommendations of BRE Report BR 211 : 2015, and following the guidance set out in BS 8485 : 2015.

4.3 The product is also satisfactory for use as a dpm in accordance with CP 102 : 1973 Section 3, BS 8000-0 : 2014 and BS 8000-4 : 1989.

## 5 Practicability of installation

The product is designed to be installed by a competent general builder, or a contractor, experienced with this type of product.

## 6 Resistance to water vapour



6.1 The membrane, including joints, provides an effective barrier to the passage of moisture from the ground.

6.2 When installed in accordance with the following documents, the membrane will comply with the minimum sheet thickness detailed in the documents supporting the national Building Regulations.

6.3 The membrane is impervious to water and provides a waterproof layer capable of accepting minor structural movements without damage.

## 7 Resistance to underground gases



7.1 The product will restrict the ingress of radon, methane and carbon dioxide into buildings from landfill and naturally occurring sources, and satisfy the performance criteria for a gas-resistant membrane as defined in BS 8485 : 2015<sup>(1)</sup>.

7.2 Measured methane gas permeability for the membrane is given in Table 1.

*Table 1 Methane gas permeability*

| Gas     | Method             | Result                                                                           |
|---------|--------------------|----------------------------------------------------------------------------------|
| Methane | ISO 15105-1 : 2007 | $\leq 0.12 \text{ ml}\cdot\text{m}^{-2}\cdot\text{day}^{-1}\cdot\text{atm}^{-1}$ |

(1) BS 8485 : 2015 requires that the methane gas transmission rate measured in accordance with ISO 15105-1 : 2007 for a gas resistant membrane is  $< 40 \text{ ml}\cdot\text{m}^{-2}\cdot\text{day}^{-1}\cdot\text{atm}^{-1}$ .

7.3 In the opinion of the BBA, the product satisfies the criteria for a radon gas-resistance membrane of BRE Report BR 211 : 2015.

## 8 Resistance to puncture

8.1 The membrane can be punctured by sharp objects, and care should be taken when handling building materials over the exposed surface.

8.2 Provided there are no sharp objects present on the membrane's surface prior to and during installation of the protective layer, the product will not be damaged by normal foot traffic.

## 9 Compatibility with other materials

The membrane contains an aluminium foil interply which may be subject to corrosion by alkaline conditions if damage to the membrane and exposure occurs. However, under normal circumstances, the polyethylene faces of the membrane are compatible with other materials and products typically used in the same areas, with the exception of those containing pitch.

## 10 Effects of temperature

The product can be installed in all normal site conditions down to  $-12^{\circ}\text{C}$ . The membrane must be dry and free from ice during jointing operations.

## 11 Maintenance

As the product is confined under concrete and has suitable durability (see section 12), maintenance is not required. However, any damage occurring before enclosure must be repaired (see section 16).

## 12 Durability



12.1 The membrane will, in normal circumstances, remain effective against the ingress of water and water vapour, and will restrict the ingress of radon, methane and carbon dioxide during the lifetime of the building.

12.2 Long periods of exposure to ultraviolet light will reduce the effectiveness of the membrane.

## 13 Reuse and recyclability

The product comprises polyethylene, which can be recycled.

## Installation

### 14 General

14.1 Monarflex Reflex Super Gas-Resistant Membrane must be installed and fixed in accordance with the Certificate holder's instructions, the relevant clauses of CP 102 : 1973 Section 3, BS 8000-0 : 2014 and BS 8000-4 : 1989.

14.2 Unless the base is smooth, a surface blinding of soft sand (or similar material) must be used to prevent puncturing during installation or when concrete screed is being placed.

14.3 If the membrane is installed below a steel-reinforced floor or concrete slab, it should be covered with a screed or protection boards prior to the positioning of the reinforcement.

14.4 If the membrane is above the slab, installation should be delayed until just before laying the screed or flooring top to avoid damage from site traffic.

### 15 Procedure

15.1 Monarflex Reflex Super Gas-Resistant Membrane must only be applied to surfaces that have a smooth finish, ie free from voids, projections and mortar deposits. Surfaces must also be dry and free from dust and frost.

15.2 Concrete surfaces must be dense. Vertical surfaces of brickwork and blockwork must be dry, and rendered to provide an even surface. Brickwork or blockwork not rendered must be pointed to give a smooth surface without sudden changes in level.

15.3 The product is rolled out, ensuring that it is properly aligned. All end and side overlaps must be a minimum of 150 mm, and prepared in accordance with the manufacturer's instructions.

15.4 The surface of the membrane to be lapped must be dry and dust-free. To ensure a watertight bond and gas-tight integrity, all laps and joints must be extrusion welded where possible. When using the specified 70 mm wide Monobond gas sealant tape, the joints must be firmly pressed down and well rolled.

15.5 All service penetrations and direction changes must be properly detailed. Service ducts must be vented to prevent the possibility of gas accumulating in confined spaces.

15.6 The product must extend over the footprint of the building, with a stepped damp-proof course separated with a mortar joint.

15.7 The product must be covered by a screed or other protective layer as soon as possible after installation. If blockwork protection is used, care must be taken to avoid damage to the product during construction.

15.8 The membrane installation should be subject to third-party independent validation, in accordance with the BS 8485 : 2015.

## 16 Repair

Any damage to the product must be repaired using a patch of the membrane welded in place or a patch of MonarSeal MRX self-adhesive gas membrane. All patches must extend a minimum of 150 mm from the damaged area. If required by the local authority, repair work must be confirmed by an independent validation report, as all gas membrane installations should be subject to third-party validation in accordance with BS 8485 : 2015.

## Technical Investigations

## 17 Tests

17.1 An assessment was made of data to BS EN 13967 : 2012 in relation to:

- dimensions
- tensile strength and elongation
- nail tear resistance
- resistance to static loading
- impact resistance
- joint strength
- watertightness on controls and following heat ageing
- watertightness after exposure to chemicals
- bitumen compatibility.

17.2 Tests were carried out to determine:

- water vapour transmission and resistance
- resistance to chisel impact
- resistance to leakage
- tensile strength of joints on controls and after 28 days heat ageing at 60°C
- low temperature flexibility
- tensile strength and elongation on controls and after 28 days heat ageing at 60°C and 100 hours UVB exposure
- nail tear strength on controls and after 56 days heat ageing at 60°C
- dimensional stability

in order to assess:

- product characteristics
- durability of the product and joints.

