

Gas Membrane Installation
Validation Report
Keepmoat
Royce Road
Manchester
Blocks 1, 2 & 3

1. INTRODUCTION

1.1 Purpose

PAG are installing a gas protection membrane to the aforementioned site. MEC Environmental Ltd (MEC) has been appointed by PAG to carry out independent validation of the installation of the membrane on the site.

1.2 Limitations

(MEC) has prepared this report in accordance with the instructions of PAG ("the Client") under the terms of its appointment for the gas membrane validation/inspections and report.

This report is limited to the verification that the gas membrane measures are correctly installed. MEC Environmental Ltd 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.

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

Chartered Institute of Environmental Health (2008). "The local authority guide to ground gas".

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

This report and its contents should not be used for any purpose other than that for which it was prepared and provided. Should the Client require to pass copies of the report to other parties for information, the whole of the report should be so copied, but no professional liability or warranty shall be extended to other parties by MEC in this connection without the explicit written agreement thereto by MEC.

1.3 Method

The Validation Consultant visually inspected 100% of the surface area of the gas membrane to identify any holes, areas of bridging and defects in the gas membrane and ancillary products.

The Validation Consultant then integrity tested (air lance) 100% of all joints and seams of the gas membrane, acoustic details, pipe penetrations and corner details.

1.4 Equipment

Electronic Tablet (Ipad), Tape Measure, Air lancing Equipment and PPE

1.5 Identification

All seams and non-seam areas of the gas membrane were inspected/tested as per 1.3 by the Validation Consultant 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.

Each repair was visually inspected/tested, repairs passing the inspection/testing were considered acceptable. The Validation Consultant carried out all visual inspections/testing of repairs and recorded the type and result of the repairs on the survey report, prior to taking sample photos which are presented in section 1.8

1.6 Validators Experience

(See Appendix 1)

1.7 Survey Sheets

Verification of gas protection measures

Site name: Keepmoat, Royce Road, Manchester		Units/ plots checked: Block 3 ground floor			
Installers Name: PAG		Type of development: Apartments			
Date: 03/04/2017		Visit No: 1			
Inspection by: Keith Barsby		Weather at time of inspection: 17° C Dry			
Item no.	Item	Comments			
1	Underside of membrane	Not inspected by MEC Environmental Ltd, Contractor advised pre cast concrete block floor system.			
2	Sub-floor void	Not inspected by MEC Environmental Ltd, contractor advised minimum 150mm void.			
3	Materials	1) Monaflex reflex super membrane 2) Self-adhesive gas membrane (SAGM)			
4	Membrane condition	The membrane was being installed to a good standard, the area was dielectrically tested at 4KV Perimeter edge membrane previously installed 147no patch repairs to perimeter, damage caused by brick workers, patch repairs made by the installer prior to our inspection as part of their CQA. Patch repairs required at a later date due to area unable to be sealed around scaffolding poles. * Installer supplied photographic evidence of repair (See Photos) No further remedial action required at the time of our inspection.			
5	Type of Joint	Tape Joint ☐	Auto Weld ☐	Hand Weld ☒	Extrusion Weld ☐
6	Jointing Testing	☒ Air Lance (ASTM D4437)		☐ Probe Test (ASTM D4437)	
7	Laps, welds and joints seals	Did all welds, laps and seals pass testing			☒ Yes ☐ No
		Joints made to a good standard using both a hand held hot air tool and extrusion weld machine. No remedial action required at the time of our inspection.			
8	Detailing Work	All detailing work carried out using warmed (SAGM) to corners, door thresholds and pipe penetrations			
9	External wall airbricks	25no external wall airbricks.			

Verification of gas protection measures

Site name: Keepmoat, Royce Road, Manchester		Units/ plots checked: Block 2 Ground Floor			
Installers Name: PAG		Type of development: Apartments			
Date: 26/04/2017		Visit No: 2			
Inspection by: Mick Corban		Weather at time of inspection: 15° C Dry			
Item no.	Item	Comments			
1	Underside of membrane	Not inspected by MEC Environmental Ltd, Contractor advised pre cast concrete block floor system.			
2	Sub-floor void	Not inspected by MEC Environmental Ltd, contractor advised minimum 150mm void.			
3	Materials	1) Monaflex reflex super membrane 2) Self-adhesive gas membrane (SAGM)			
4	Membrane condition	The membrane was being installed to a good standard, the area was dielectrically tested at 4KV Perimeter edge membrane previously installed 134no patch repairs to perimeter, damage caused by brick workers, patch repairs to be made by the installer and inspected on 27/04/17 Patch repairs required at a later date due to area unable to be sealed around scaffolding poles. * Installer supplied photographic evidence of repair (See Photos) No further remedial action required at the time of our inspection.			
5	Type of Joint	Tape Joint ☐	Auto Weld ☐	Hand Weld ☒	Extrusion Weld ☐
6	Jointing Testing	☒ Air Lance (ASTM D4437)		☐ Probe Test (ASTM D4437)	
7	Laps, welds and joints seals	Did all welds, laps and seals pass testing			☒ Yes ☐ No
		Joints made to a good standard using both a hand held hot air tool and extrusion weld machine. No remedial action required at the time of our inspection.			
8	Detailing Work	All detailing work carried out using warmed (SAGM) to corners, door thresholds and pipe penetrations			
9	External wall airbricks	Unable to count due to scaffolding			

