

# PermaSEAL<sup>®</sup>

Permagard

## Cavity Drain Membrane

Clear / Eco Installation Guide

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## 1. Introduction

PermaSEAL Clear and PermaSEAL Eco are high density polyethylene (HDPE) membranes suitable for use in waterproofing structures below ground level (basements) and isolating damp walls above ground level. The stud depth of 8mm provides versatile use as both a wall and floor applied membrane.

PermaSEAL 8 Clear and PermaSEAL 8 Eco are suitable for use in accordance with BS8102:2009 to provide Type 'C' drained protection to structures below ground providing a Grade 3 dry environment suitable for domestic or commercial use.

It is essential that if applied in this way it is used in conjunction with the PermaSEAL sump and pump system (unless passive drainage is available on one side of the building) and that this is maintained throughout the lifetime of the installation.

PermaSEAL Clear and PermaSEAL Eco have a life expectancy of at least 30 years (DIN 9001:2000). They are inert products with high compressive loading stability. They are highly resistant to water, alkalis, saline solutions and organic acids, and are not affected by minerals. It is also resistant to bacteria, fungi, and other small organisms.

PermaSEAL Clear and PermaSEAL Eco can accept a range of wall and floor finishes. When fixed with the PermaSEAL Brick Plug or Quick Plug, this allows for the addition of battens and metal lath systems which can be insulated before the addition of plasterboard finish. When used as a floor membrane, insulation, underfloor heating, screed and floating floors can all be accommodated. For advice, please speak to our technical team.

## 2. Preparation

PermaSEAL Clear and PermaSEAL Eco can be installed over a wide range of substrates in varying situations - walls, floors, ceilings, soffits, etc. However, before the system is installed, the area must be assessed to determine what preparation is required:

1. Plaster that may be affected by being closed in behind the cavity drain membrane in the "wet zone", such as gypsum or lightweight plaster, or where the existing plaster is loose or de-bonding, should be removed from walls/soffits prior to membrane application. Only where dense and well adhered sand and cement renders are present and where removal may cause unwanted structural damage to substrates can they be left in place.
2. All timber fixtures and other organic material must be removed to prevent risk of fungal or bacterial growth behind the membrane, e.g., skirting boards, timber plates, old wallpaper etc. If evidence of rot exists, this must be dealt with by a specialist contractor prior to installation of the membrane. If any mould exists, this should be cleaned off and the area sterilised with a fungicidal wash.
3. If the walls are uneven or areas have deteriorated, any large depressions should be levelled and made good with sand & cement or with PermaSEAL Fillet Seal to ensure a solid fixing and easier installation.
4. When assessing floor applications, consideration should be given to the type of finish that is required. The floor must be cleared of oil, loose material and any sharp protrusions. The floor should be made level or have a slight fall to the water evacuation point. Any holes or severe depressions should be filled. When a timber floor is the preferred finish, more consideration should be given to achieve a flat substrate prior to laying the membrane. This will relieve any undue movement when fitting a final floor finish.
5. When fixing the system to flat soffits you must ensure that there is a fall to create proper drainage and prevent ponding. Any sagging of the membrane should not be great enough for ponding to take place.

## 3. Wall installation

PermaSEAL Clear and PermaSEAL Eco are fixed studs facing the wall to create an air/ depressurisation gap. The gap created is designed for either air movement or water movement down to a drainage system (if applicable).

PermaSEAL Clear and PermaSEAL Eco can be fixed horizontally or vertically depending on the area to be lined and the wall height. Horizontal fitting requires less joints as the roll is simply unrolled around the room however, this method will require movement of the full roll which is relatively heavy to start and can be difficult at height. Vertical fitting is a lot easier as you are only dealing with part sheets. This method is also employed where the wall height is taller than the roll height so the roll is cut into predetermined lengths (wall height) and installed like wall paper. This method has a lot more joints as each section needs to be overlapped and joined to the next strip, as per jointing instructions later.