## 18 Investigations

18.1 The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

18.2 An evaluation was made of data on the permeability of radon, methane and carbon dioxide in relation to the product.

18.3 A site visit was carried out to assess the practicability of installation.

## Bibliography

BRE Report BR 211 : 2015 *Radon : Guidance on protective measures for new buildings*

BS 8000-0 : 2014 *Workmanship on construction sites — Introduction and general principles*

BS 8000-4 : 1989 *Workmanship on building sites — Code of practice for waterproofing*

BS 8485 : 2015 *Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings*

BS EN 13967 : 2012 + A1 : 2017 *Flexible sheets for waterproofing — Plastic and rubber damp proof sheets including plastic and rubber basement tanking sheet — Definitions*

BS EN ISO 9001 : 2015 *Quality management systems — Requirements*

CP 102 : 1973 *Code of practice for protection of buildings against water from the ground*

ISO 15105-1 : 2007 *Plastics — Film and sheeting — Determination of gas-transmission rate — Differential-pressure methods*

### 19 Conditions

#### 19.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page – no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document – it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

19.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

19.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

19.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

19.5 In issuing this Certificate the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

19.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.

## IKO HYLOAD GASTITE DPC

### PRODUCT INFORMATION

IKO Hyload Gastite DPC is an SBS modified bitumen DPC system with a 50 micron aluminium core. This core gives greater material resistance to the passage of radon, carbon dioxide and methane. When used within a suitably designed ground gas system, it serves to resist gas migration into the cavity of the masonry wall construction.

The products primary area of use is within hazardous ground gas systems; however it can also be used within masonry walls to prevent passage of moisture from the ground and at all levels as cavity tray to prevent the downward movement of water.

As the product is sand surfaced, it achieves an excellent bond with mortar and can be used to provide protection under situations of minimal loading such as parapet walls, under throated coping stones and under brick-on edge detailing for both solid masonry and cavity wall construction.

| Roll Width | Product Code |
|------------|--------------|
| 100mm - 1m | 373*****     |



### USE

IKO Hyload Gastite DPC is used as a horizontal, vertical or stepped damp proof coursing system and is also suitable for the on-site creation of cavity trays within masonry cavity wall construction.

It is primarily used within ground gas protection systems designed in accordance with the guidance of CIRIA C665 and NHBC Traffic Light system.

The product does not currently conform to the requirements of ground gas protection measures designed to BS8485:2015

### FEATURES & BENEFITS

**Gas Resistant** – a 50 micron aluminium core gives an improved material resistance to gas permeation

**Developed Components** – as part of the IKO Hyload brand, the product has a full range of system components.

**Excellent Mortar Bond** – when installed in between fresh beds of mortar, the product displays excellent mortar adhesion and bond properties.

### PERFORMANCE & COMPOSITION

|                                     |                                                    |
|-------------------------------------|----------------------------------------------------|
| <b>Composition:</b>                 | Modified Bitumen                                   |
| <b>Form:</b>                        | Roll                                               |
| <b>Colour:</b>                      | Black                                              |
| <b>General Dimension Data</b>       |                                                    |
| <b>Nominal Thickness:</b>           | 3mm                                                |
| <b>Weight:</b>                      | 3.44kg/m <sup>2</sup>                              |
| <b>Roll Length:</b>                 | 8m                                                 |
| <b>Roll Width:</b>                  | 100mm – 1000mm                                     |
| <b>Performance Data</b>             |                                                    |
| <b>Water tightness (EN 1928):</b>   | 2kPa for 24 hrs                                    |
| <b>Reaction to Fire:</b>            | F                                                  |
| <b>Water Vapour Resistance:</b>     | >5000 MNs/g                                        |
| <b>Tensile Strength at Break:</b>   | MD 450N/mm <sup>2</sup><br>CD 450N/mm <sup>2</sup> |
| <b>Elongation at break:</b>         | MD 25%<br>CD 50%                                   |
| <b>Tear Strength:</b>               | MD 180N<br>CD 200N                                 |
| <b>Methane gas transmission</b>     |                                                    |
| <b>Rate:</b>                        | <0.14ml/m <sup>2</sup> /24hrs                      |
| <b>Low Temperature flexibility:</b> | -15°C                                              |

### INDEPENDENT ACCREDITATION



0086-CPD-537587

## **SPECIFICATION**

NBS Clauses can be made available for Common Arrangement Work Sections:

### **F30 – Accessories/Sundry Items for Brick/Block/Stone Walling**

All construction detailing and specification should conform to UK Building Regulations, relevant Codes of Practice, industry reports and British Standards.

In particular it is recommended that reference is made to the relevant parts of:

BS6398:1983 Specification for bitumen damp-proof courses for masonry

BS 8215:1991 Code of Practice for design and installation of damp-proof courses in masonry construction

BS 8000-3:2001 Workmanship on building sites. Code of Practice for masonry

BS EN 1996-1-1:2005+A1:2012 Eurocode 6: Design of masonry structures – Part 1-1: General rules for reinforced and unreinforced masonry structures

PD 6697:2010 Recommendations for the design of masonry structures to BS EN 1996-1-1 and BS EN 1996-2.

BRE Report 212 Construction of new buildings on gas-contaminated land

BRE Report 414 Protective measures for housing on gas-contaminated land

Where required by building warranty providers i.e. NHBC, LABC, etc. installers and those undertaking specifications should seek guidance from Technical Standards as issued by the provider in addition to the above.

If required, please consult with IKO Technical Services.

## **SYSTEM COMPONENTS**

IKO have a range of essential system components, specifically tailored to facilitate the multiple uses of the IKO Gastite DPC system.

The following represents the system components available as part of that range:

**IKO Hyload DPC Jointing Tape** – a black, double-sided bituminous tape in 100mm x 10m rolls. Used for bonding overlaps in DPC material and DPC to IKO Hyload Pre-formed Cloak Units.

**IKO Hyload DPC Joint Support Board** – is a twin walled polypropylene reinforced support board, which can be bent to form the required profile. Employed directly under joints in the system, the board provides resistance when applying pressure during the joints creation.

