INSTALLATION GUIDE

CDM System 500

Cavity Drain Waterproofing System

NEWTON SYSTEMS WATERPROOFING

Revision: 10.3- 1st Feb 2024 - NZ

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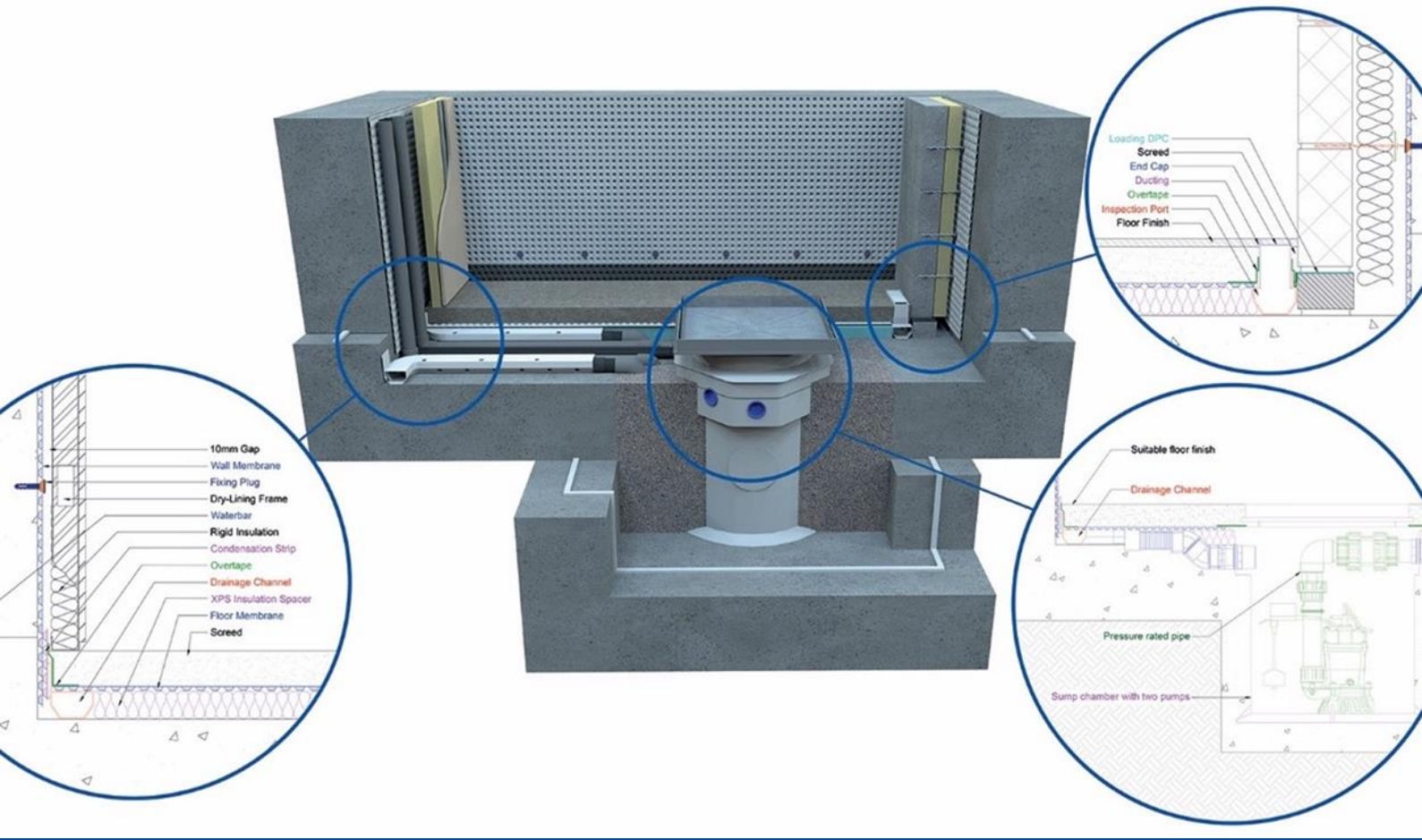
CDM System 500

Cavity Drain Waterproofing System



SECTION 1. INTRODUCTION OF THE NEWTON CDM SYSTEM 500

1.1. INTRODUCTION

Newton Systems Ltd New Zealand was first formed in 2014 due to a demand for an alternative waterproofing solution. Working alongside Newton Waterproofing Systems UK the Newton CDM System 500 is fast becoming a popular design choice for below ground waterproofing/Tanking in New Zealand.

Newton Waterproofing Systems was established in the UK in 1848 as John Newton & Co. Ltd. and has been involved in the remedial damp proofing industry since 1937, with the introduction of the original Newtonite Lath ventilated damp proofing membrane.

With our unique long-standing experience in this industry, we have evolved our products and technical support to the present high standards we now offer.

Newton CDM is a Type C waterproofing system that includes CodeMark & BBA Certified membranes, drainage channels, pumping systems and pumping ancillaries specifically designed for waterproofing earth retaining structures against water ingress.

The system works by creating depressurisation spaces, which are formed by the studded Newton membrane and drainage channels placed above or adjacent to the known and/or designed points of weakness in the structure. The system includes a range of tapes, fixing plugs, pumping systems and ancillaries. The Newton CDM System can also offer protection in areas where high radon, Sulphur, methane and other gases may be identified and present.

The Newton CDM System does not seek to hold back water pressure. Water ingress is controlled and managed by the depressurisation spaces created by the system. Draining the water away from the system is vitally important, and when designed correctly is the safest method of waterproofing available.

1.2. PRODUCTS WITHIN RANGE

The Newton CDM system comprises a range of specifically designed complementary products. The products that make the waterproofing system are listed below, together with a brief explanation of each product use:

CDM 508R
High Density Polyethylene (HDPE) Cavity Drain Membrane with 8mm deep conical studs for lining walls, soffits and floors. CDM 508R is certified for use as a gas barrier and is the membrane to be used to both walls and floors with the PAC-500 Gas System. Rolls are 20m long and either 2.07m or 2.4m wide including the 70mm flat jointing flange.

