



Final Gas Membrane Installation

Validation Report

Myra Homes

120 Laund Road

Huddersfield

Salendine Nook

HD3 3TY

Version 1.0

Issued 14/02/23

(Plots 2,5,6,7&8)



THIS PAGE IS INTENTIONALLY BLANK

1. INTRODUCTION

1.1 Purpose

Myra Homes are installing a gas protection membrane to the aforementioned site. MEC Environmental Ltd (MEC) has been appointed by Myra Homes 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 MEC Environmental 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.

1.2 Limitations

This report is limited to providing lines of evidence to the regulatory authority for the areas components inspected by MEC 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 MEC, 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

1.3 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 MEC Environmental 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 – MEC 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 MEC 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.

1.4 Method for Tracer gas Integrity Testing (Plot 2)

On arrival at site the groundfloor area was swept with a Sewerin microelectronic hydrogen sensor (Bell probe). The purpose of this sweep was to determine the background levels of hydrogen prior to the test taking place.

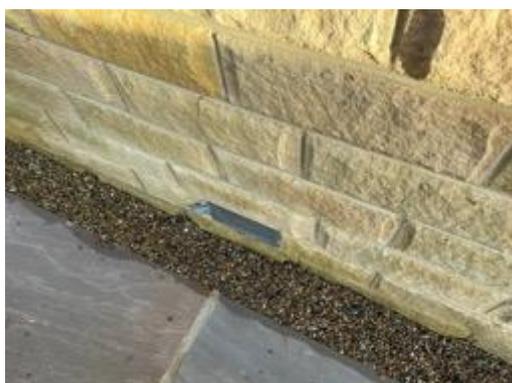
Test Equipment

- 1) Tracer Gas Test Used – a mixture of 5% Hydrogen and 95% Nitrogen
- 2) Sewerin Variotec 460 (Date of last Calibration 12/09/21)
- 3) Sealing Tape For Airbricks
- 4) Makita Cordless Fan Blower

Room	Area Swept	Max Reading PPM
Hall	100% of the Junction of skirting and tiled floor	0.2 ppm

Living Room	100% of the Junction of skirting and concrete floor	0.1 ppm
Kitchen/Diner	100% of the Junction of skirting and tiled floor and junction between kitchen base units and tiled floor	0.1ppm
Lounge	100% of the Junction of skirting and tiled floor	0.1ppm
Utility	100% of the Junction of skirting and tiled floor and junction between kitchen base units and tiled floor	0.1ppm
W.C	100% of the Junction of skirting and tiled floor	0.1ppm
Garage	Around the SVP pipe, materials were stored in the garage and therefore there were some restricted areas	0.1ppm

On completion of the above background sweep all airbricks (excluding the gas injection airbrick and gas egress air brick) were sealed off were sealed off with duct tape (see below).



Sealed Airbrick

The gas injection point consisted of a Makita air blower with a 10mm nylon gas tube fitted to the face of the air brick then sealed with duct tape, the gas was then introduced into the void at a rate of 20 l/min, the blower fan was turned on and set approx. to a blow speed of 2m/s at the air brick (see below photo).



Gas Injection Point



Gas Egress Point

After a period of 2 minutes the test egress point was swept to ensure that the tracer gas was registering and elevated reading at the gas egress point. The start reading at the egress test point was 1340 ppm. (see above photo) On this basis the internal sweep of the property commenced.

Results of Internal Sweep

Room	Area Swept	Max Reading PPM
*Hall	100% of the Junction of skirting and tiled floor (including under the stairs)	0.1 ppm
*Hall (svp pipe)	Around the boxing in of SVP pipe	0.2 ppm
*Living Room	100% of the Junction of skirting and concrete floor	0.2 ppm
*Kitchen/Diner	100% of the Junction of skirting and tiled floor and junction between kitchen base units and tiled floor	0.1ppm
*Cupboard Under Kitchen sink	Area around alkathene water pipe	0.1 ppm
*Lounge	100% of the Junction of skirting and tiled floor	0.1ppm
*Utility	100% of the Junction of skirting and tiled floor and junction between kitchen base units and tiled floor and inside the kitchen sink cupboard	0.4ppm
*W.C	100% of the Junction of skirting and tiled floor and around the toilet waste pipe	0.4ppm
*Garage	Around the SVP pipe, materials were stored in the garage and therefore there were some restricted areas	0.3ppm

See Appendix 1 for photos

At no point during the test were there any elevated levels of hydrogen detected, the background level of hydrogen in air is typically below 0.5ppm (Table 4.1 Ciria C735).