Verification of gas protection measures

Site name: Keepmoat, Royce Road, Manchester		Units/ plots checked: Block 1 Ground Floor and perimeter repairs to Block 2			
Installers Name: PAG		Type of development: Apartments			
Date: 27/04/2017		Visit No: 3			
Inspection by: Mick Corban		Weather at time of inspection: 12° C Dry			
Item no.	Item	Comments			
1	Underside of membrane	Not inspected by MEC Environmental Ltd, Contractor advised pre cast concrete block floor system.			
2	Sub-floor void	Not inspected by MEC Environmental Ltd, contractor advised minimum 150mm void.			
3	Materials	1) Monaflex reflex super membrane 2) Self-adhesive gas membrane SAGM)			
4	Membrane condition	Block 1: The membrane was being installed to a good standard, the area was dielectrically tested at 4KV Perimeter edge membrane previously installed 84no patch repairs to perimeter, damage caused by brick workers, patch repairs had already been completed by the installer prior to our inspection. Patch repairs required at a later date due to area unable to be sealed around scaffolding poles. * Installer supplied photographic evidence of repair (See Photos) No further remedial action required at the time of our inspection. Block 2: patch repairs highlighted on report 26/04/73 to the perimeter have been completed by the installer to our satisfaction. Patch repairs still required at a later date due to area unable to be sealed around scaffolding poles. * Installer supplied photographic evidence of repair (See Photos)			
5	Type of Joint	Tape Joint ☐	Auto Weld ☐	Hand Weld ☒	Extrusion Weld ☐
6	Jointing Testing	☒ Air Lance (ASTM D4437)		☐ Probe Test (ASTM D4437)	
7	Laps, welds and joints seals	Did all welds, laps and seals pass testing			☒ Yes ☐ No
		Joints made to a good standard using both a hand held hot air tool and extrusion weld machine.			

		No remedial action required at the time of our inspection.
8	Detailing Work	All detailing work carried out using warmed (SAGM) to corners, door thresholds and pipe penetrations
9	External wall airbricks	Unable to count due to scaffolding

Photographs



03/04/17



03/04/17



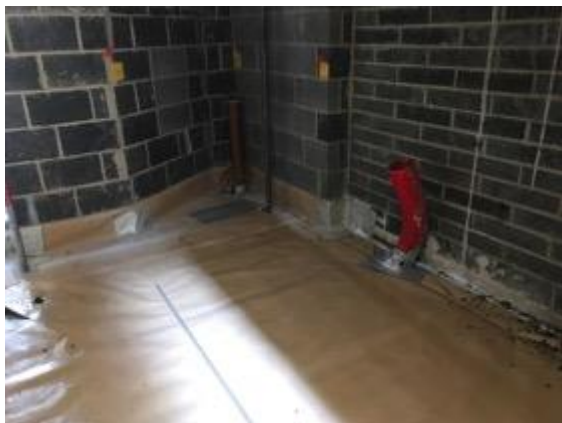
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03/04/17



03/04/17



26/04/17



26/04/17



27/04/17

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26/04/17



27/04/17



27/04/17



27/04/17



* Contractor supplied repair photos



* Contractor supplied repair photos



* Contractor supplied repair photos



* Contractor supplied repair photos

The installation has **PASSED** inspection and a further inspection is not required to these plots.

The installers all hold the NVQ Level 2 "Gas membrane Installations" qualification and as such are classed as a qualified and experienced installer. MEC Environmental have checked the CSCS Trade Cards of the installers, which confirms the holder has attained the qualification.

The frequency and number of independent visits and inspection regime employed is broadly line with Annex 1 of CIRIA C735.

Signed: 
Director
MEC Environmental Ltd

Date: 21/05/2018

Appendix 1

Consultants Gas Protection Specific Experience:

Michael Corban

10 years Building Surveyor (Blackburn Borough Council)

2 years Surveyor (Environmental Protection Group)

4 years Geo-engineering Technical Manager (APG Ltd)

2 years Geo-engineering Technical Manager (Geosolutions Ltd)

8 Years Technical Director (MEC Environmental Ltd)

Member of Technical Committee Published Guidance and Papers

1) Ciria 665 "Assessing risks posed by hazardous ground gases" (Steering Group Member Non-Funder)

2) Ciria C716 "Remediating and Mitigating risks from volatile organic compound (VOC) vapours from land affected by contamination" (Steering Group Member Non-Funder)

Author of Published Guidance and Papers

1) Chartered Institute of Environmental Health Card G & Wilson S **"Local Authority Ground Gas Handbook"** (Text Contributor and Peer Review Committee)

2) Corban M & Wilson S 2012 **"Gas membranes and the requirements of CIRIA C665/British Standard BS8485"** (co-author)

3) Corban M & Wilson S 2012 **"Gas Membrane Tracer Gas Testing Trial"** (co-author)

4) Mallet H, Taffel-Andureau L, Wilson S & Corban M **Ciria 735 "Good Practice on the testing and verification of protection systems for buildings against hazardous ground gases"** (co-author)

5) Consultant to Construction Skills CITB - co author of the **Cskills NVQ Level 2 syllabus for "Gas membrane Installation and Integrity Testing apprenticeship and Up-skilling Courses"**

Gas Protection Specific Qualifications

- 1) The Welding Institutes **"Geomembrane Welding Training and Inspection Course"**
- 2) BGA & Construction skills **"Quality Controls of Inspection and Validations of Gas Membrane Installations"**
- 3) Radon Council (Approved Designer)
- 4) Co-Author of the syllabus and Instructor of the BGA & Construction Skills Training Course **"Quality Controls of Inspection and Validations of Gas Membrane Installations"**
- 5) Construction Skills CITB **"Cskills "Gas membrane Installation Up-skilling Course"**

Associations

British Geomembrane Association (BGA)

Construction Related Qualifications

- ONC Building Construction (Blackburn College 1989-91)
- HNC Building Construction (Blackburn College 1991-93)