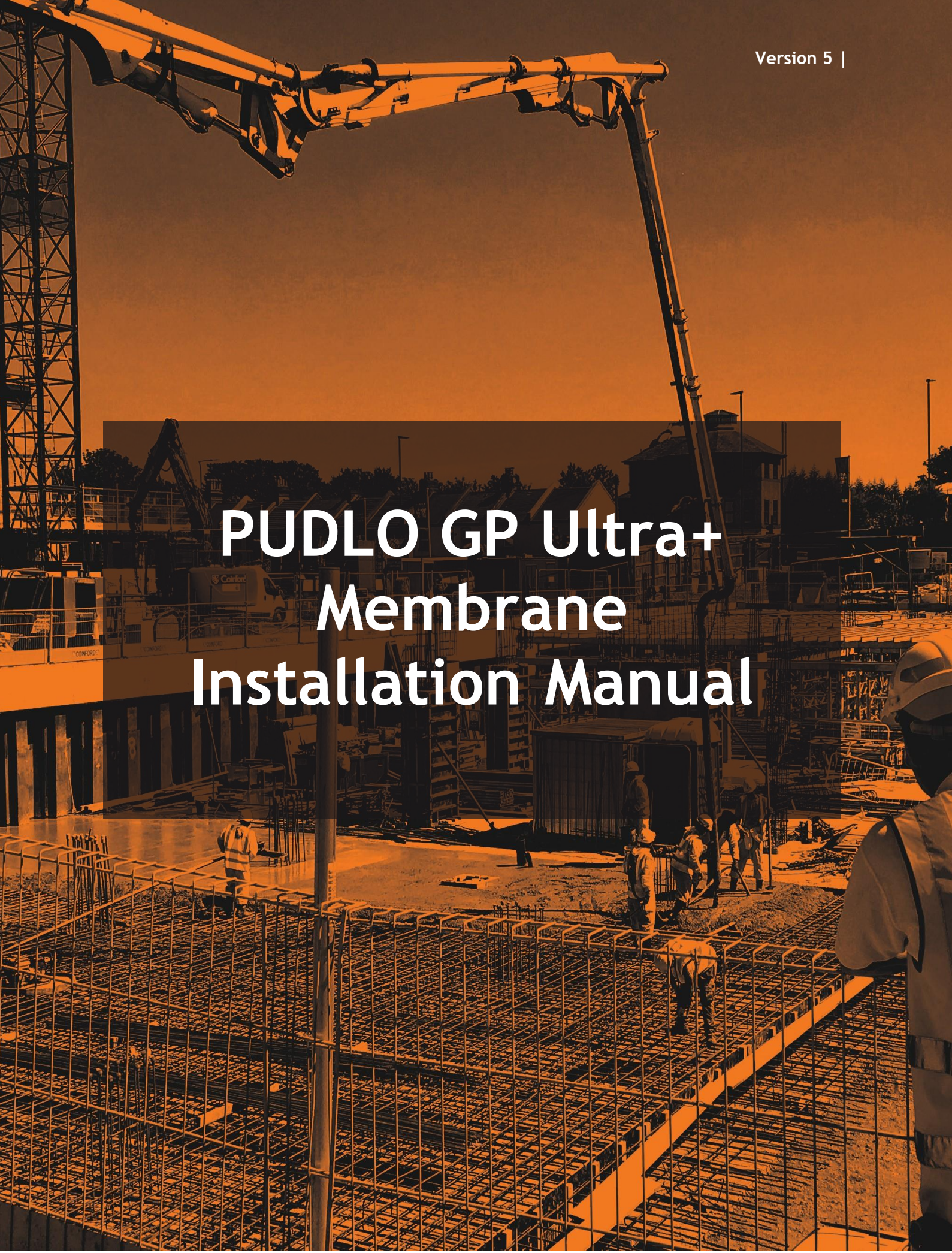

Version 5 |

PUDLO GP Ultra+ Membrane Installation Manual

Author: Liam Leonard AMICT CSSW – Technical Standards Manager

DB Group

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Introduction

PUDLO Waterproofing Systems has been at the forefront of protecting structures from water ingress for over 140 years. In 2016, PUDLO introduced its first membranes into its waterproofing range. In 2017, PUDLO successfully added two more Type A membranes to its growing list of waterproofing systems. These became known as PUDLO Membrane BW and PUDLO GP Ultra+.

PUDLO GP ULTRA+ is a BBA approved dual performance membrane that provides protection from gases - including VOCs, Hydrocarbons, Carbon Dioxide, Methane and Radon, whilst also protecting the structure from water ingress. PUDLO GP Ultra+ is a multi-layer, polythene membrane which is fleece-backed, providing a system that is fully bonded to the concrete.

PUDLO GP Ultra+ is used for all aspects of gas protection and where a Grade 3 (waterproofing) environment is required, as part of a dual system recommended in BS8102:2009. PUDLO GP Ultra+ can be used in horizontal or vertical applications and is suitable for all ground floor and basement constructions, including lift pits, slabs, liner walls, capping beams, and service penetrations. PUDLO GP Ultra+ can also be used as a single system.