On completion of the internal testing the gas levels were checked at the gas egress point, the hydrogen was measured at 1970ppm

1.5 MEC Staff Competency

The tracer gas test was conducted by Mick Corban who is suitably qualified as defined in CIRIA C735, the qualification held by Mick Corban is the NVQ Level 4 in gas protection verification and the NVQ Level 2 in gas membrane installation

Mick Corban is also a CL:AIRE accredited Specialist in Gas Protection Verification (SGPV).

1.6 Conclusion (Plot 2)

We believe the independent inspections undertaken by Sub Surface Limited during the original installation of the membrane and the subsequent retrospective tracer gas testing undertaken by MEC Environmental backs up the statement in Sub Surface limited original verification report that the protection measures installed achieve the required level for CS2 rated site.

Therefore we are confident that the materials used and fixed will perform adequately the functions for which they are intended as per Regulation 7 of the building regulations, and as such appropriate lines of evidence have now been provided to demonstrate the remedial measures agreed have now been achieved.

1.7 Method of Inspection (Plots 5,6,7 & 8)

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.

1.8 MEC Staff Competency

All site inspections have been carried out by suitably qualified staff as defined in CIRIA C735, the qualification held by all MEC inspection surveyors is either the NVQ Level 4 in gas protection verification or the NVQ Level 2 in gas membrane installation

The author of this report is also a CL:AIRE accredited Specialist in Gas Protection Verification (SGPV) and holds both the NVQ Level 2 in gas membrane installation and the NVQ Level 4 in gas protection verification.

1.9 Conclusion (Plots 5,6,7 & 8)

During our inspections to the areas denoted in Appendix 1 (Site Surveys Sheets) 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.

Date: 08/06/2022

Michael Corban S.G.P.V.
Director
MEC Environmental Ltd

Appendix 1 – Site Survey Sheets

Housebuilder Name: Myra Homes - Laund Road		Plot Number: 7 & 8	
Site Name: 120 Laund Road, Huddersfield, Salendine Nook.		Detached House	<input type="checkbox"/>
		Semi-Detached	<input checked="" type="checkbox"/>
Postcode: HD3 3TY	Weather: 2 °C Dry	Terrace	<input type="checkbox"/>
Installer: Myra Homes		Apartment Block	<input type="checkbox"/>
Surveyor: Dan Squire		Detached Garage	<input type="checkbox"/>
Date: 04/02/2022		Flat Over Garage	<input type="checkbox"/>
Full Footprint <input type="checkbox"/> Perimeter Only <input type="checkbox"/> Infill Only <input checked="" type="checkbox"/> Other <input type="checkbox"/> If other, please describe			
Item	Comments		
Sub-floor void	Inspected by MEC <input type="checkbox"/>	Not Inspected by MEC contractor advised <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
	Beam & Block min 150mm <input checked="" type="checkbox"/>		
	Strips of 25mm Geocomposite <input type="checkbox"/>		
	Full Cover of 25mm Geocomposite <input type="checkbox"/>		
	<ul style="list-style-type: none"> Contractor advised the venting is installed as per the design <input checked="" type="checkbox"/> The venting has failed inspection, see notes in defects section <input type="checkbox"/> 		
Ventilation Inlets and Outlets	(Inlet/Outlet Type) Air Bricks <input checked="" type="checkbox"/> Ventboxes <input type="checkbox"/> Not in Place at Time of Inspection <input type="checkbox"/>		
	Number of Vents: 24no		
Materials used:	Membrane Name: Visqueen gas barrier membrane		
	Self-Adhesive Membrane <input checked="" type="checkbox"/>	Preformed Tophats <input type="checkbox"/>	
	Double Sided Butyl Tape <input checked="" type="checkbox"/>	Preformed Corners <input type="checkbox"/>	
	Others Please List: N/A		
Type of Joint	Tape Joint <input checked="" type="checkbox"/>	Auto Weld <input type="checkbox"/>	Hand Weld <input type="checkbox"/> Extrusion Weld <input type="checkbox"/>
Testing/Inspection	<input checked="" type="checkbox"/> Visual Inspection	<input checked="" type="checkbox"/> Air Lance (ASTM D4437)	<input type="checkbox"/> Tracer Gas Test
	<input checked="" type="checkbox"/> Probe Test (ASTM D4437)	<input type="checkbox"/> Dielectric Test (NACE RP0188-99)	
Laps, welds and detailing	Have all joints passed testing prior to surveyor leaving site?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
	Have all pipes passed testing prior to surveyor leaving site?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A