CDM 508 *eco* Floor
Made from fully recycled HDPE, CDM 508 *eco* Floor is the strongest Newton membrane and so is ideally suited as a flooring membrane. It has a higher studs per meter ratio than any other Newton membrane making it the ideal membrane to be used above the CDM XPS 500 insulated drainage spacer. Rolls are 20m long and 2.5m wide including the 70mm flat jointing flange.

CDM 520 *eco*
A fully recycled High Density Polyethylene (HDPE) Cavity Drain Membrane with 20mm deep conical studs for floors. CDM 520 eco is used where it is expected that water may ingress into the structure through slab defects and a greater drainage performance is required. CDM 520 *eco* is black and comes in 20m long x 2.00m wide rolls including the 70mm flat jointing flange.

CDM 508
Lighter weight version of CDM 508R that is available in a choice of sizes and in 500g/m^2 and 700g/m^2 variants. Both variants are suitable for wall applications, whilst the 700g/m^2 variant is also suitable for floor membrane applications. It is not suitable for use with gas protection systems. Rolls are 20m long and available in widths of 2.4m and 2.0m including the 70mm flat jointing flange.

CDM 508 Mesh
High Density Polyethylene (HDPE) Cavity Drain Membrane with 8mm deep conical studs for walls. The membrane has nylon mesh thermally welded to the face of the membrane to act as a key for plasters, renders and as a base for dot-&-dab plasterboard. Rolls are 20m long and 2.0m wide including the 70mm flat jointing flange.

CDM 503
High Density Polyethylene (HDPE) Membrane with 3mm deep square pattern studs for walls.

CDM 503 Mesh
High Density Polyethylene (HDPE) Cavity Drain Membrane with 3mm deep conical studs for walls. The membrane has nylon mesh thermally welded to the face of the membrane to act as a key for plasters, renders and as a base for dot-&-dab plasterboard. Rolls are 20m long and 2.0m wide including the 70mm flat jointing flange.

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CDM Condensation Strip
Forms an 8mm gap between the CDM BaseDrain perimeter drainage channel and wall membrane so that if condensation should form, it will be collected by the CDM BaseDrain and not pool on the floor, damaging finishes.

CDM 906 Lime Inhibitor
A surface applied treatment prevents the leaching of free lime from out of the concrete.

CDM Rope
Butyl rope in a 10mm bead used for jointing membranes when a flange seal is not possible. Rolls are 4.75m long in black.

CDM Joint Tape
Butyl tape used for jointing membranes along the flange. The rolls are 22.5m x 2mm x 30mm wide in black.

CDM MultiPlug
The CDM MultiPlug has been engineered to give a better fix in questionable substrate's and has the added benefit of a rubber sealing grommet supplied with the plug. If the fix is not as good as hoped, a pin (supplied in bags of 100 at extra cost) is inserted into the plug, expanding its circumference by nearly 2mm to tighten the plug into the substrate. The CDM MultiPlug accepts a size 10 (5mm) self-tapping screw for the fixing of battens or other dry-lining systems. 100 plugs per bag. Requires a 10mm drilled hole for insertion. For vaulted ceilings use either the CDM MultiPlug and replace the rubber sealing grommet with a bead of CDM Rope or use the CDM NuSeal Plug with a bead of CDM Rope.

CDM NuSeal Plug
The CDM NuSeal Plug is used with CDM Rope to provide a watertight seal between the plug and the membrane, and is the plug used for fixing Newton membranes to vaulted/curved soffits. The CDM NuSeal Plug is pre-drilled to accept a size 12 (6mm) self-tapping screw for the fixing of battens or other dry-lining systems. 100 plugs per bag, colored red. Requires a 11mm drilled hole for insertion.

CDM OverTape
Black, PVC-backed, one-sided tape used for connecting floor membranes to the CDM BaseDrain up-stand, floor membranes to wall membranes, sealing abutting joints of CDM 503 or CDM 508, and for repairs and reveal details. Rolls are 20m long x 150mm or 100mm wide.

Mesh Tape
One-sided fabric tape used for over taping joints to CDM 503 Mesh or CDM 508 Mesh which have already been sealed with CDM Rope or CDM Joint Tape as a surface key for plastering or rendering. Rolls are 10m long x 100mm wide.

CDM BaseDrain & CDM FloorDrain
White PVC drainage conduit designed to drain the CDM System at the wall/floor junction and at construction joints to the floor. Has 18mm holes every 100mm along its length to receive water at the vulnerable junction of wall and floor and at construction joints within the floor. Has fittings for connection to the Titan-Pro sump chambers, to 63mm O/D pipe for further connection to 110mm drainage pipe for when safe gravity removal of water is possible, for variable height inspection ports, as well as T-Pieces and 90-degree swept corners. Six, 2 m lengths per pack.

XPS 500C - Insulated Spacer
Boards of Newton XPS 500C insulation form a 50 mm insulated spacer adjacent to the CDM BaseDrain and CDM FloorDrain drainage channels within the Newton CDM System. The insulation boards are tested together with the floor membranes to confirm the long-term load capacity (50-years),

DampSafe 809-HP DPC
High-load capable, physical damp-proof course which is used within the Newton CDM System to ensure continuity between the wall and floor membranes through an internal block wall, or block spine walls built from a nib, kicker or engineering brick.

CDM Pumping Systems
A selection of pumping systems based upon the Titan-Pro chamber are available from 250W to 750W motors, heads from 7.2m to 14m and flow rates of 180 liters per minute to 410 liters per minute. The Newton Victron Inverter/Charger units will also allow the pumps to be operational even in the event of power failure. The Titan-Pro pumping systems are supplied with a recessed lockable lid that can receive a range of floor finishes including screed, tile, carpet, linoleum, and chipboard.

