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PUDLO GB SELF SEAL INSTALLATION GUIDE

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1. Introduction

PUDLO Waterproofing Systems has been at the forefront of protecting structures from water ingress for over 140 years. To expand on our widely used Type B (structural integral) concrete, we launched our first successful membrane system (Type A) in 2016. Since then, PUDLO has launched several waterproofing membranes -PUDLO TS TR & TF Membrane, PUDLO GB Self Seal, PUDLO GB Reinforced, PUDLO Liquid Tank / Liquid GB as well as PUDLO GP Ultra+ / Ultra Seal / Ultra Tank - which were the first of its kind in the UK to provide protection from both gas and water, in accordance with BS 8485:2015. In addition, PUDLO Waterproofing Systems launched PUDLO GB Self Seal.

PUDLO GB Self Seal a self-adhesive membrane specifically designed and manufactured to reduce the passage of methane and radon gasses. This is achieved by the aluminium acting as the primary barrier which is reinforced with a protective laminated HDPE film to one side along with a robust bitumen rubber compound to the other. The product can be used as a damp-proof and waterproof membrane.

2. Gases

Methane

Landfill gases that contain methane are developed in sites by decomposition of biodegradable refuse. These biodegradable materials are made up of organic matter such as animal and vegetable materials, paper, wood and wood-based products. They are readily found in households, commercial buildings and industrial waste sites. More than 1,400 sites (approx.) in the UK pose a potential gas risk and of these 50% lie within 250 metres of housing. Methane production varies over length of time and will depend on the site.

Methane has two major constituents both of which are odourless and colourless. Methane alone can produce flammable and asphyxiant conditions. Methane can produce flammable mixtures in the range of 5 to 15% by volume in air. It is recommended that methane should be kept to below 1% by volume.

Sites with high levels of gas should have the necessary protection measures put in place with a gas resistant membrane and venting.

Radon

Radon is a naturally occurring radioactive gas which is generated from certain rock structures. Over time, it has been observed that Radon is specific to certain areas within the UK. Radon can only be detected using special equipment. When a waterproofing design is put together, radon should be considered.

3. Accreditation & Installers

PUDLO GB Self Seal has independent test data to confirm resistance to methane and radon which also includes ancillary products associated with it. PUDLO GB Self Seal must be installed strictly in accordance with the certificate's requirements.

PUDLO Waterproofing Systems works with several specialist installers of PUDLO GB Self Seal. A person/company is considered as a recommended installer after:

Having actively attended a technical session (hands-on) with PUDLO Waterproofing Systems

Having satisfactorily installed the first job following the technical session (start-up)

Installers of PUDLO GB Self Seal are all familiar with such systems and we only work with third parties who are passionate about waterproofing, are professional and have the technical knowledge to provide the end-user with a robust waterproofing system.

PUDLO GB Self Seal is covered under a 20-year product warranty with a separate 12-year installation warranty issued to the client directly by the recommended installers, or what has been agreed between client and installers.

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Note: In the event the client requires an all-encompassing 20-year performance warranty directly from DB Group (Holdings) Limited (strictly applies only where PUDLO CWP is used as part of a dual system), please contact PUDLO directly to discuss your specific project requirements. We are always on hand and happy to assist.

It is important to ensure that the PUDLO GB Self Seal is installed by skilled, trained operatives to achieve optimal performance on the first attempt. The works will be executed on the instruction of the contractor and must be completed by a fully trained and competent person that can install the PUDLO GB Self Seal.

Note: The PUDLO GB Self Seal system is not covered under the PUDLO Premium QA System (unless used in conjunction with PUDLO CWP). However, we can put several measures in place to ensure the client is left in safe hands with third party specialist installers.

4. PUDLO GB Self Seal Installation

The PUDLO GB Self Seal system comes with several ancillaries that are vital to achieving optimal performance. If any one of these products is installed incorrectly it may result in failures to the waterproofing and gas protection system. Listed below are the general principles of the PUDLO Self GB Seal.

All substrates should be smooth, clean, dry and free from any sharp edges. Voids within the substrate must be filled with PS Concrete Repair or PS 3min Rapid Mortar. Any loose material and contaminants should be removed as this will affect the installation of the membrane.