**IKO Hyload DPC Fixing Strip** – is a 29mm wide x 2mm thick x 2m long corrosion resistant rigid plastic strip, used specifically to provide surface fixing solutions in cavity tray formation. Pre-drilled at set 150mm centres, the component is complemented by fixings pins specific to the substrates of masonry and insulation.

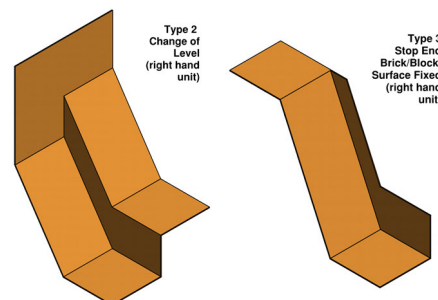
**IKO Hyload DPC Fixing Pins For Masonry** - used with IKO Hyload DPC Fixing Strip, IKO Hyload DPC Fixing Pins for masonry are corrosion resistant and can be used for surface fixing IKO Hyload high performance DPC systems to any solid internal substrate such as brick, stone and concrete. IKO Hyload DPC Fixing Pin bodies are made from moulded nylon and the drive pins are made from polycarbonate. Drill a clearance hole 6mm diameter by 45mm deep into substrate and when the drive pin is located, the barbed portion of the fixing pin body expands giving a secure grip and pull out resistance.

**IKO Hyload DPC Fixing Pins For Insulation** - used with IKO Hyload DPC Fixing Strip, IKO Hyload DPC Fixing Pins for insulation are corrosion resistant and can be used for surface fixing to the rigid insulation of composite inner skins. Using a tool such as a bradawl, a pilot hole should be formed prior to inserting the push fit pin. The fir tree portion securely locates into the rigid insulation.

**IKO Hyload DPC Mastic** - a thick synthetic rubber mastic adhesive with gap filling properties up to 6mm. Supplied in 2.5L tins or 400ml cartridges, IKO Hyload DPC Mastic is suitable for bonding surface-fixed IKO Hyload high performance DPC cavity trays and preformed cloak units to a wide range of common building materials such as block, concrete or metal.

**IKO Hyload Pre-formed Cloak Units** – covering all aspects of detailing from stop ends to complex and awkward interface detailing, pre-formed cloak units reduce on site detailing work to a rapid position and fix operation, whilst providing consistent quality of work throughout.

Ultrasonic welding technology allows the semi-rigid polymeric cloak material to be formed into a vast number of profiles and shapes.



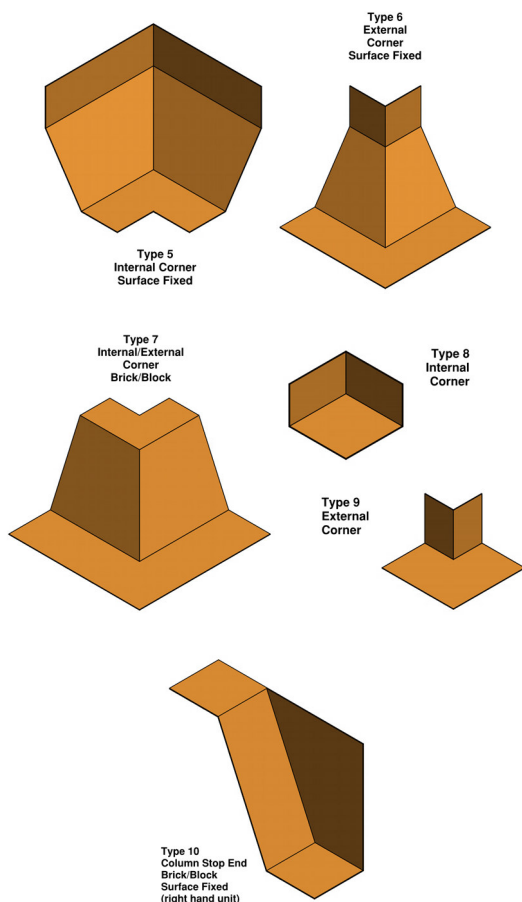


Figure 1 – Hyload Pre-formed Cloak Units

## **SITE STORAGE**

### **GENERAL**

DPC material and any product ancillary to the system should be stored in the dry, under cover, and protected against damage.

DPC rolls should be stored on their ends on a flat and stable surface, and stacking above 1m high should be avoided.

Materials should be kept away from direct sources of heat.

Check all labels on adhesives for any particular storage recommendations, and for any hazards relating to that specific product.

### **24 HOURS PRIOR TO WORK**

DPC material should be checked to ensure that they conform to the project specification prior to removal from the main storage area, to avoid the risks of damage from undue handling.

Store a sufficient number of rolls of DPC and any adhesive tapes for the next day's use in a warm place prior to use. This will ensure the desired performance is achieved i.e. good flexibility and tape adhesion.

## **IMMEDIATELY PRIOR TO WORK**

Storage of the product at the place of work should be no less satisfactory than that experienced within the main storage areas to prevent damage immediately before use i.e. flat, dry, clean and free from contaminants.

When being used around the work area, rolls should **not** be stacked irrespective of their size.

In periods of inclement weather, DPC materials and any components should be returned to the conditions of the main storage area as soon as practicable.

## **CONSTRUCTION**

### **PRIOR TO COMMENCEMENT**

For instances where installation of the DPC involves the use of gas torches to create sealed lap arrangements in line with the following sections, the work must always follow good, safe working practice.

Prior to commencing works, it is advisable to consult relevant Health and Safety Executive Guidance documents irrespective of levels of competence, to ensure all works are being planned and undertaken in a safe, pragmatic manner.

Torch applied materials should only be applied by those competent, conversant and capable of undertaking hot works safely, and that are experienced in the use of gas torches and procedures.

Care must be taken when using torch applied membranes in close proximity to combustible materials, decorative coatings and heat sensitive materials.

### **APPLICATION**

The IKO Hyload DPC system, when correctly specified and installed provides a satisfactory horizontal, vertical or stepped damp proof coursing system and is also suitable for the on-site creation of cavity trays within masonry cavity wall construction.