Foul and Surface Water Pumping Systems
A full range of packaged sewage and surface water pumping systems based upon the Trojan-Pro sump chamber. Systems prefixed with 'F' are suitable for foul water and prefixed with 'S' are suitable for Surface and Ground water. Larger, purpose-built systems are available by request. We strongly recommend that clean ground water and sewage/dirty water should be kept separate and not collected in the same chamber.

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1.3. NEW ZEALAND BUILDING CODE *(VERSION AS OF 15TH NOVEMBER 2021)*

All building work in New Zealand must comply with the Building Code, even if it doesn't require a building consent. This ensures buildings are safe, healthy, and durable for everyone who may use them.

The performance clauses of the New Zealand Building Code that are relevant to the intended use of the Newton CDM System and with which the building method or product complies or contributes to (where used as part of a system).

B2 Durability: B2.3.1 (a), B 2.3.2 (a)

E2 External Moisture: E2.3.3, E2.3.5 E2.3.7

F2 Hazardous Building Materials: F2.3.1

For further reading on how the newton system achieves each compliance code please refer to *Newton Systems 500 NZ Building Code Compliance Version 15.2 – March 2024*

1.4. BRITISH STANDARD 8102:2022 - DRAINED PROTECTION

British Standard 8102:2022 is the Code of Practice for the Protection of Below Ground Structures Against Water Ingress.

Without a dedicated standard for waterproofing below ground in New Zealand we refer top and reference this document to provide guidance for our designs.

Waterproofing of structures below the ground, and those partially earth retaining, should consider designs to comply with BS 8102:2022 the Code of Practice for the Protection of Below Ground Structures Against Water Ingress

Amongst other recommendations, BS 8102:2022 states that you should assume a head of water pressure to the full depth of the basement sometime during its life, unless extensive ground water analysis has been undertaken. Even then, the designer should consider the possibility of high ground water levels due to climate change, burst water mains, surface flooding, etc.

All waterproofing systems should be designed to deal with expected heads of water pressure.

Note: The Newton CDM System 500 is a Cavity Drainage System. To comply with standards, adequate drainage and water removal must be included within the design, to ensure water can always be removed from behind the system. The System will not hold back water pressure, if free water is allowed to build the system will fail.

1.5. FINISHING

A wide range of finishes can be employed on walls and floors. These provide protection for the membrane and create a decorative finish. Types of finishes will be subject to the designer and clients requirements.

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SECTION 2. DESIGN PRINCIPLES

The design of the Newton CDM System 500 is specific to the type of structure to be waterproofed. An understanding of the structure, specifically how and where it may leak, is very important. Whether the waterproofing system is installed to a New build structure or to an existing structure.

Drained waterproofing is often interpreted as being a holistic method of waterproofing, whereby water is allowed to come in through the structure and is dealt with using drainage systems that will remove the water more quickly than it enters. In general terms the statement is correct, but unfortunately, we have to be more specific than this. For example, it would be pointless to design a new structure that would allow large volumes of water to enter if the structure is sited within ground that has a propensity for high and far-reaching water tables. It would be impossible to calculate how much water would or could enter the structure and so it would be difficult to design a waterproofing system to deal with this unknown amount of ingressing water.

British Standard 8102:2022, Section 10.1, states that *"The external elements of the structure should be capable of controlling the rate of water ingress so as not to exceed the capabilities of the cavity drain system."*

New Zealand Building Regulations 1992 (Version as at 15th November 2021) Clause E2 External Moisture E2.2 States that "*Buildings must be constructed to provide adequate resistance to penetration by, and the accumulation of, moisture from the outside.*"

Therefore, we consider the following rules of thumb to be applicable:

2.1. EXISTING STRUCTURES

- An existing structure may or may not have been designed to withstand heads of water pressure as required by NZ Clause E2.2 or BS 8102:2022
- An existing structure may or may not have a correctly working form of external drainage.
- It is difficult to ascertain whether the ground surrounding the structure is free draining or not.
- It is difficult or often impossible to ascertain whether the design engineer of the existing structure was aware of the potential for water ingress caused by high groundwater levels. Victorian and Georgian engineers seemed to have a good understanding in this regard, and it is quite rare to see a badly flooded Victorian or Georgian structure. Many Victorian and Georgian structures were built with some form of drainage system below or around the structure.
- It is difficult or often impossible to expose the outside of the structure down to slab/raft/footing level to either investigate the cause of failure or to apply remedial measures.

Waterproofing of existing structures falls into two categories:

1. Those structures that have been built for some considerable time, where there is no indication as to the design principles used during construction. These structures are in the main, built with brick or Block walls and in-fill concrete slabs or floors of other materials. These structures tend not to have major water ingress problems, although this cannot be guaranteed. However, this type of structure offers very little resistance to water pressure and will leak freely at the wall/floor junction if even a very small head of water pressure comes to bear. It is unusual for water to ingress at any other point other than the junction between wall and floor, as this is by far the weakest point within this relatively weak structure. Ideally, the Newton CDM System should only work well within its performance capabilities and in some cases the structure will require upgrading to reduce the potential for water ingress so that the Newton CDM System is only dealing with small volumes of water ingress. This may involve a new structural slab, a Type A applied slurry tanking membrane, or injection of a specialist resin into the soil surrounding the structure. In some cases, all three of these options may need to be adopted.
2. Structures that have been built more recently and that have flooded within a few weeks/months/years of construction, where the design principles are still available, and often the designers themselves are available to offer an insight into their design principles. These structures are mainly built with more modern construction products such as reinforced concrete rafts, and reinforced concrete or concrete block walls with reinforced concrete infill. Structures built more recently should have been built in accordance with modern building regulations and the relevant Standards. Because these structures are so strong, and the concrete is placed to a recent Standard, water generally enters this type of structure at joints within the concrete, for example at kicker joints; movement joints; and construction joints. If the flow of water at the joints can be seen, it is good practice to try and stop or at least slow down the flow using Resin Injection System or Hydro Seal Systems. Once the flow of water has been reduced or stopped, the Newton CDM System can be installed to the structure to deal with any leakage.