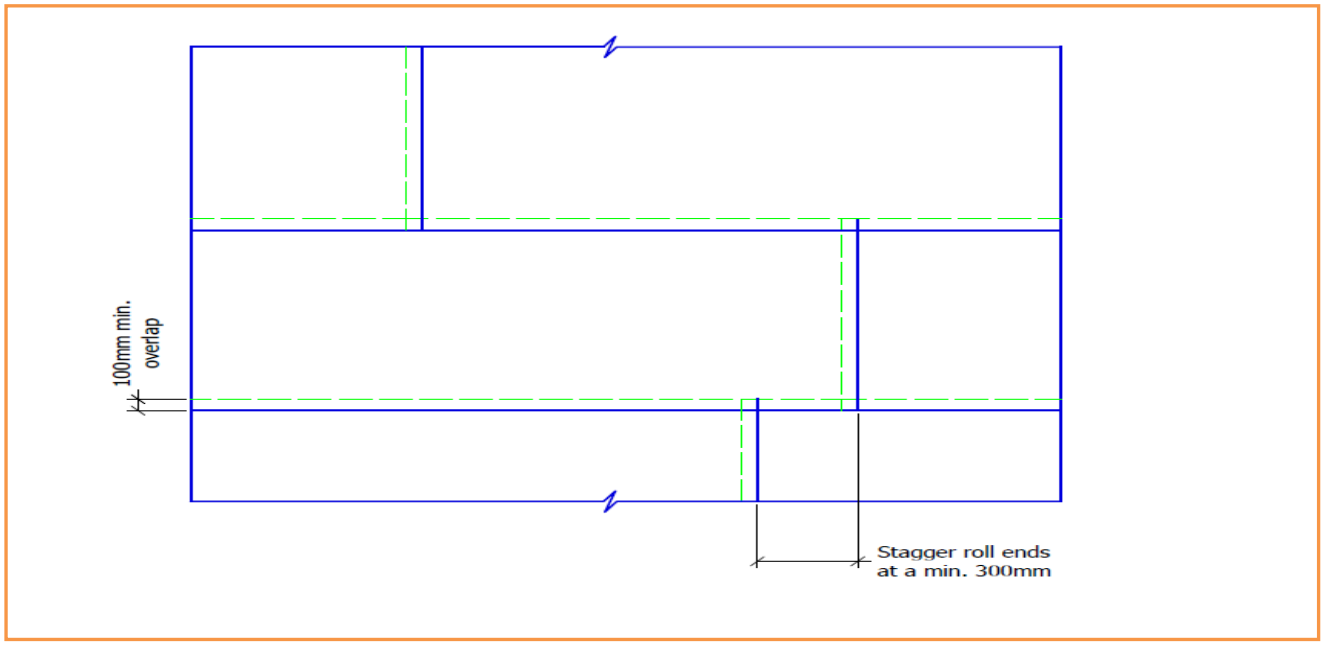
Note: The membrane should NOT be installed in wet conditions or on top of a damp surface.

When bonding PUDLO GB Self Seal to the surface, care should be taken to avoid air pockets beneath the membrane. To achieve good adhesion, apply pressure across the membrane from the centre towards the edges.

Membrane overlaps should be staggered and a minimum 100mm overlap must be achieved.

Membrane overlaps must be secured and fully bonded. Rollers are a good tool to use to apply even pressure across the overlaps.

Figure1



Surface Preparation

2.1 – Priming the substrate will bind any remaining surface dust and stabilise the surface.

2.2 – All surfaces must be primed using PUDLO GB Self Seal Primer.

2.3 – PUDLO GB Self Seal Primer should not be applied to the membrane and is not necessary for overlapping membrane joints.

Note: Only prime the surfaces that are being covered the same day the membrane is installed. Application of the membrane should commence as soon as the primer is dry.

Angles / Edges

2.4 – External angles should be chamfered so sharp edges are avoided. Sharp edges could tear the membrane which could compromise the waterproofing.

2.5 – When transitioning from horizontal to vertical, prior to application of the membrane, a fillet should be installed. These fillets can be pre-formed by using missing sand / cement mortar.

2.6 – All internal and external angles should be reinforced with a strip of PUDLO GB Self Seal Reinforced Strip.

Membrane Application – Horizontal Services

3.1 – Installation of PUDLO GB Self Seal must be carried out by two people. Mark a straight line onto the concrete to mark where the edge of the first roll needs to be positioned and roll out the membrane around 1.5m from the marked line.

3.2 - At the end of the PUDLO GB Self Seal, lift and peel back about 500mm of the backing and fold this underneath the roll. Apply the PUDLO GB Self Seal to the surface along the marked line and bond the exposed adhesive side of the membrane to the concrete. Once applied, press down from the centre of the membrane and smooth out to the edges.

All lap joints must be thoroughly rolled to ensure a complete and effective seal. Close attention must be given to obtaining a continuous sheeting to prevent gas penetration.