### **LINEAR DAMP PROOF COURSES**

IKO Hyload DPC systems are suitable for inclusion into solid single skin masonry walls or in instances which do not employ cavity trays i.e. separate horizontal DPC within each constituent masonry leaf.

When installing linear DPC, it is essential that:

- The DPC material is laid in continuous lengths as far as practicable. Instances where the DPC must be lapped, installation must achieve 100 mm overlap as a minimum with overlaps at angles i.e. corners, etc. achieving the full width of the receiving masonry leaf;
- The DPC width is equal to that of the masonry leaf into which it is being installed;
- The DPC **must** be sandwiched between even beds of wet mortar, receiving a further course of masonry units on mortar on the DPC. The weight of these immediate courses helps to develop good adhesion between the masonry units, the mortar and the DPC;

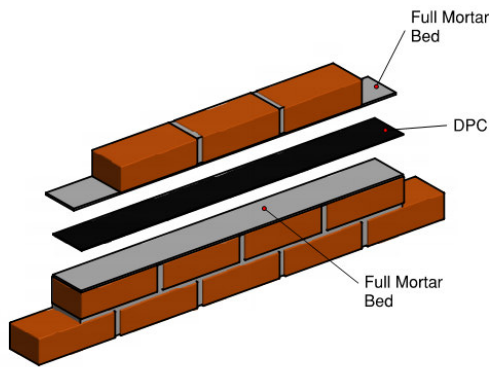


Figure 2 – Hyload DPC bedding

- The edge of the DPC remains visible through the completed mortar joint inclusive of pointing, finishes, etc. to a position which leaves it at least flush with the outer surface of the wall;
- In the construction of cavity walls where there are separate DPCs within each masonry leaf, the edge of the DPC must not project into the cavity as this can provide a place for debris to lodge and create a potential for moisture to bridge the cavity;
- Underneath coping stones or units that create an overhang to the wall surface below, the edge of the DPC should project no less than 5mm beyond the face of the wall surface (Figure 3);
- DPC under coping stones on cavity walls should be supported across any cavity using an appropriate support board, with all overlaps set at 100 mm and fully sealed in using Hyload DPC Jointing Tape;

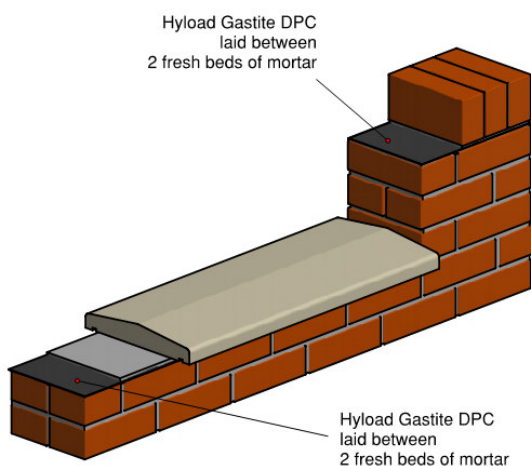


Figure 3 – Coping Stones and Brick-on-Edge Detailing

## CAVITY TRAYS

When constructing cavity walls, bridges that create the opportunity for water to cross the cavity from the external masonry leaf to the inner leaf can occur. Typically such instances are found above window and door openings, above ducts and horizontal cavity barriers.

In these situations IKO Hyload DPC systems can be used to create cavity trays, which divert this water back to the external leaf and out through masonry via weep vents within the external leaf.

When installing cavity trays, it is essential that:

- They are created in continuous lengths, as far as practicable;
- All overlaps are 100 mm and **must** be fully sealed. Joints with pre-formed cloaks are completed by gently heating the contact surfaces of the DPC to disperse sand and adequately prepare for the application of IKO Hyload DPC Jointing Tape; overlaps occurring at joints within the DPC may also be gently heat bonded together without the use of Hyload DPC Jointing Tape.
- They are fully supported at joints with either IKO Hyload Joint Support Boards or IKO Hyload Pre-formed Cloak Units;

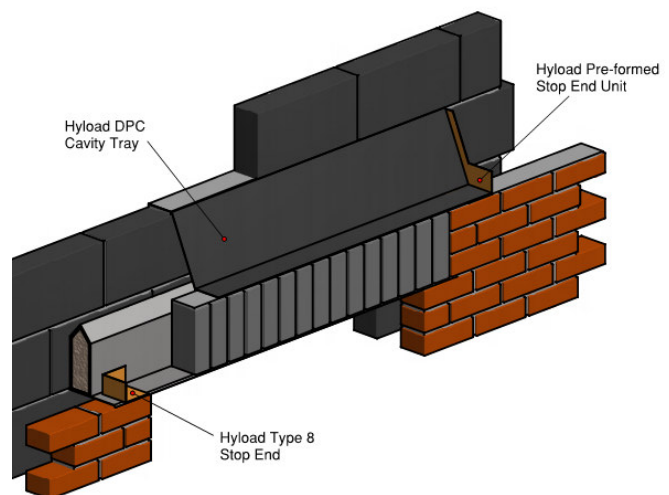


Figure 4 – Typical Hyload Cavity Tray above lintel position

- When they are intermittent or cover isolated areas of detailing i.e. lintels, ducts, etc. they cover the full extent of the obstruction within the cavity, extending not less than 150 mm beyond ends of bridged cavity positions and incorporate stop ends to create a defined termination;
- They are securely fixed to maintain their position and profile across the cavity, and step up towards the inner leaf a minimum of 150mm;
- The DPC passing through the respective masonry leaves **must** be sandwiched between even beds of wet mortar, receiving at least one further course of masonry units on mortar on the DPC. The weight of this immediate course helps to develop good adhesion between the masonry units, the mortar and the DPC;

- On the outer face of the outer masonry leaf, the edge of the DPC remains visible through the completed mortar joint inclusive of pointing, finishes, etc. to a position which leaves it at least flush with the outer surface of the wall.

## **GAS DETAILING**

IKO Hyload Gastite DPC can be used as part of a fully sealed gas system to close cavities at their base and inhibit the movement of gas from the ground.

Gas detailing must follow the good practices highlighted by the relevant documents noted within the 'Specification' section of this document.

Linear DPC and cavity tray installation must follow the requirements indicated within the above sections.

General arrangement requires a horizontal portion of DPC across the cavity to create a physical barrier to migrating gas, which should then be linked with the chosen gas barrier within the main floor area.