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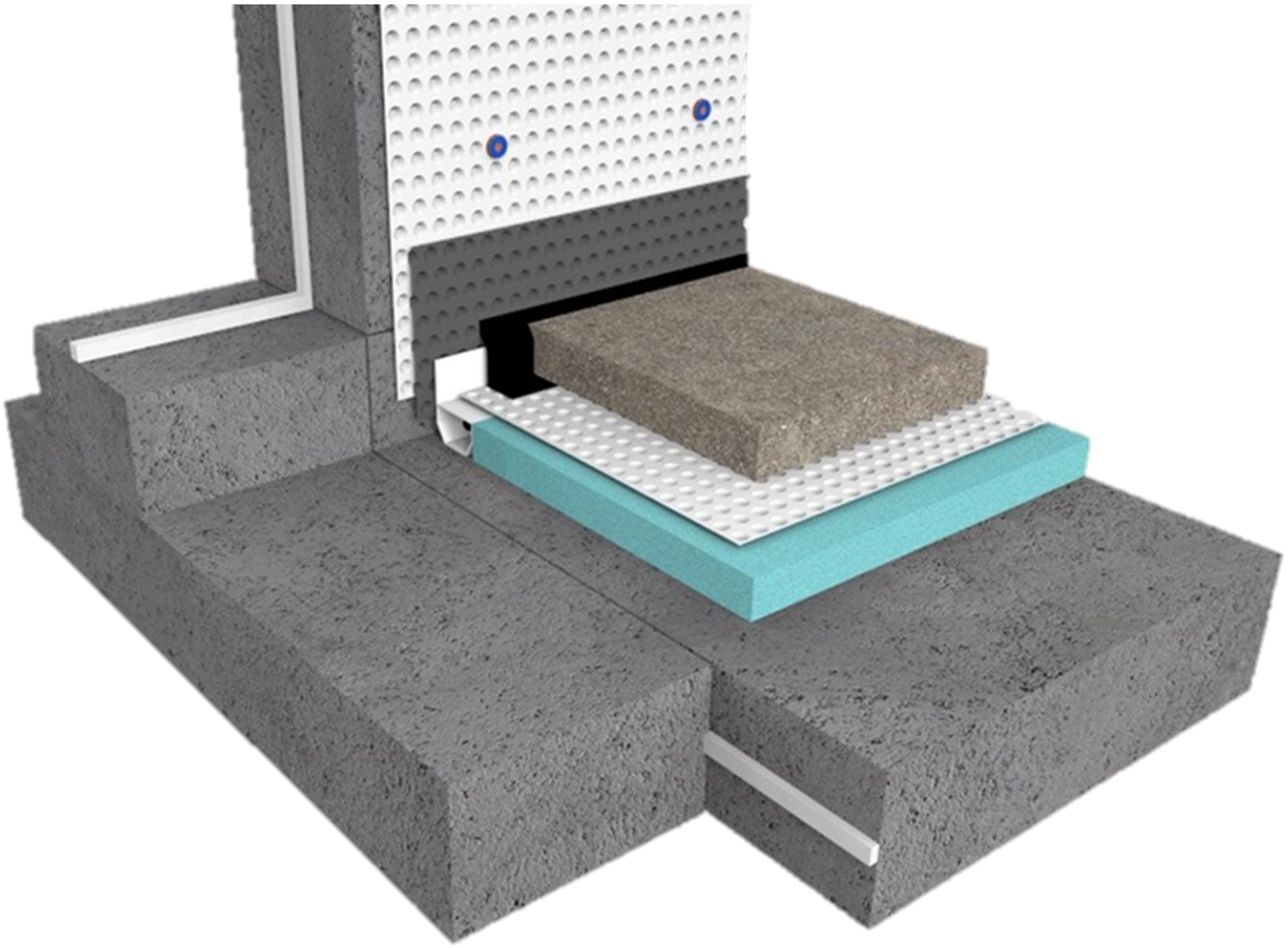
2.2. NEW-BUILD STRUCTURES

The waterproofing of new build structures is very similar to the waterproofing of existing concrete structures as mentioned in section 2. above. The basic principle of waterproofing existing structures is to build the structure so that it is as watertight as is required for the intended end use of the structure, with the intention in most cases that no water should enter the structure. The structure should be strong enough so that it can resist the stresses of withstanding heads of water pressure, and the design should ensure the prevention of differential settlement, the control of cracking and provision of a dense impervious concrete structure. Hairline cracks should be made good, and any joints within the construction should be waterproof. Consideration should also be made for protecting the structure from sulphates or any other progressive contaminants that may exist within the soil.

The structure can be waterproofed with the Newton CDM System to protect the dry internal habitable areas from any leakage that may occur through the concrete structure.

Note: In all cases, provision should be included to remove the water collected by the Newton CDM System 500. Water should be removed to either a sump chamber to be pumped out of the structure, or to a safe form of natural gravity fed drainage, where it is impossible for water to backup and pressurize the system, such as a drainage collection point that is downhill and so below the level of the slab or raft of the structure.

It is Newton's opinion that waterproofing systems should always be designed and installed by experts in the waterproofing of below ground structures. Our Newton Specialist Applicators (NSA's) are experts in both the design and installation of our systems, and we strongly recommend that designers should use their expertise wherever possible.