3.3 – Push the roll back to rewind it until the loose end of the release paper can be grasped in both hands and pulled away from underneath the membrane. Take up the backing, ideally winding this onto a wooden rod until this is at an angle for the installer to use easily.

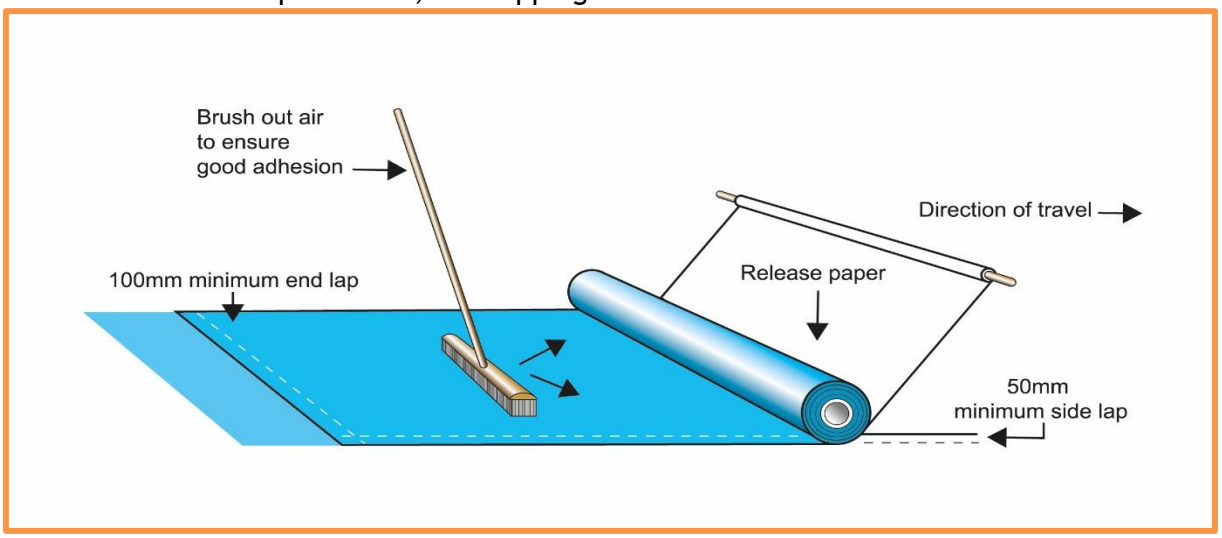
3.4 – When applying the PUDLO GB Self Seal the first person should walk slowly

backwards making sure they are applying an even strain to the release backing which should wind round the wooden rod, making sure that the membrane is aligned along the marked line.

3.5 – Once the PUDLO GB Self Seal has been placed, the second person must then apply pressure onto the surface of the membrane making sure there is good adhesion to the surface and no air has been trapped underneath.

3.6 – Once the first roll has been laid, the next roll should be positioned, overlapping the end of the previous roll to form an end lap joint and bond 500mm to the surface. Once the first roll of PUDLO GB Self Seal has been applied, lay the next roll alongside the previous one, laying it in the same way as before.

3.7- As well as making sure there is a good bond to the substrate, the installer must ensure there is a watertight joint across and along the whole of the side lap by pressing down on the PUDLO GB Self Seal using a roller.



Membrane Application- Vertical Surfaces

4.1 – Secure the end of PUDLO GB Self Seal at the top of the vertical surface (this will depend on the site conditions). The installer may need to mechanically fix the PUDLO GB Self Seal to the top of the substrate by fixing a wooden batten across the top of it.

4.2 – Once secured, unroll the PUDLO GB Self Seal about 1 metre and peel back 500mm of the backing paper from the PUDLO GB Self Seal, fold this over and then press the exposed self-adhesive compound onto the surface to create a strong bond.

4.3 – Unroll and lower the PUDLO GB Self Seal towards the group until the sheet is hanging vertically against the surface. Take hold of the release backing that was folded back earlier and slowly but firmly pull it down. As with the horizontal application, the release backing should be wound around a wooden rod to make this easier.

4.4 – As the release backing is peeled away, the self-adhesive layer should be pressed firmly to the surface.

4.5 – If an end of roll overlap joint is to be formed, the end lap dimensions should be a minimum of 100mm. The overlap joint should be formed by lapping the end of the first roll on top of the second. Press down using a hand roller.

4.6 – Once the first roll has been applied, the next roll should be fitted adjacent to the first roll in the same way with a side lap joint along the membrane.

Completing the Installation

5.1 – As soon as the PUDLO GB Self Seal has been laid, this should be covered by backfilling and should be protected by PUDLO Geo-Flo. For vertical applications, the backfill materials should ideally be sand or soil that does not contain debris as it could damage the membrane.