PermaSEAL Clear and PermaSEAL Eco are fixed to the wall with either the PermaSEAL Brick Plug or PermaSEAL Quick Plug. For ease of use both can be supplied with pre-fitted rubber sealing washers which when hammered home will compress against the membrane to create a watertight seal. As an option for slightly undulating surfaces the seals can be removed and the head of the plug wrapped with PermaSEAL Rope which when compressed against the membrane will stick to both the plug and membrane to create a permanent bond.

Place the membrane in position as level as you can judge by eye. Using a 10mm drill bit, drill through the centre of a stud near the top and edge to a depth greater than the fixing. The fixing is then hammered into the pre-drilled hole until the seal compresses tightly into the stud. The rubber washer re-seals the hole. Level the membrane using the spirit level or laser level if used, and fix another plug about 2m along at the top of the sheet. The membrane will now be hanging level to the wall.

If you are fixing horizontally, continue fixing every 2m until you have reached the end of the roll or you have covered all of the wall(s) to be treated. It is very important to regularly check the level. If the membrane is not level, you may well find that the membrane is kinked and looks unsightly, it will also dive down when fitted around corners.

If you are fixing vertically, hang each subsequent sheet by the two fixings as described above. The subsequent sheet should overlap by at least the width of the flange (part with no studs) of the new sheet. You may find it easier to interlock the first stud of the new sheet to the last stud of the last sheet as this helps to keep the new sheet level. The vertical joints have to be sealed with PermaSEAL Tape. It is easier to apply the tape to the inner surface of the flange of the next sheet. Clean the flange and the face of the last sheet with a clean rag. When you have fixed the new sheet level with the correct overlap, pull off the backing paper from the tape and peel down whilst applying pressure to the flange. Once all the backing paper has been removed, apply more pressure with the palm of your hand to further seal the whole of the joint. A Hot Air Gun should be used to help sealing in cold or damp conditions.

#### **4. Plug fixing centres**

Once the wall membrane is hanging off the top fixings the rest of the fixing plugs need to be fixed.

The spacing of these fixings is dependent on the type of wall finish to be used:

Timber battens	600mm centres vertically and 400mm horizontally. Barrel Vaults require tighter centres 300mm around the vault and 600mm down the vault.
Fixed metal track	800mm centres vertically and 600mm horizontally.

Free standing timber stud walls, metal frames and block walls do not require specific fixing centres. In these cases, use sufficient fixings to ensure the membrane is neat and tidy and reasonably tight to the wall, especially around corners and reveals.

Where brick or block walls will be restrained to the retaining wall using wall ties, additional fixings should be installed to accommodate the restraints at the correct installation centres specified.

When fixing the system to vaulted soffits you must ensure that enough fixings are used to keep the wall membrane tight to the soffits with no sagging. It is essential the PermaSEAL Brick Plug or Quick Plug is sealed with PermaSEAL Rope as this gives a better seal in this situation. All fixings should be in line both horizontally and vertically.

#### **5. Battens**

Battens should be pre-treated and of a minimum dimension of 25mm x 38mm although you may find that 25mm x 50mm offers better fixing at the edge of the plasterboard.

The battens can be fixed into the PermaSEAL Brick Plug or PermaSEAL Quick Plug without piercing the membrane, by using 5mm (size 10) self-tapping screws. The plug will take 25mm of screw, so be sure to purchase the correct length for the thickness of batten.

Over-tightening of over length screws can loosen the plug. Be very careful not to puncture the wall membrane when drilling and fixing the battens. Battens should be fixed so that all plasterboard edges are supported. Use a timber treatment such as Permagard Universal Wood Preserver to protect cut battens.

Once the battens are fitted into position, plasterboard can be fixed to them using plasterboard screws. Care should be taken not to exceed the depth of the battens with the screws, and thereby puncture the membrane.