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SECTION 3. PREPARATION

3.1. PREPARATION

The Newton CDM System 500 can be installed over a 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 might be required:

- All timber and organic material must be removed to prevent fungal or bacterial growth behind the System, e.g. skirting boards, timber plates, old wallpaper etc. If evidence of rot exists, this must be dealt with by a specialist prior to installation. If any mould, etc. exists, this should be cleaned, and the area sterilized with a fungicidal wash.
- If the walls are uneven or have deteriorated, large depressions should be leveled and made good for a solid fixing to be achieved.
- When assessing floor applications, consider the type of finish that is required. The floor must be cleared of oil, loose material and sharp protrusions and should be made level. Holes or severe depressions should be filled. If a timber floor finish is preferred, consider achieving a flat substrate prior to commencing the waterproofing.
- The performance of the drainage system is dependent on the gradient and regularity of the slab/raft that the drainage is applied to. The design of a new slab and the preparation of an existing slab is fundamental to the success of CDM waterproofing systems. The following reference documents are useful:

Concrete NZ Technical Specification 01:2021 and BS 8204-1:2003+A1:2009 Screeds, bases and in-situ floorings

3.14 Departure from Datum

BS 8024-1:2003 suggests that a departure of up to 15mm is satisfactory, but that greater accuracy is required where "specialised equipment is to be installed directly to the floor".

The problem with this advice is that +/- 15 mm = 30mm, which is too great a deviation for a CDM System. It can also be strongly argued that the CDM System is "specialised equipment".

Deviation in height of the surface of a flooring layer from a fixed datum plane

The slab height at the point where the drainage channel is adjacent to sump chamber must be considered the datum point for the waterproofing system. Deviation from the datum may not be more than -5mm at any point between the datum and the furthest point on the floor to which the waterproofing system extends. Equally, deviation from the datum may be up to +15mm as long as this is at the furthest point from the datum and does not occur at any mid-point that may lead to water becoming stranded.

3.15 Surface Regularity

Deviation in height of the surface of a flooring layer over short distances in a local area

NOTE: Surface regularity is also known as flatness.

6.8.3 Surface Regularity

Table 5 – Classification of surface regularity of direct finished base slab or levelling screed

CLASS	**Maximum permissible departure from the underside of a 2m straightedge resting in contact with the floor.** *(Refer to Annex C of BS 8204-1:2003 + A1:2009)*
SR1	3 mm
SR2	5 mm
SR3	10 mm

The recommended surface regularity for the Newton CDM System is to SR1 or better (3mm on a slip gauge).

Testing

The surface regularity and the departure from datum must be tested using water (flood test) or laser levels. Any irregularities will be highlighted to the client and made good to ensure compliance. This can be achieved by planning or grinding or using a suitable levelling compound.

- When fixing the system to flat soffits you must ensure that there is a fall to promote drainage and prevent ponding. Any sagging of the membrane should not be great enough for ponding to take place.
- New concrete may require a treatment with Newton 106 Lime Inhibitor which prevents free lime from the curing concrete being drawn out by ingressing water. (Contact our Tech Department for more information)

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SECTION 4. WALL APPLICATION

4.1. TOOLS

Minimum Requirement

- Good quality 110V SDS hammer drill
- Mallet or club hammer
- Stanley Knife with spare blades
- Tape measure
- Long spirit level
- 10mm or 11mm SDS drill bits depending on which plugs are used.
- Clean rags
- Staging or scaffold for safe working at height
- PPE - Gloves and safety glasses

Recommended

- Extra lighting
- 110V Hot Air Gun
- Revolving laser level

Throughout the rest of this installation guide, our fixing plug options will be referred to generically as a 'CDM Fixing Plug' to mean any of the above options, dependent on the application scenario.

4.2. WALL APPLICATION

The membrane can be fixed either vertically or horizontally. When making this decision, you will need to consider the size of the area to be lined, and the height of the walls relative to the width of the membrane. Horizontal fixing requires less cuts and jointing, but the full roll is very heavy at first. Vertical fixing has much lighter strips to fix but requires that each of these is taped back together again. You may find that vertical fixing is easier but requires more CDM Joint Tape for jointing.

Depending on the application scenario, the membrane is fixed to the wall with either the CDM MultiPlug, CDM Plug or CDM NuSeal Plug. The CDM MultiPlug and CDM Plug both have a soft rubber sealing washer fitted to the plug for sealing to the wall membrane, whereas the CDM NuSeal Plug requires a bead of CDM Rope to applied before installation in order to create a seal.

Place the Newton wall membrane in a position as level as you can judge by eye. Using a 10mm drill bit, drill through the center 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 plug sits flush in 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 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 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 are sealed with CDM Joint 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, especially in cold or damp conditions.

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4.3. FIXING CENTRES

Once the wall membrane is hanging from the top fixings, the rest of the fixing plugs are ready to be fixed.

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

- Timber battens - 600mm centered vertically and 400mm horizontally.
- Barrel Vaults - Tighter centers 300mm around the vault and 600mm down the vault.
- Fixed metal track (Gypliner) - 800mm centers vertically and 600mm horizontally
- Brick or block walls restrained to the retaining wall using ties should have the fixings at centers to provide the correct number of restraints at the correct centers
- Free standing timber and metal frames and free-standing block walls do not require specific fixing centers. In these cases, use sufficient fixings to ensure the membrane is neat and tidy and reasonably tight to the wall, especially to corners and reveals, a minimum center of 2000mm vertically and 800 to 1000mm horizontally.
- 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
- All fixings should be in line both horizontally and vertically.

4.4. BATTENS

Timber 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 Gib/plasterboard.

The battens can be fixed into the CDM Fixing Plug without piercing/compromising the membrane, by using 5mm (size 10) self-tapping screws. The plug will take 30mm of screw, so be sure to purchase the correct length of screw 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 Gib/plasterboard edges are supported. Use a timber treatment such as 'End Cut' to protect cut battens.

Once the battens are fitted into position, Gib/plasterboard can be fixed to them using clout nails or preferably plaster/Gibboard screws. Care should be taken not to exceed the depth of the battens with the screws, and thereby puncture the membrane.

4.5. ALTERNATIVE FIXINGS

Other finishes may be employed depending on the requirements of the specifier.