This DPC **must be fully supported** by either rigid insulation, cavity lean mix or a suitable support board and **fully sealed** using the aforementioned techniques. Detailing at the base of the cavity is then concluded with a cavity tray to ensure water from the cavity above is not able to cross to the inner leaf.

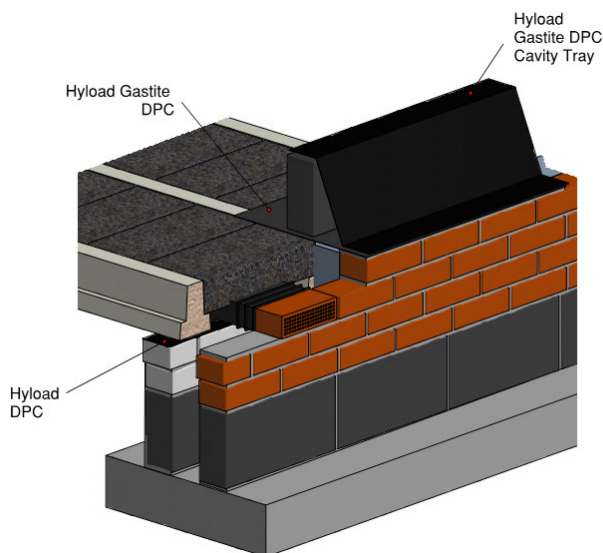


Figure 5 – Typical Arrangement of Hyload Gastite at a wall base

## **CLEANING**

### **DURING INSTALLATION**

During the process of installation, damp proof course materials can incur damage from careless cleaning operations.

Recommendations to prevent damage, particularly for cavity tray installations, are:

- To utilise cavity battens to prevent excessive amounts of mortar reaching the DPC;
- Remove mortar droppings before hardening occurs;
- To ensure that implements such as steel rods **are not** used for cleaning.

As the DPC system cannot be repaired once covered, it is strongly recommended that work is regularly inspected for damage and rectified prior to continuing works. In most instances, it is necessary to cut out the damaged sections and replace where necessary, utilising the aforementioned jointing materials and techniques.

## **AFTER INSTALLATION**

Due to the concealed nature of DPC work, it is not necessary to conduct any special tasks for the aftercare of DPC after masonry is completed.

Any clean down operations conducted to the masonry itself should be done so in a manner which does not adversely affect the DPC material.

## **DURABILITY**

When properly specified and installed, the system in normal circumstances, will remain effective for the lifetime of the building.

## **DISCLAIMER**

Whilst every precaution is taken to ensure that the information given in this literature is correct and up to date it is not intended to form part of any contract or give rise to any collateral liability, which is hereby specifically excluded. IKO reserve the right to amend and/or withdraw this document without notice.

Intending purchasers of our materials should therefore verify with the company whether any changes in our specification, application details, withdrawals or otherwise have taken place since this literature was issued.

## **APPENDIX C**

### **Gas Protection Measures Inspection Records**

## Verification of Ground Gas Protection Systems



**BROWNFIELD  
SOLUTIONS LTD**

**Job No:** M4246  
**Client:** The Dean Trust  
**Site Name:** Dean Trust Academy  
**Plot/Area Number (s):** Perimeter Walls  
**Weather:** Sunny and dry  
**Verifier/Inspector (s):** Megan Buckley

**Drawing Refs:**  
**Structure Type:** Commercial  
**Floor Slab Type:** Ground Bearing - Lightly reinforced concrete slab  
**Gas protection Type:** Active  
**Installer and competency (e.g. NVQ)** PAG Level 2 NVQ Qualified

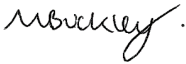
| Passive Venting Measures    | ✓/✗ | Inspection Date (s) | Photos: |
|-----------------------------|-----|---------------------|---------|
| Void Former                 |     |                     | N/A     |
| Void Height                 |     |                     | N/A     |
| Gravel Type                 |     |                     | N/A     |
| External Wall Air Bricks    |     |                     | N/A     |
| Internal Sleeper Wall Vents |     |                     | N/A     |
| External Vent Trench/Duct   |     |                     | N/A     |

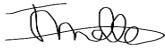
| Gas Barrier/Membrane          | ✓/✗ | Inspection Date (s) | Photo                                                                                                                   |
|-------------------------------|-----|---------------------|-------------------------------------------------------------------------------------------------------------------------|
| Underside of membrane         | ✓   | 17/04/2024          | ✓ Ground Bearing concrete slab.                                                                                         |
| Membrane Type                 | ✓   | 17/04/2024          | ✓ Monarflex Membrane.                                                                                                   |
| Extent of Coverage            | ✓   | 17/04/2024          | ✓ Perimeter walls of extension.                                                                                         |
| Slab/membrane condition       | ✓   | 17/04/2024          | ✓ Membrane in good condition.                                                                                           |
| Joining tape product          | ✓   | 17/04/2024          | ✓ Welded seams joining membrane sheets, very high quality seals.                                                        |
| Laps, joints, welds and seals | ✓   | 17/04/2024          | ✓ All laps sufficient with minimum 100mm overlap or greater which is sufficient for heat welded seals. Very good seals. |
| Damp-proof course             |     |                     | N/A                                                                                                                     |
| Service entries and seals     | ✓   | 17/04/2024          | ✓ Sealed with Gas resistant Self-Adhesive Membrane. Very good seals.                                                    |
| Cavity inspection             |     |                     | N/A                                                                                                                     |

This plot/area

**PASSED INSPECTION**

Where the above inspection indicates a Pass, construction works for that plot/area may proceed, subject to suitable protection measures of the membrane being applied in accordance with the manufacturer's recommendations.