## 6. Membrane sealing and jointing instructions

It should be noted that all membrane and sealing surfaces must be clean, dry and dust free before applying sealing materials. When making a joint between two sections of membrane, PermaSEAL Tape should be pressed firmly against the PermaSEAL Clear and PermaSEAL Eco membrane for good adhesion. Any visible air gaps between the membrane and the sealing compound must be firmly pressed out to give a full watertight seal.

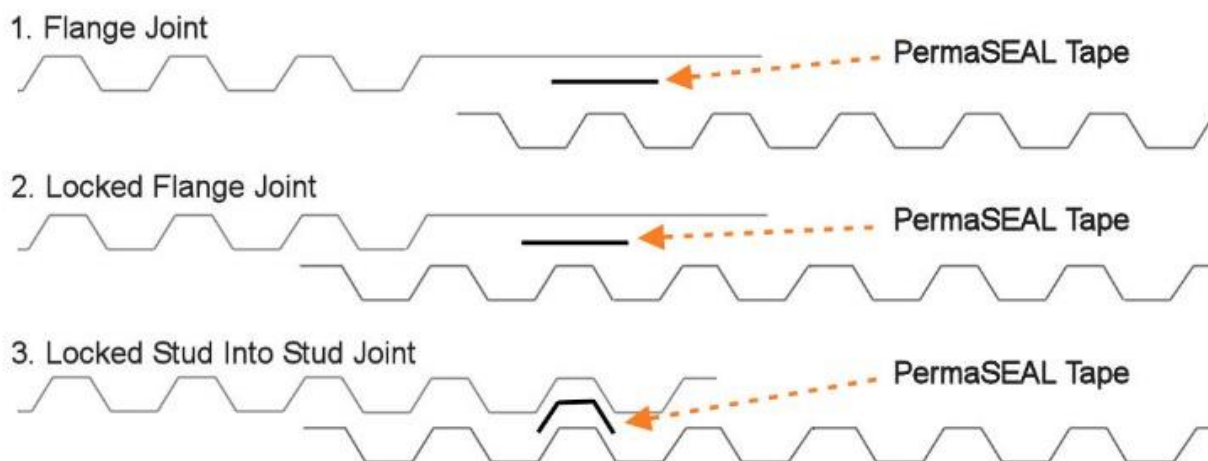
There are three standard types of sealed joints that can be made:

1. **Flange Joint:** The Flange Joint should be used whenever the flat flanged edge of the membrane is available. Consecutive membrane widths are fixed to the walls or laid on the floor so that the flange lays over the top of the studded edge of the previous sheet. The flange must cover a minimum of two rows of studs. Using the PermaSEAL Tape, unroll this onto the studded edge sheet, beneath the flange. The PermaSEAL Tape should be positioned between the last two rows of studs on the flat section, and pressed firmly into place.

The backing paper should still be on the tape at this point. Check that the flanged edge of the upper membrane is in position and covering two rows of studs before removing the backing paper from the PermaSEAL Tape. Once the flanged edge is in position, remove the PermaSEAL Tape's backing paper. Press the two membrane layers together firmly as you remove the protective backing paper.

2. **Locked Flange Joint:** This joint is similar to the 'Flanged Joint' but has the first line of studs of the next sheet of PermaSEAL Clear or Eco interlocking with the last line of studs on the previous sheet of PermaSEAL Clear or Eco. This method is used where you wish to guarantee that the next sheet of PermaSEAL 8 Clear is laid or fitted exactly square to the previous sheet and is useful on large floors or where the wall membrane is fitted horizontally and a horizontal joint is required.
3. **Locked Stud into Stud Joint:** Where a 'Flanged Joint' is not possible, and where the studs from each sheet line up correctly so that they interlock into each other, a 'Stud into Stud' joint is possible.

The overlap should be a minimum of three studs. PermaSEAL Tape is used to achieve a flat joint. Attach the PermaSEAL Tape to the flat area between the last two studs of the previous sheet of membrane with the backing tape still adhered. Carefully remove the backing tape and push the next sheet studs into the previous sheet studs to create the flat joint.