Free-Standing Frame

This method should be employed if the wall is undulating, as with some stone structures or where space loss is a secondary consideration. The frame would be fixed to the soffit and the floor finish with the supplied 'U' channels or timber plate. With the increasing requirement of insulation to meet Clause H of building codes, the use of these frames is becoming more popular, the thickness of insulation required is often in excess of the thickness of the frame, and so the use of these frames does not add extra depth to the wall build when using this method. Because the frame is free standing and has no relationship with the wall membrane, very few fixings are required and so this wall finish above allows for the fastest and most efficient method of fixing the membrane to the wall.

Proprietary Fixing Systems

Fixing systems such as Rondo, Gypliner or Lafarge can be used with the Newton CDM System. It is also possible to use metal profile systems when constructing new internal walls.

Internal Block Walls

If preferred the system can provide a water and vapour proof barrier, and then be lined with a block or brick inner skin. Special ties are available that fit into the CDM Fixing Plug for lateral restraint of the internal wall. The ties and retaining clips can also be used for fixing and holding in place the wall insulation.

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SECTION 5. WALL APPLICATION - MESHED MEMBRANES

5.1. FIXING TO WALLS

The wall membrane is fixed to the walls in the same way as in the section above using the CDM Fixing Plug. As the rolls are heavier and not available in 2.4m high rolls, most fixing of Newton meshed membranes will be vertical.

5.2. FIXING CENTRES

Fix in a square at 350mm centers, and then fix a plug in the center of four fixings so it looks like a 5 on a dice. All fixings will then be a maximum of 250mm centers. On very flat walls, the horizontal and vertical centers can be moved out to 400mm so when the center plug is fixed, the centers are not more than 300mm.

5.3. FINISHES

Newton Meshed membranes can be plastered or rendered or can be plaster boarded using a dab fix.

5.3.1. PLASTERS

The recommended plaster to be applied to Newton meshed membranes is Tarmac Limelight Whitewall, supplied by Newton Waterproofing, which should be in two coats. The plasters can accept a finishing 3mm skim coat to finish. If an alternative lightweight plaster is to be considered, please discuss this with the Newton Technical team before purchasing/applying the material.

Note: Manufacturers recommended drying times may vary according to atmospheric conditions.

5.3.2. CEMENT-BASED RENDERS

For internal cement renders the mix should be six parts clean sharp sand/one part lime/one part cement. A two-coat application is recommended allowing 7-10 days between coats. Drying time is important because shrinkage cracks may appear. A weaker mix of seven or even eight parts sand can be used for the second coat.

5.3.3. HYDRAULIC LIME BASED MORTARS

First Coat

Using a ratio of 1 part Lime to 2 1/2 - 3 parts sharp washed sand with evenly distributed hair throughout the mortar and working to a layer of 10mm thick, push the plaster into and across the pre-wet laths at a 45-degree angle to the lathes.

The plaster should be correctly cured until hard.

Second Coat

The second coat, also known as the intermediate or float coat will be applied similar to the first coat only without any hair being added to the mortar. You must ensure you wet down the first coat with a fine mist before spreading a 7mm coat, before scratching up and leaving in preparation of the finish coat.

Finish Coat

For the final topcoat a fine mix of 1 part lime putty to 2 parts well graded super fine sand. Remembering to wet down the surface before application with a fine mist spray. Allow time for the water to absorb into the plaster then apply a coat of approximately 5mm, then rule off and leave for a couple of hours. When ready, rub up the finish coat using a plastic or wooden trowel to bring back the fat until the required finish has been reached in the case of any light crazing this can be rubbed up and trowelled out.

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5.3.4. GENERAL PLASTERING & RENDERING CONSIDERATIONS

Note: All plasters and renders etc. should be to a minimum total depth of 15mm. The first coat should be applied with firm pressure to ensure the product is fully pushed behind the mesh so that the studs are fully filled, and to an approximate thickness of 5mm and be well scratched with a wire scratcher. When the scratch coat has set, the floating coat should be applied to a depth of 7mm and lightly scratched to provide a firm key for the final coat, which should be to a minimum thickness of 3mm.

All plasters and renders should be applied strictly in accordance with the manufacturer's instructions, and good plastering/rendering practice as described in BS5492 and BS5262 Code of Practice and relevant NZ Codes of practice.

Do not apply decoration until the plaster or render is thoroughly dry.

Note: If plasters other than those specified above are used, they will not conform to the Newton Waterproofing specification and will therefore invalidate any guarantee on the material. If any special renders or plasters are to be considered, technical advice must be sought from the Newton Technical Department.

5.3.5. CURING

Note: Cement and Lime based mortars require curing. Curing is the process of keeping a mortar or render under a specific environmental condition until the chemical set (referred to as hydration) is sufficient to withstand the environment into which the mortar has been placed. Lime binders are generally weaker than cements taking longer to acquire their strength and hardness, leaving them potentially more vulnerable for a longer period than cement equivalents, and curing them once placed is simply regarded as best practice.

Good curing is typically considered to be that of providing a humid environment stimulating full hydration of the lime or cement binders, providing strength development along with other benefits, especially the ability to withstand hairline cracking. The most common cause of failure is allowing a mortar/render to dry out too quickly, impeding the chemical process for hydration, stressing the mortar resulting in cracking.

Standard practice for protecting cement or lime-based renders/mortars is with wet/dampened hessian sheeting draped over the area in relatively close proximity to the render. This should be left in place for at least a week and is a standard requirement that is required in all cases. During the warmer months, the hessian will need to be repeatedly wetted and/or covered with plastic sheeting to ensure the correct curing environment.

Curing should be of at least 7 days.

5.3.6. DRY LINING

Newton Meshed Membranes can be effectively used in conjunction with dry lining by dab fixing the plasterboard using a proprietary dabbing compound. Be careful when installing laminated or insulated plasterboard, as when they are dot & dabbed to Newton meshed membranes, building regulations often require two mechanical fixes to each laminated board. These fixings may breach the membrane which cannot be repaired.

Where insulation is required to the wall build, it may be easier to use non-meshed membranes and use an independent dry-lining frame.