	Have all corners passed testing prior to surveyor leaving site?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
	Have all acoustic details passed testing prior to surveyor leaving site?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A

Surveyors Comments

The membrane is laid across the full footprint off the building and extends across the cavity. All Pipes and ducts have been sealed with Self Adhesive Gas Membrane that was warmed prior to placing. The sheets of gas membrane have been adequately overlapped to provide a suitable substrate to achieve a gas tight joint. The Joints have been sealed with a 50mm butyl gas tape with all trapped air expunged. All joints and pipes penetrations have been air lanced and pick tested as per the methodology laid down in ASTM D4437 as required in CIRIA C735. During the inspection the installers made 15no (Plot 7) & 9no (Plot 8) patch repairs using SAGM to some minor defects, the patches were also air lance tested.

The standard of the installation after visual inspection and testing was deemed "fit for its intended purpose" and therefore the plots have passed our inspection and testing

Result of Inspection The Plots/Area have passed inspection and no further remedial works are required

Signed: **Dan Squire**

Date: **04/02/2022**

Photographs 04/02/2022



Plot 7 infill installation



Plot 7 infill installation



Plot 7 T joint SAGM patch



Plot 7 sealed pipe penetration



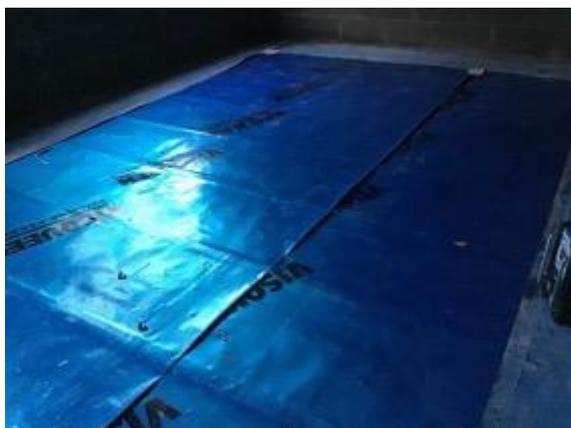
Plot 8 sealed pipe penetration with expanded foam filler between water main and duct