**Compiled by:**  Megan Buckley

**Checked By:**  Jack Mather

## Verification of Ground Gas Protection Systems



**BROWNFIELD  
SOLUTIONS LTD**

**Job No:** M4246  
**Client:** The Dean Trust  
**Site Name:** Dean Trust Academy  
**Plot/Area Number (s):** Perimeter Walls  
**Weather:** Sunny and dry  
**Verifier/Inspector (s):** Sam Jennings

**Drawing Refs:**  
**Structure Type:** Commercial  
**Floor Slab Type:** Ground Bearing - Lightly reinforced concrete slab  
**Gas protection Type:** Active  
**Installer and competency (e.g. NVQ)** PAG Level 2 NVQ Qualified

| Passive Venting Measures    | ✓/✗ | Inspection Date (s) | Photos: |
|-----------------------------|-----|---------------------|---------|
| Void Former                 |     |                     | N/A     |
| Void Height                 |     |                     | N/A     |
| Gravel Type                 |     |                     | N/A     |
| External Wall Air Bricks    |     |                     | N/A     |
| Internal Sleeper Wall Vents |     |                     | N/A     |
| External Vent Trench/Duct   |     |                     | N/A     |

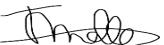
| Gas Barrier/Membrane          | ✓/✗ | Inspection Date (s) | Photo                                                                                                                   |
|-------------------------------|-----|---------------------|-------------------------------------------------------------------------------------------------------------------------|
| Underside of membrane         | ✓   | 01/05/2024          | ✓ Ground Bearing concrete slab.                                                                                         |
| Membrane Type                 | ✓   | 01/05/2024          | ✓ Monarflex Membrane.                                                                                                   |
| Extent of Coverage            | ✓   | 01/05/2024          | ✓ Perimeter walls of extension.                                                                                         |
| Slab/membrane condition       | ✓   | 01/05/2024          | ✓ Membrane in good condition.                                                                                           |
| Joining tape product          | ✓   | 01/05/2024          | ✓ Welded seams joining membrane sheets, very high quality seals.                                                        |
| Laps, joints, welds and seals | ✓   | 01/05/2024          | ✓ All laps sufficient with minimum 100mm overlap or greater which is sufficient for heat welded seals. Very good seals. |
| Damp-proof course             |     |                     | N/A                                                                                                                     |
| Service entries and seals     | ✓   | 01/05/2024          | ✓ Sealed with Gas resistant Self-Adhesive Membrane. Very good seals.                                                    |
| Cavity inspection             |     |                     | N/A                                                                                                                     |

This plot/area

**PASSED INSPECTION**

Where the above inspection indicates a Pass, construction works for that plot/area may proceed, subject to suitable protection measures of the membrane being applied in accordance with the manufacturer's recommendations.

**Compiled by:**  Sam Jennings

**Checked By:**  Jack Mather

## Verification of Ground Gas Protection Systems



**BROWNFIELD  
SOLUTIONS LTD**

**Job No:** M4246  
**Client:** The Dean Trust  
**Site Name:** Dean Trust Academy  
**Plot/Area Number (s):** Internal  
**Weather:** Sunny and dry  
**Verifier/Inspector (s):** CMcShane

**Drawing Refs:**  
**Structure Type:** Commercial  
**Floor Slab Type:** Ground Bearing - Lightly reinforced concrete slab  
**Gas protection Type:** Active  
**Installer and competency (e.g. NVQ)** PAG Level 2 NVQ Qualified

| Passive Venting Measures    | ✓/✗ | Inspection Date (s) | Photos: |
|-----------------------------|-----|---------------------|---------|
| Void Former                 |     |                     | N/A     |
| Void Height                 |     |                     | N/A     |
| Gravel Type                 |     |                     | N/A     |
| External Wall Air Bricks    |     |                     | N/A     |
| Internal Sleeper Wall Vents |     |                     | N/A     |
| External Vent Trench/Duct   |     |                     | N/A     |

| Gas Barrier/Membrane          | ✓/✗ | Inspection Date (s) | Photo                                                                                                                   |
|-------------------------------|-----|---------------------|-------------------------------------------------------------------------------------------------------------------------|
| Underside of membrane         |     |                     |                                                                                                                         |
| Membrane Type                 | ✓   | 21/05/2024          | ✓ Monarflex Membrane.                                                                                                   |
| Extent of Coverage            | ✓   | 21/05/2024          | ✓ 100%                                                                                                                  |
| Slab/membrane condition       | ✓   | 21/05/2024          | ✓ Membrane in good condition.                                                                                           |
| Joining tape product          | ✓   | 21/05/2024          | ✓ Welded seams joining membrane sheets, very high quality seals.                                                        |
| Laps, joints, welds and seals | ✓   | 21/05/2024          | ✓ All laps sufficient with minimum 100mm overlap or greater which is sufficient for heat welded seals. Very good seals. |
| Damp-proof course             |     |                     | N/A                                                                                                                     |
| Service entries and seals     | ✓   | 21/05/2024          | ✓ Sealed with Gas resistant Self-Adhesive Membrane. Very good seals.                                                    |
| Cavity inspection             |     |                     | N/A                                                                                                                     |

This plot/area

**PASSED INSPECTION**

Where the above inspection indicates a Pass, construction works for that plot/area may proceed, subject to suitable protection measures of the membrane being applied in accordance with the manufacturer's recommendations.

**Compiled by:**  C McShane

**Checked By:**



PHOTO 1



PHOTO 2



PHOTO 3



PHOTO 4

Photo Descriptions

| PHOTO NO. | DETAILS                 |
|-----------|-------------------------|
| 1         | Perimeter wall overview |
| 2         | Perimeter wall overview |
| 3         | Corner detailing        |
| 4         | Corner detailing        |

| REV | DATE | DESCRIPTION | BY | CKD |
|-----|------|-------------|----|-----|
|     |      |             |    |     |
|     |      |             |    |     |



|                             |  |                                                              |  |
|-----------------------------|--|--------------------------------------------------------------|--|
| CLIENT                      |  | THE DEAN TRUST                                               |  |
| PROJECT TITLE               |  | DEAN TRUST ACADEMY, ARDWICK, MANCHESTER                      |  |
| TITLE                       |  | GROUND GAS PROTECTION MEASURES VERIFICATION – PERIMETER WALL |  |
| Associated Document Ref No. |  | PAGE                                                         |  |
| NS/M4246/13163              |  | 1 of 4                                                       |  |
| COMPLIED BY                 |  | CHECKED BY                                                   |  |
| MB                          |  | JM                                                           |  |



PHOTO 5



PHOTO 6



PHOTO 7



PHOTO 8

Photo Descriptions

| PHOTO NO. | DETAILS                 |
|-----------|-------------------------|
| 5         | Service entry detailing |
| 6         | Service entry detailing |
| 7         | Column detail           |
| 8         | Column detail           |
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PHOTO 9