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SECTION 6. FLOOR APPLICATION

6.1. PREPARATION

Please refer to section 3 preparation and attend to any preparatory work prior to installation. Always clean both edges of the membrane before making a seal.

6.2. METHODS OF DRAINAGE FOR NEWTON FLOOR MEMBRANES

The drainage must effectively remove all water from below the membrane and take the water to a point of discharge such as a sump chamber or a form of safe natural drainage. Standing water can block the membrane with silt or lime scale so it is important for water to flow uninterrupted to the drainage point.

6.2.1. BASEDRAIN

CDM BaseDrain is placed at the wall/floor junction and collects water from behind the wall membrane and receives water at the wall/floor junction. CDM BaseDrain is a designed method of removing water as it can interface with sump chambers, gullies, waste pipes etc. It can be maintained by inserting Newton Inspection Ports into the system.

6.2.2. BASEBOARD

With existing floors and where there is insufficient headroom to use the BaseDrain, the Baseboard channel can be used as the drainage medium.

6.3. INSTALLATION OF FLOOR MEMBRANES - EARTH RETAINING

Starting at one side of the room, unroll the membrane with the studs down and cut to fit the room as one would a carpet. The next membrane width is rolled out so that the flanged edge overlaps onto the edge of the previous roll of membrane. Clean both edges. CDM Joint Tape is then applied to the high flat area between the first two studs at the edge of the previous roll of membrane with the backing paper still intact. Check the two widths for alignment, with the flange covering the backing paper. Starting from the end of the joint, remove the backing paper and press down on the joint sealing the two sections together. This process is repeated until all areas are covered.

Seal the Newton floor membrane to the up stand of the CDM BaseDrain channel, or CDM Condensation Strip (if fitted) with CDM OverTape. Use a heat-gun to dry the membrane surface and to assist with the bonding of the tapes.

Where the floor membrane is required to be jointed to horizontal DPC's, such as Newton DampSafe 809-HP DPC, through internal and external walls, these joints should be sealed with CDM Joint Tape. Ensure both surfaces are clean and dry before attempting to make these joints.

If there are any services through the floor, the membrane can be cut and trimmed around them, and the gap filled and sealed using the Newton range of adhesives. If necessary, a patch of membrane or DampSafe 809-HP DPC is laid over and sealed to the service with CDM Rope, and around its perimeter with CDM Joint Tape. Alternatively, Newton Pipe Collar or Newton Pipe Sleeve can be used. 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.

The specified floor finish can now be laid directly over the floor membrane, which must not be punctured by any fixings through the floor. When a timber floor finish is preferred, you must allow an expansion gap around the wall edge. Speak to the supplier of the floor finish to confirm the correct size of this expansion gap.

6.4. FAST TRACK APPLICATION OF FLOOR FINISHES

Following the installation of new concrete slabs and screeds, it is normal to expect lengthy drying periods before floor finishes can be applied. The membranes can be laid onto green concrete as soon as it is 'walkable', allowing instant application of floor coverings without reference to RH levels. The construction moisture is controlled in the air gap.

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6.5. FLOOR APPLICATION - 20mm MEMBRANES

6.5.1. INSTALLATION

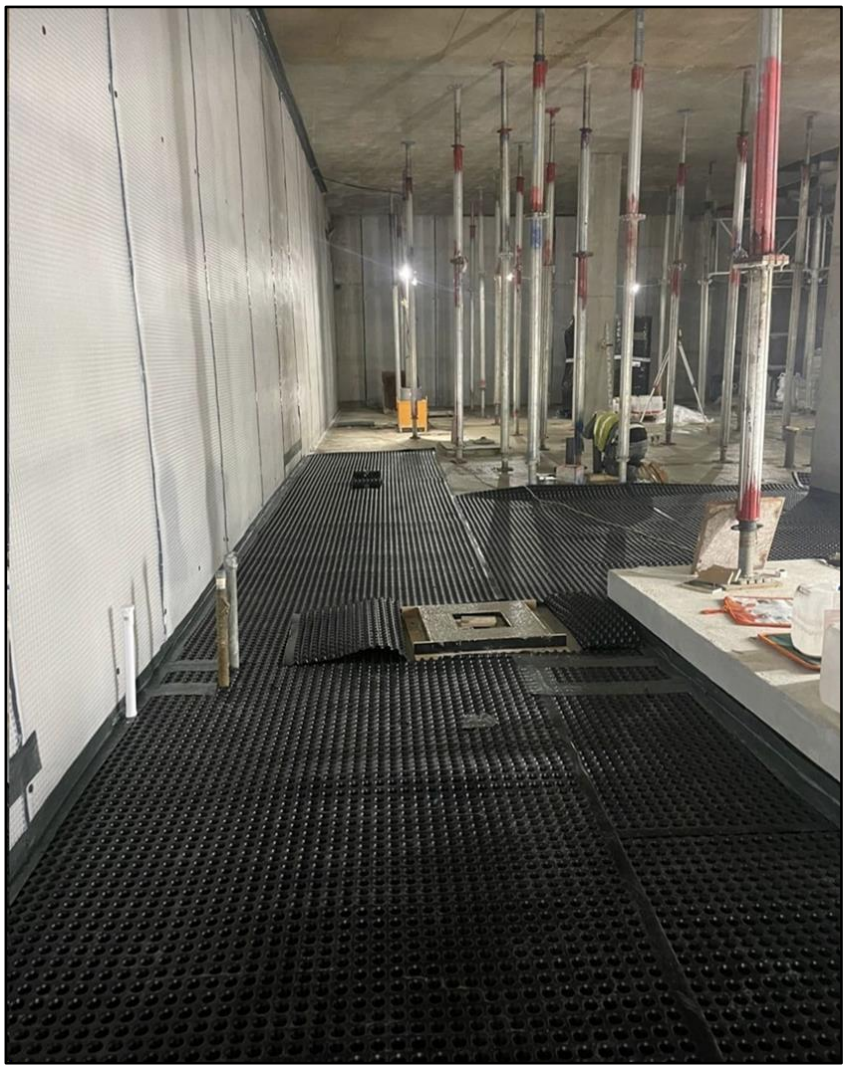
Starting at one side of the room, unroll the membrane with the studs down and cut to fit the room as one would a carpet. The next membrane width is rolled out so that the flanged edge overlaps onto the edge of the previous roll of membrane. Clean both edges. CDM Joint Tape is then applied to the high flat area between the first two studs at the edge of the previous roll of membrane with the backing paper still intact. Check the two widths for alignment, with the flange covering the backing paper. Starting from the end of the joint, remove the backing paper and press down on the joint sealing the two sections together. This process is repeated until all areas are covered.