5.2 – If the backfill has debris in it or where this cannot be determined, the PUDLO GB Self Seal must then be protected with PUDLO Geo Floor thick protection. The use of the PUDLO Geo Flo is important for vertical applications because if the backfill is done from a height then the drop could cause damage to the membrane. PUDLO Geo Flo also acts as a drainage layer.

5.3 – Horizontal applications of PUDLO GB Self Seal can be covered using sand/cement screed, paving, pea gravel or other specified material. PUDLO Geo Flo on horizontal surfaces is important if the slab is to be used as a green roof.

Precautions During Fitting

6.1 – Surface prep, membrane application, protections and backfilling should be carried out as soon as possible to minimise any chance of the PUDLO GB Self Seal becoming damaged. There should be minimum delay between priming, application and covering as high temperatures, dust and dirt or other site workers may damage the membrane

6.2 – As mentioned in 6.1, high temperatures could damage the PUDLO GB Self Seal and may cause it to blister. Blistering will not reduce the waterproofing performance once this is covered.

6.3 – If the fitting of the PUDLO GB Self Seal is interrupted for a week or more, it is recommended that the exposed edges of the membrane are fixed fully to the substrate and sealed with double-sided tape. The tape can remain in position and will be covered by the next roll of membrane when the fitting starts again. Any horizontal applications of the PUDLO GB Self Seal must be covered by PUDLO Geo Flo as soon as this is fitted.

6.4 – Any temporary battens that have been used to secure the PUDLO GB Self Seal should be left until you install the PUDLO GB Self Seal and backfilling. The top of the PUDLO GB Self Seal should be reinforced by bonding some of the membrane across horizontally.

General Detailing

7.1 – When two different structural elements join the PUDLO GB Self Seal, this needs to be reinforced with PUDLO Self Seal Reinforced Strip so that it reduces stress on the PUDLO GB Self Seal by any relative movement of the structural elements.

7.2 – All overlapping joints should be formed in a way that the final exposed edge is facing downwards.

7.3 – It is essential to bond all membranes, corner pieces and reinforcing strips fully to the substrate.

Corner Detail

7.4 – When laying the PUDLO GB Self Seal around a corner angle between two walls, the corner should be smoothed by fitting a vertical fillet of sand and cement mortar. Reinforce fillets with PUDLO Self Seal Reinforced strip, tape along the angles and bottom corners applying a 300mm strip in these areas.

7.5 – When applying the membrane either vertically or horizontally, it must be lapped over the corner and the further membrane. Both horizontal and vertical membrane will have to be cut and folded in the exact same way as the corner pieces so that they can be applied correctly at the bottom corner.

Note: All membrane overlaps must be secured with PUDLO GB Self Seal Tape.

BS 8102:2009

When it comes to waterproofing below ground, two key elements are vital to the success of keeping everything dry and performing correctly. Firstly, the design should be carried out in consultation with a professional who is CSSW accredited. Secondly, the design should be done in accordance with BS 8102:2009 ‘Code of

practice for protection of below ground structures against water from the ground'.

PUDLO Waterproofing Systems technical and commercial team are CSSW accredited and happy to consult on the design where needed. There are three different waterproofing types and grades. These are listed below:

Type A – Barrier Protection, where groundwater is stopped at the point of entry by the application of a waterproof membrane

Type B – Structurally Integral Protection, where the basement structure is designed and built to be watertight

Type C – Drained Protection, where the structure allows limited ground water to penetrate, and then diverts the water in a controlled manner to pump or drainage. (This system should not be used where hydrostatic pressure is present).

The BS8102:2009 table below defines three separate grades of waterproofing for intended use:

Grades are detailed in the following table:

Grade	Example of Use	Performance Level
1	Car parks, plant rooms (excluding electrical equipment), workshops	Some leakage and damp areas are tolerable, dependent on the intended use. Local drainage may be necessary to deal with leakage
2	Plant rooms and workshops requiring a drier environment (then Grade 1), storage areas	No water penetration, damp areas tolerable, ventilation may be required
3	Ventilated residential and commercial areas including offices, restaurants, leisure centres, etc.	No water penetration acceptable. Ventilation, dehumidification or air conditioning necessary, appropriate to intended use

A) Leakage and damp areas for some forms of construction can be quantified with reference to industry standards, such as the ICE's Specification for Piling and Embedded Walls.

B) Archives, landmark buildings and stores requiring a controlled environment need special consideration, e.g. by referring to BS5454 regarding archives.