PUDLO provides advice on best practices for the installation of PUDLO GP Ultra+, handling on site, appropriate placement, compaction, and concrete curing according to ambient temperatures and conditions. PUDLO GP Ultra+ is accepted by NHBC, with a BBA certificate issued in 2018.

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The PUDLO GP Ultra+ Membrane System

The sealing of PUDLO GP Ultra+, which provides structures with protection from harmful gases and water, is comprised of two very simple elements:

1) Multi-layer polythene

2) Virgin polypropylene geotextile, which bonds to the concrete

PUDLO GP Ultra+ has been extensively tested and has been proven to withstand aggressive environments. PUDLO GP Ultra+ provides the client with peace of mind and ultimate confidence that the product is suitable and fit for purpose. PUDLO Waterproofing Systems recognises the importance of providing best-in-class products in terms of robustness and durability.

PUDLO GP Ultra+ is a pre-applied, fully bonded waterproofing and gas protection membrane. The geotextile is laminated to the membrane to provide dual functions. The purpose of the geotextile is not only to bond it to the concrete, but it is also designed to protect the membrane.

Note: This installation guideline is provided for illustration and information purposes only. This manual should be read in conjunction with standard details. All project-specific detailing and installation should be in line with the client's requirements and subject to the outcome of a ground investigation report. PUDLO is not responsible for any discrepancies, should the correct instruction not be followed.

Main benefits of PUDLO GP Ultra+

- Recognised by the BBA as an accepted system for gas and water protection
- Accepted by insurance providers
- Overlaps can be taped, or heat welded (dependent on gas type and level)
- Full surface contact between membrane and concrete
- Quick and easy installation
- Can be installed in all weather conditions
- No requirement for priming
- High resistance to ground gases
- Exceptional chemical resistance
- Long-term durability (performance guaranteed for the lifetime of the building)
- Meets the latest British Standards (BS8485:2015)
- Waterproofing barrier Type A criteria (BS8102:2009)
- Hydrocarbon and VOC barrier (CIRIA C748)

Installation

Note: PUDLO GP Ultra+ should avoid pressure points when installed. Protection boards should be in place to protect the membrane from becoming damaged.

PUDLO GP Ultra+ comes in the following roll size:

PUDLO GP Ultra+	1.9m x 25m roll. (47.5m2). Roll weight = 35kg

System Components & Accessories

PUDLO Ultra Detailing Strip	1m wide strip of PUDLO GP Ultra+ for use on corners and kicker details to facilitate transition from horizontal to vertical application. Used in conjunction with corner units.
PUDLO ULTRA EXT TAPE	300mm wide self-adhesive strip of PUDLO Ultra Tape. For use on roll-end joints and for detailing around penetrations/perforations in the PUDLO GP Ultra+. This can also be used as a repair patch.
PUDLO Ultra Tape	100mm wide double-sided pressure sensitive tape for PUDLO Ultra Tape roll-edge sealing.
PUDLO Ultra Top Hats (PREFABRICATED)	Standard 110mm top hat with 150mm wide skirt. Prefabricated corners come in 500mm x 500mm x 500mm internal and external corners.
PUDLO Liquid GB	Latex-based, liquid-applied membrane with gas-resistant additives for use on pile heads and penetrations. This provides a continuous gas protection barrier. PUDLO Liquid GB can also be used for transitions where membrane terminates from G/F to DPC / DPM. PUDLO Liquid GB also provides protection from water ingress.
Drainage Layer	Used externally to provide protection to the membrane and provide a drainage pathway to alleviate water pressure coming to bear on the structure.

General Installation procedure - PUDLO GP Ultra+:

- Installation should begin at the perimeter detail (edge), followed by the floor (horizontal) and then up the wall (vertical) application.
- Installation works should only proceed on a suitable subsurface. Defects in the system are most commonly caused by the subsurface - owing to insufficient surface preparation.
- PUDLO GP ULTRA+ prefabricated (internal & external) corner units to all corners. Once in place, install PUDLO Ultra Detailing Strip to the perimeter edges and connections on the walls and upstands, then join the corner units to the edge strip.
- PUDLO GP Ultra+ membrane should be laid out in the floor area. Create overlaps to cover 100mm selvedge on all rolls (horizontal), then join sheets together with PUDLO Ultra Tape or PUDLO Ultra EXT Tape.
- Form all necessary details to the floor area. This will consist of, but is not limited to, the following: Service pipe penetrations, connections, sumps, lift pits, pile caps, expansion joints, capping beams, (all 3 forms of piling - steel, contig and secant, where applicable).
- PUDLO GP Ultra+ is hung onto the wall area (vertical) with overlaps to cover 100mm selvedge on all rolls. Join the sheets together with either PUDLO Ultra Tape or PUDLO Ultra EXT Tape (or with welded joints, as required).

Note: mechanical fixings should only be limited to the selvedge and not directly through the geotextile (fleece side).