PHOTO 10



PHOTO 11



PHOTO 12

Photo Descriptions

| PHOTO NO. | DETAILS            |
|-----------|--------------------|
| 9         | Column detail      |
| 10        | Rear Column detail |
| 11        | Perimeter detail   |
| 12        | Column detail      |

| REV | DATE | DESCRIPTION | BY | CKD |
|-----|------|-------------|----|-----|
|     |      |             |    |     |
|     |      |             |    |     |



CLIENT  
**THE DEAN TRUST**

PROJECT TITLE  
**DEAN TRUST ACADEMY, ARDWICK,  
MANCHESTER**

TITLE  
**GROUND GAS PROTECTION MEASURES  
VERIFICATION – PERIMETER WALL**

|                                                      |                       |
|------------------------------------------------------|-----------------------|
| Associated Document Ref No.<br><b>NS/M4246/13163</b> | PAGE<br><b>3 of 6</b> |
|------------------------------------------------------|-----------------------|

|                          |                         |
|--------------------------|-------------------------|
| COMPLIED BY<br><b>SJ</b> | CHECKED BY<br><b>JM</b> |
|--------------------------|-------------------------|



PHOTO 13



PHOTO 14



PHOTO 15



PHOTO 16

Photo Descriptions

| PHOTO NO. | DETAILS                 |
|-----------|-------------------------|
| 13        | Corner detail           |
| 14        | Adjoining Corner detail |
| 15        | Column detail           |
| 16        | Column detail           |

| REV | DATE | DESCRIPTION | BY | CKD |
|-----|------|-------------|----|-----|
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| CLIENT<br><br>THE DEAN TRUST                                             |                  |
| PROJECT TITLE<br>DEAN TRUST ACADEMY, ARDWICK,<br>MANCHESTER              |                  |
| TITLE<br>GROUND GAS PROTECTION MEASURES<br>VERIFICATION – PERIMETER WALL |                  |
| Associated Document Ref No.<br>NS/M4246/13163                            | PAGE<br>4 of 6   |
| COMPLIED BY<br>SJ                                                        | CHECKED BY<br>JM |

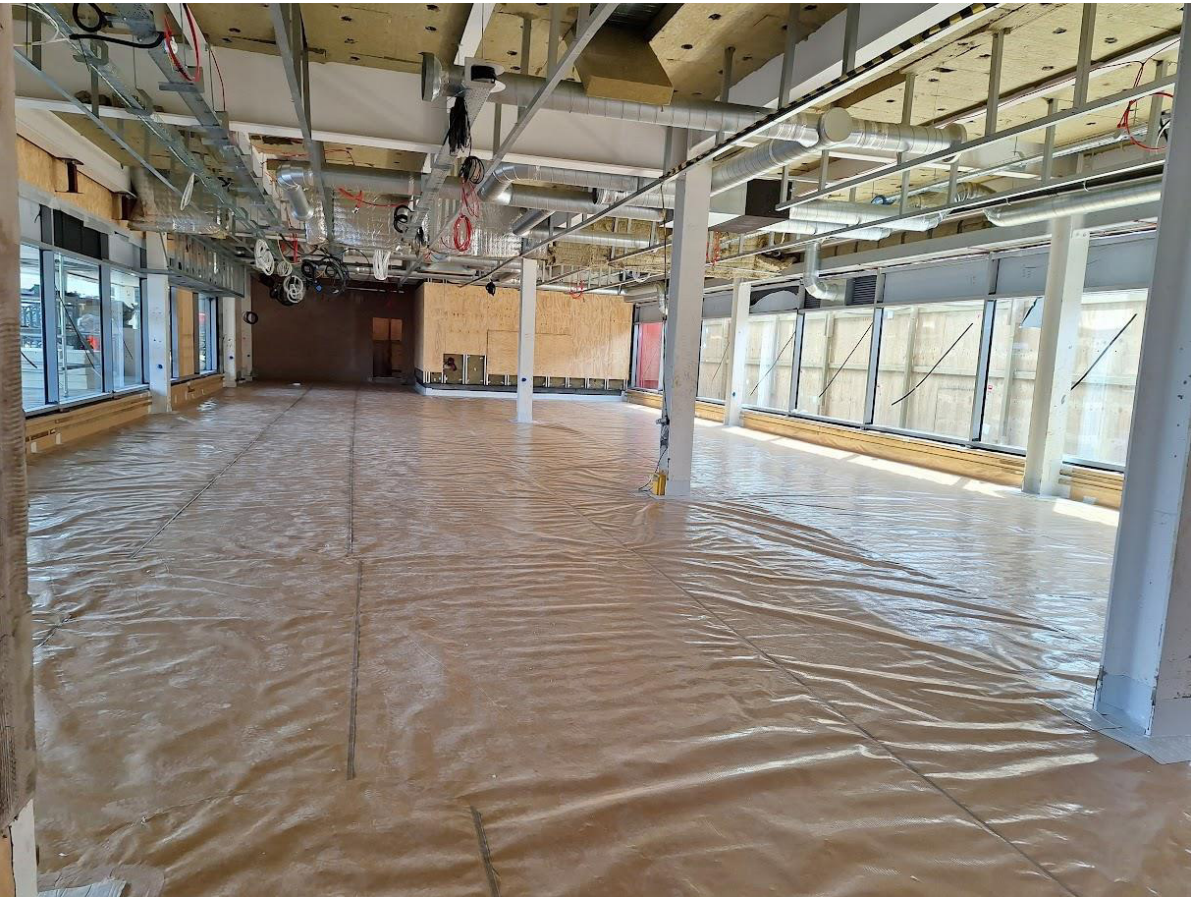


PHOTO 17



PHOTO 18



PHOTO 19



PHOTO 20

Photo Descriptions

| PHOTO NO. | DETAILS                                |
|-----------|----------------------------------------|
| 17        | Extent of membrane inside              |
| 18        | Air lancing seams: Good seal           |
| 19        | Pick testing: Seal needs improvement   |
| 20        | Heated and welded creating a good seal |

| REV | DATE | DESCRIPTION | BY | CKD |
|-----|------|-------------|----|-----|
|     |      |             |    |     |
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| CLIENT                      |  | THE DEAN TRUST                                         |  |
| PROJECT TITLE               |  | DEAN TRUST ACADEMY, ARDWICK, MANCHESTER                |  |
| TITLE                       |  | GROUND GAS PROTECTION MEASURES VERIFICATION – INTERNAL |  |
| Associated Document Ref No. |  | PAGE                                                   |  |
| NS/M4246/13163              |  | 5 of 6                                                 |  |
| COMPLIED BY                 |  | CHECKED BY                                             |  |
| CM                          |  | JM                                                     |  |