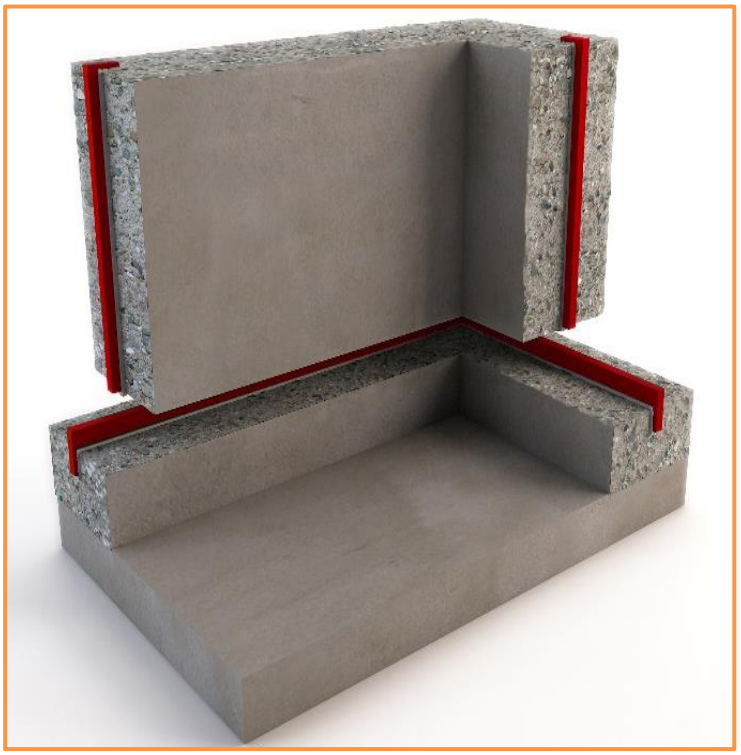
PUDLO GB Self Seal falls under Type A – Barrier Protection& Gas Protection Membrane

When it comes to performance, it is vital that the system is installed by a fully trained and competent individual. PUDLO Waterproofing Systems prides itself on maintaining the highest standards and only works with companies / individuals who work to the same standards.

Note: Before work starts on a project, please consult PUDLO Waterproofing Systems for advice to ensure you achieve optimal performance. Installation quality is vital as no two projects are ever the same.

Surestop BWB

PUDLO GB Self Seal can be incorporated as a dual system with either a Type B or Type C. Where a Type B system is used, regardless of whether it is PUDLO CWP or if the concrete is designed to BS 8007 / EN 1992-3 limiting crack widths to 0.2mm, all construction joints should be installed with *Surestop BWB*.



Surestop BWB is a red hydrophilic strip made of natural sodium bentonite for the sealing of construction joints for cast-in-place concrete. Surestop BWB expands over its original dry volume on contact with water to form a positive seal.

Surestop BWB is supplied in 25mm x 20mm x 5m rolls in boxes (6 x 5 metre rolls per box). For fixing instructions please refer to:

- Surestop BWB BBA certificate
- Surestop BWBTDS
- The PUDLO System Concrete Standards & Best Practice literature
- Typical details - available on request from your Technical Manager or PUDLO Site Support Team representative

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Limited Warranty

PUDLO GB Self Seal should only be installed once the site ground conditions are suitable to receive the waterproofing product. **PUDLO GB Self Seal** is designed to be used on most substrates and is NOT designed to waterproof against movement / expansion joints. Please consult PUDLO for special installation guidelines. The information and data contained herein is believed to be accurate and reliable. Specifications and other information contained within this 'guide' supersede all previously printed material and is subject to change without prior notice. Manufacturer's warranty of the installed system is available. Please contact PUDLO for terms and limitations. All goods sold by the seller are warranted to be free from defects in material and workmanship. The warranty is in lieu of and excludes all other warranties not expressly set forth herein. Seller shall not be liable for incidental or consequential losses, damages or expenses, directly or indirectly arising from the sale, handling or use of goods, or from any other cause relating thereto, and seller's liability hereunder in any case is expressly limited to the replacement (in the form originally shipped) of goods not complying with this agreement or at seller's election, to the repayment of, or crediting buyer with, an amount equal to the purchase price of such goods, whether such claims are for breach of warranty or negligence. Any claim by buyer with reference to the goods sold hereunder for any cause shall be deemed waived by buyer unless submitted to seller in writing within 30 days from the date buyer discovered or should have discovered any claimed breach.

Materials should be inspected and tested by purchaser prior to their use if product quality is subject to verification after shipment. Performance guarantees are normally supplied by the applicator of the **PUDLO GB Self Seal**.