## 7. Vaulted or curved soffit installation

When working in a vault with rounded ceilings the water can run off freely and the following method should be adopted:

When lining vaults always work from the front to the back at the highest point of the vault, starting on the centre line. For ease of installation, we suggest PermaSEAL 8 Clear is used and a clear chalk line or laser line is set down the centre line of the vault.

Measure the length of the vault and add 400mm to this measurement, then cut the membrane to the length. Form a downward crease 200mm in from either end of the membrane. Offer the membrane up to the ceiling along the centre line of the vault, and drill and hammer home the PermaSEAL Brick Plug or Quick Plug (Sealed with PermaSEAL Rope) in a straight line at 600 centres from front to rear. These will provide fixing points for the battens. Working out from this centre line continue to fix the rest of the membrane.

Continue to join other sheets of membrane in this fashion working out from the first sheet, ensuring a joint of not less than eight studs. The flange should be used to make both of these joints either side of the initial membrane fixed off the central line of the vault. The joints are sealed in a locked flange joint using the PermaSEAL Tape as per image 2. It is imperative to create this joint on the underside of the previous sheet which will create the joint on the dry side of the membrane. Using this method will ensure any water ingress will run over the membrane like roof tiles and the joint will never be in contact with water.

The creased downturn at either end of the vault will start to deform going into the curvature of the vault ceiling. Where this occurs, carefully slit/cut the deformed sections towards the crease but stop short of the crease by one stud. The membrane can now be overlaid and will flatten out to the wall and follow the curvature. Several slits may be required to achieve this depending on the radius of the vault.

The end walls are now ready to be lined with the membrane. The end wall sections are cut to the true width of the vault so that the membrane overlaps the membrane returns already formed. These sections of membrane are fixed and sealed in exactly the same way as described for wall application. The end wall membrane stud to stud joint should be sealed around the radius with PermaSEAL Rope and PermaSEAL Corner Strip.

## 8. Floor preparation

It is essential that there are no undulating surfaces or depressions in the floor. In new build or whenever floors are being replaced, the floor slabs can be designed and constructed to falls 2° or 3° towards the water collection facility i.e. sump chamber. Where an existing solid floor is to be retained a sand/cement screed can be laid over the entire floor gently sloping towards the sump. In all cases the floor should have a flood test carried out tested by spraying area with a hose, to ensure that all water finds its way to the water collection point before laying PermaSEAL Clear or PermaSEAL Eco membrane.

Note: It is essential that the waterproofing designer incorporates drainage facilities to remove any water from a cavity drain membrane system otherwise failure of the system will occur if there is water ingress.

The concrete slab/raft should have PermaSEAL Lime Inhibitor applied to reduce the risk of limescale build up under the PermaSEAL Clear or PermaSEAL Eco membrane.

## 9. Floor installation

Starting at one side of the room, unroll the membrane with the studs down and cut to fit the area. The membrane is butt jointed to the wall membrane or upstand of the drainage channel. This process is then repeated until the whole area is covered. The floor membrane can be joined using one of the methods previously described, we suggest the locked flange joint is used.

Once the whole floor area is covered, seal the PermaSEAL membrane to the up-stand of the PermaSEAL Drainage Channel, Condensation Strip or the wall membrane.

There may be instances where PermaSEAL Clear or PermaSEAL Eco membrane may need to join to a DPC membrane, simply clean both surfaces and join with PermaSEAL Tape. If there are any services coming through the floor, the membrane can be cut and trimmed around them. This should be carried out as tight as possible then any gap left should be sealed with either PermaSEAL Rope or PermaSEAL Corner Strip. It should be noted that protrusions through the floor slab/raft should be avoided wherever possible as they create weaknesses that allow unnecessary water ingress.

## 10. Maintenance

PermaSEAL cavity drain membrane system will require maintenance for the lifetime of the system however, this is mainly the drainage channels and sump and pump system. For information on this please refer to relevant installation guides, technical data sheets or speak with our technical team.

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