Plot 8 infill installation



Plot 8 T joint SAGM patch and patch repairs



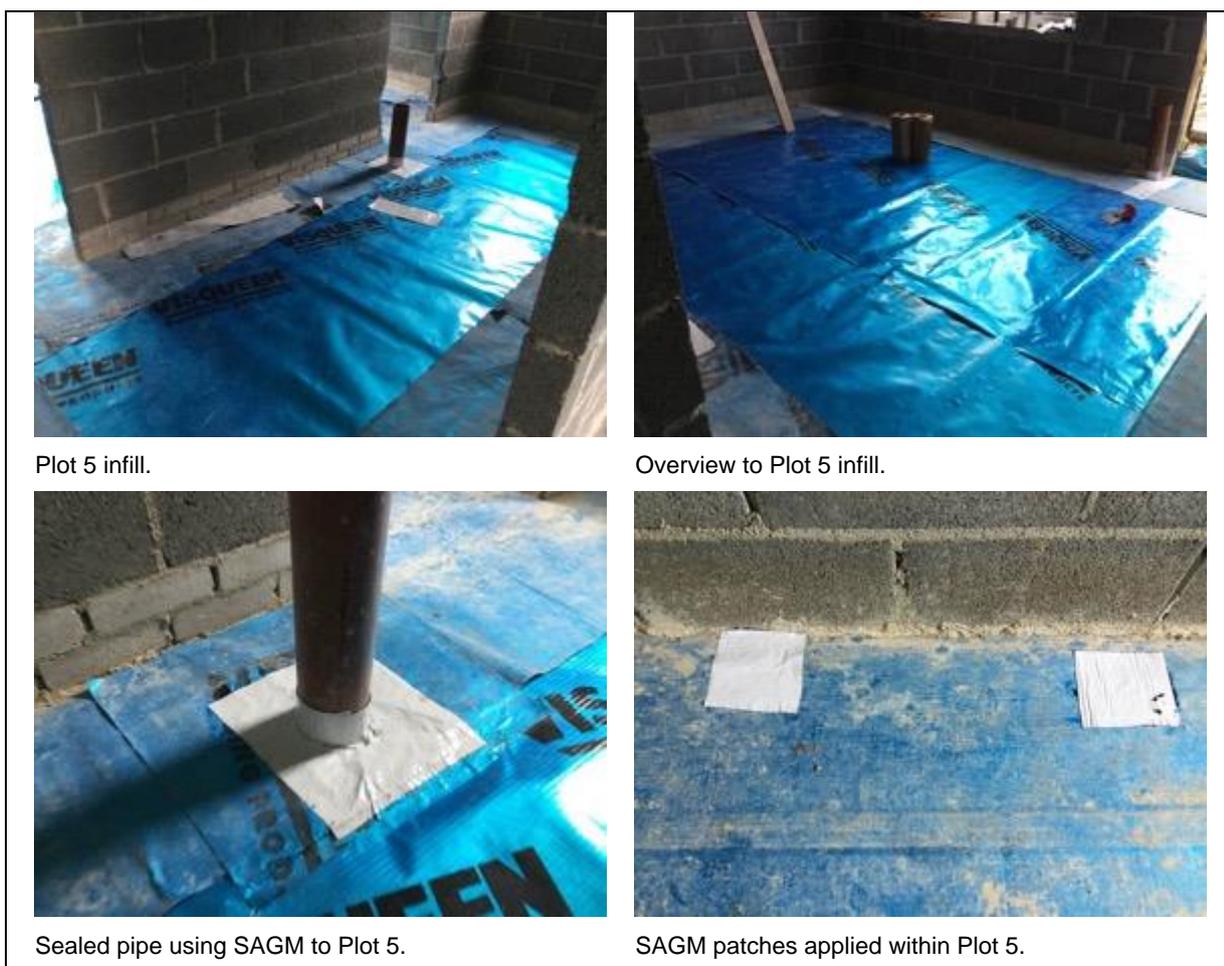
Plot 8 infill installation

Housebuilder Name: Myra Homes		Plot Number: 5&6	
Site Name: 120 Laund Road, Huddersfield, Salendine Nook		Detached House	<input type="checkbox"/>
		Semi-Detached	<input checked="" type="checkbox"/>
Postcode: HD3 3TY	Weather: 15 °C Dry	Terrace	<input type="checkbox"/>
Installer: Myra Homes		Apartment Block	<input type="checkbox"/>
Surveyor: Ross Edwards		Detached Garage	<input type="checkbox"/>
Date: 08/06/2022		Flat Over Garage	<input type="checkbox"/>
Full Footprint <input type="checkbox"/> Perimeter Only <input type="checkbox"/> Infill Only <input checked="" type="checkbox"/> Other <input checked="" type="checkbox"/> If other, please describe			
Item	Comments		
Sub-floor void	Inspected by MEC <input type="checkbox"/>	Not Inspected by MEC contractor advised <input type="checkbox"/>	N/A <input type="checkbox"/>
	Beam & Block min 150mm <input checked="" type="checkbox"/> Strips of 25mm Geocomposite <input type="checkbox"/> Full Cover of 25mm Geocomposite <input type="checkbox"/>		
	<ul style="list-style-type: none"> The venting has passed inspection and is installed as per the design <input checked="" type="checkbox"/> The venting has failed inspection, see notes in defects section <input type="checkbox"/> 		
Ventilation Inlets and Outlets	(Inlet/Outlet Type) Air Bricks <input checked="" type="checkbox"/> Ventboxes <input type="checkbox"/> Not in Place at Time of Inspection <input type="checkbox"/>		
	Number of Vents: Plots 5 & 6 = 26no		
Materials used:	Membrane Name: Visqueen Standard Gas Barrier		
	Self-Adhesive Membrane <input checked="" type="checkbox"/>	Preformed Tophats <input type="checkbox"/>	
	Double Sided Butyl Tape <input checked="" type="checkbox"/>	Preformed Corners <input type="checkbox"/>	