PHOTO 21

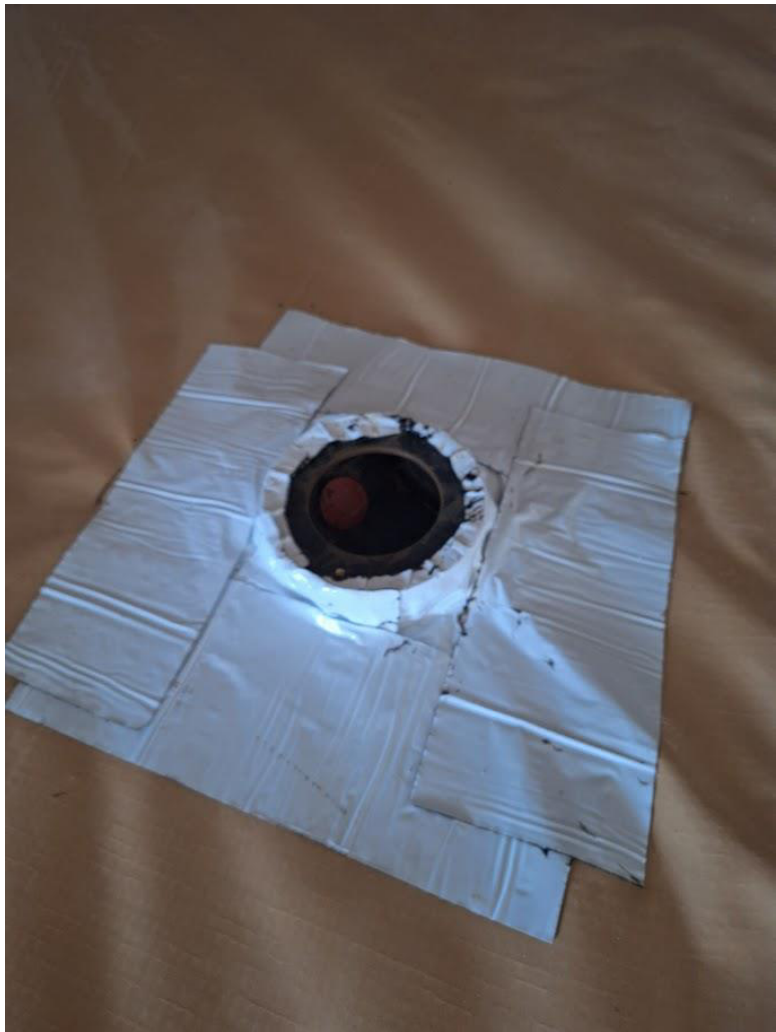


PHOTO 22



PHOTO 23



PHOTO 24

Photo Descriptions

| PHOTO NO. | DETAILS                                  |
|-----------|------------------------------------------|
| 21        | Steel beam detailing                     |
| 22        | Service entry detailing                  |
| 23        | Damage to self adhesive jointing product |
| 24        | Repair, good seal.                       |

| REV | DATE | DESCRIPTION | BY | CKD |
|-----|------|-------------|----|-----|
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| CLIENT<br><br>THE DEAN TRUST                                       |                  |
| PROJECT TITLE<br>DEAN TRUST ACADEMY, ARDWICK,<br>MANCHESTER        |                  |
| TITLE<br>GROUND GAS PROTECTION MEASURES<br>VERIFICATION – INTERNAL |                  |
| Associated Document Ref No.<br>NS/M4246/13163                      | PAGE<br>6 of 6   |
| COMPLIED BY<br>CM                                                  | CHECKED BY<br>JM |



## **APPENDIX D**

### **Air Lancing Test Certificates**

## Air Lance Integrity Testing Certificate (ATSM D 4437)



**BROWNFIELD  
SOLUTIONS LTD**

**Job No:** M4246  
**Client:** The Dean Trust  
**Site Name:** Dean Trust Academy  
**Plot/Area Tested (s):** Internal  
**Weather:** Sunny and dry  
**Integrity Tester (s):** CMcShane

**Drawing Refs:**  
**Structure Type:** Commercial  
**Floor Slab Type:** Ground Bearing - Lightly reinforced concrete slab  
**Gas protection Type:** Active  
**Installer and competency (e.g. NVQ)** PAG Level 2 NVQ Qualified

| Integrity Testing Record |                                                                                                                                                                                                                                      |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inspection Date          | Comments                                                                                                                                                                                                                             |
| 21/05/2024               | 100% coverage: Membrane in good condition, with welded seams joining membrane sheets, very high quality seals. All laps sufficient with minimum 100mm overlap or greater which is sufficient for heat welded seals. Very good seals. |
|                          |                                                                                                                                                                                                                                      |

| Concluding Statement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Air Lancing was completed in accordance with ATSM D 4437 at a pressure of 50 PSI no further than 50mm away from any given seam. Integrity testing by air lancing has been completed across 30% of the overall floor area and along the membrane - DPC seal around the perimeter of the building (excluding incomplete stanchion areas and western wall). Given the very good performance, BSL consider 30% coverage to be sufficient and is in accordance with the approved remedial strategy for the site. All other seals have been or will be subjected to mechanical pick testing with results reported under a separate inspection records.</p> |

This plot/area has **PASSED** integrity testing by Air Lancing in accordance with CIRIA C735

Where the above testing indicates a Pass, construction works for that plot/area may proceed, subject to suitable protection measures of the membrane being applied in accordance with the manufacturer's recommendations. BSL cannot be held responsible for damage caused after inspection not brought to our attention.

**Compiled by:**  C McShane

**Checked By:**  N Swallow