Joint Sealing (heat-welded application)

- For applications where elevated VOC or hydrocarbon concentrations are present on the building site, welded joints are necessary to provide an effective seal. Taped joints will not be accepted by PUDLO.
- For applications where elevated methane & carbon dioxide concentrations are present on the building site, welded joints are recommended to provide the most effective seal. However, taped joints are acceptable (gas level dependent).
- For applications where only waterproofing is needed, or where only radon levels are present (or both), taped joints are acceptable.
- Heat-welded window application for gas protection is 180-240OC, at a suggested rate of 1.5mm/min on low air flow.

All heat-welded applications, where VOCs are present, must be installed by a third-party, Level-2 NVQ installer. The membrane installer must be trained to install the PUDLO GP Ultra+ system.

PUDLO does not offer a warranty for gas protection - only for waterproofing. Once the membrane has been installed, this must also be signed off by a third-party gas validator who has been appointed at the start of the project. PUDLO is unable to instruct an independent assessor. Please refer to CIRIA C735 for more information.

If using PUDLO GP Ultra+ in two-sided shuttering, the PUDLO GP Ultra+ must be backfilled against the outside. Ensure that protection measures are put in place to keep the membrane defect free.

- A minimum overlap joint of 50mm wide should be achieved. It should be noted that the suitability of the welded joint is defined by joint integrity, as tested in accordance with CIRIA C735 (Air lance ASTM D4437-08:2013). If the welded joint passes the integrity testing, this would be deemed as acceptable.

Joint Sealing (taped application)

- 100mm overlap selvedge is provided on all rolls of PUDLO GP Ultra+ and PUDLO Ultra Detailing Strip.
- PUDLO Ultra Tape (100mm wide) should be installed for taped PUDLO GP Ultra+ overlap joints.

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- To install the membrane and seal the overlaps using tapes, ensure the first panel of membrane barrier is laid. All surfaces of the selvedge should be clean from dust, dirt and debris. Begin by peeling one side of the protective coating from the tape, apply the tape along the outside edge of the selvedge. The tape should be applied across the full width of the selvedge.
- Place the second layer of membrane, ensuring a full selvedge overlap by slowly removing the upper layer of protective film from the tape and pressing firmly on the taped joint with a silicone roller (this removes any trapped air). Taped joints have the highest rate of failure when tested in accordance with CIRIA C735 to ASTM D4437-08:2013. Therefore, it is important that pressure sealing with a silicone roller is carried out.

Repairing Punctures / Membrane Tears

In the event a tear or puncture occurs in the membrane during installation, patch it using PUDLO Ultra EXT Tape. The patch material must overlap the area by at least 100mm. The patch piece must be applied with firm pressure, using a silicone roller to release trapped air. Repairs should be completed with a heat-welded patch preferably which provides an optimal seal.

Pile Head / Rebar Penetrations

When installing PUDLO GP Ultra+, it is inevitable that installation around pile heads, or through rebar penetrations, will occasionally occur. An effective seal is achieved by applying PUDLO Liquid GB or PUDLO Ultra EXT Tape. Apply the PUDLO Liquid GB sealant to the penetration areas thoroughly.

To achieve the required thickness of at least 1.00mm, two coats are required. PUDLO Ultra EXT Tape should be applied to ensure a 150mm overlap on to the penetration, and a 150mm overlap on to the PUDLO GP Ultra+.

Surestop BWB

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

Surestop BWB

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

- Surestop BWB BBA certificate
- Surestop BWB product data sheet
- The PUDLO System Concrete Standards & Best Practice literature
- Typical Details (available on request from the PUDLO Technical Team)

PUDLO GP Ultra+ Typical Details & General Information

Please contact PUDLO on 01954 780687 or email technical@dbgholdings.com and we will be more than happy to help. Please note that standard details may not suit every project, especially where tricky or unusual waterproofing or gas protection sealing is required. If the membrane is being installed by a third-party installer, please refer to their standard details or site-specific design

Precautions

It is recommended that membrane barrier systems are installed in ambient air temperatures more than 5^0C. Prior to application of PUDLO GP Ultra+, the area of installation must be free from live water ingress. If water is present, the source must be located, and the flow of water stopped prior to application. This is not the responsibility of PUDLO, but the contractor. The following should also apply on-site:

- Appropriate PPE to be always worn during handling and installation
- Foot traffic should be restricted. Foot boards are acceptable

  Traffic directly on top of the PUDLO GP Ultra+ is strictly prohibited
- Smoking and naked flames are strictly prohibited

Substrate preparation

Substrates for installation of PUDLO GP Ultra+ membrane system need to have enough stability to avoid movement during the installation and construction works. The following should be adopted on site:

- Clean, dry, uniform surface, free from dirt, dust, and debris
- Ponding water to be pumped away (damp/slightly wet is acceptable)
- Voids more than 12mm deep (or width) must be filled before the installation of PUDLO GP Ultra+ can take place
- Voids can be filled with suitable sub-grade fill material or repair mortar. Please check with structural engineers for suitable replacement material.

Limited Warranty

PUDLO GP Ultra+ should only be installed once the site ground conditions are suitable to receive the waterproofing product. **PUDLO GP Ultra+** is designed to be used on most substrates. 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 GP Ultra+**.