	Others Please List:		
Type of Joint	Tape Joint <input checked="" type="checkbox"/>	Auto Weld <input type="checkbox"/>	Hand Weld <input type="checkbox"/> Extrusion Weld <input type="checkbox"/>
Testing/Inspection	<input checked="" type="checkbox"/> Visual Inspection	<input checked="" type="checkbox"/> Air Lance (ASTM D4437)	<input type="checkbox"/> Tracer Gas Test
	<input checked="" type="checkbox"/> Probe Test (ASTM D4437)	<input type="checkbox"/> Dielectric Test (NACE RP0188-99)	

Laps, welds and detailing	Have all joints passed testing prior to surveyor leaving site?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
	Have all pipes passed testing prior to surveyor leaving site?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
	Have all corners passed testing prior to surveyor leaving site?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A

	Have all acoustic details passed testing prior to surveyor leaving site?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
<p>Surveyors Comments</p> <p>Visqueen membrane has been installed across the footprint to the infill to Plots 5&6 will all lap joints double sided taped. All pipe penetration details have been sealed using SAGM.</p> <p>Plot 5 = 8no Plot 6 = 14no patched applied using SAGM.</p> <p>Due to the brick work in place MEC are unable to inspect the membrane installed through the perimeter cavity and internal walls.</p>				
<p>Result of Inspection The Plots/Area has passed inspection</p> <p>Signed: Ross Edwards Date: 08/06/2022</p>				

Photographs 08/06/2022



Plot 5 infill.

Overview to Plot 5 infill.

Sealed pipe using SAGM to Plot 5.

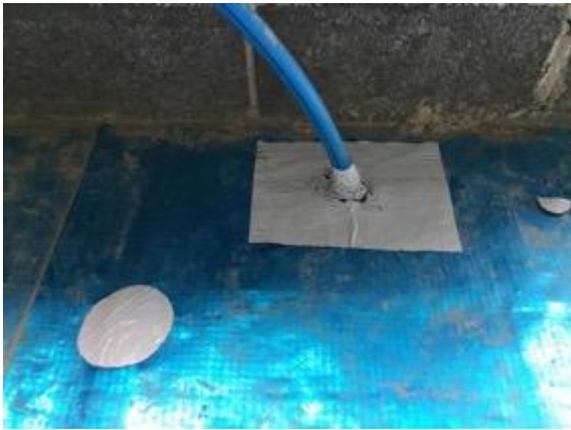
SAGM patches applied within Plot 5.



Overview to Plot 6 infill.



Plot 6 infill.



Water pipe sealed with SAGM.



Overview showing the SAGM patches applied within Plot 6