Seal the Newton floor membrane to the up stand of the CDM BaseDrain channel, or CDM Condensation Strip (if fitted) with CDM OverTape. Use a heat-gun to dry the membrane surface and to assist with the bonding of the tapes.

Where the floor membrane is required to be jointed to horizontal DPC's, such as Newton DampSafe 809-HP DPC, through internal and external walls, these joints should be sealed with CDM Joint Tape. Ensure both surfaces are clean and dry before attempting to make these joints.

If there are any services through the floor, the membrane can be cut and trimmed around them, and the gap filled and sealed using the Newton range of adhesives. If necessary, a patch of membrane or DampSafe 809-HP DPC is laid over and sealed to the service with CDM Rope, and around its perimeter with CDM Joint Tape. Alternatively, Newton Pipe Collar or Newton Pipe Sleeve can be used. 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.

The specified floor finish can now be laid directly over the floor membrane, which must not be punctured by any fixings through the floor. When a timber floor finish is preferred you must allow an expansion gap around the wall edge. Speak to the supplier of the floor finish to confirm the correct size of this expansion gap.



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SECTION 7. VAULT APPLICATION

Newton CDM 508, CDM 508R or CDM 508 Mesh can all be used for vaults or vaulted soffits.

7.1. INSTALLATION TO VAULTS OF CDM 508, CDM 508R & CDM 508 MESH

A ceiling which is to be covered, as in a vaulted cellar construction, should be fixed and lapped in such a way so that water does not pond behind the system. The laps and joints should also be detailed correctly to allow correct drainage and prevent water from sitting on joints. The rubber sealing washer fitted to the CDM MultiPlug and CDM Plug should not be used to fix the membrane to vaulted ceilings or to soffits and instead a seal made from a ring of CDM Rope should be used to the chosen Newton CDM Fixing Plug. Where flat soffits are being considered it is imperative that they should have a fall in line with drainage requirements. Again, sagging of the membrane should be avoided to prevent ponding. If in doubt about soffits speak to our Technical Department

7.2. DRAINAGE

See section 2 Design Principles and Drainage within Section 6 floor applications.

7.3. APPLICATION

Where the Newton CDM System is to be installed in vaulted cellars our experience shows that the best method of application is as follows:

Measure the depth of the vault from front to back wall and allow for a downturn at each end of 200mm. Unroll the sheet and cut it to size.

Estimate the approximate center of the arched ceiling and mark it. Measure down the arch 1.2 meters from there and mark it again. Strike a horizontal line along the wall from back to front. This will give you a guideline for your sheet edge as you fix it along the length of the ceiling, thereby keeping your sheet sections symmetrical. You may wish to hammer in masonry nails to the guideline to give a physical edge to the guideline.

Offer up your first section of membrane to the ceiling allowing a lap to the back wall of 200mm. Using your guideline to keep the sheet square, drill and fix the sheet along the apex of the arch following the same line of studs. You will use the CDM MultiPlug or the CDM NuSeal Plug, using CDM Rope to seal the plugs. **NOTE: The rubber washer sold with the CDM MultiPlug is not suitable. Order the plugs without washers and use the CDM Rope to affect the seal.** The fixings should be fixed through the center of the membrane studs at approximately 600mm centers. It should be remembered that the plugs provide the fixing points for your battens; therefore, they should be kept in line.

Your next section of membrane is again cut to size allowing a 200mm lap at each end. Before offering up the next sheet, a CDM Joint Tape joint should be applied to the edges of the first sheet, either on the flanged edge or between the last two rows of studs on the none-flanged edge. With the protective paper left on the tape you can now offer up the next sheet ensuring that you use the flanged edge to overlap onto the sealing tape.

Once you have the second sheet positioned correctly over the sealing tape, remove the protective paper working out from the middle and effect a seal.

You can now carry on fixing the sheet as previously described. This process is repeated until you have covered the arched walls to the springer and the vertical walls below the springer, maintaining a 200mm lap to the end walls.

7.4. VAULTS - END WALLS

At the end walls of the vaulted construction an ‘end piece’ of flat membrane is fitted to the end wall of the vault. The 200mm lap from the soffit membrane is cut in fans to fit the curve and sit neatly against the wall, filling each cut with a small piece of CDM Rope or CDM Joint Tape. Do not make the cuts all the way up to the ceiling and make as few cuts as possible.

Measuring the highest point of the arch, the ‘end piece’ membrane is cut to size and fixed to the end walls in front of the fanned ceiling membrane. The membrane is then trimmed to fit neatly into the curve of the ceiling.

The end wall membrane is then pulled back at the sides and around the arch to expose the studs on the reverse side. Using CDM Rope, a joint is made by the same method at the stud/stud joint details, with the exception that around the arch the rope should follow the contour of the ceiling curve.

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7.5. FLOORS

Where a floor application is required in this situation, which is common practice in this type of specification, it is laid as per our standard floor installation (see 6.4 and 7.1). If a floor membrane is not installed, you should still provide for the correct drainage facility.

7.6. DOOR REVEALS

When you fit the Newton membrane to the end wall with the door opening, please bear in mind that you will have to fit a section of membrane around the door head and lapped down the sides by approximately 100mm. You can then wrap the wall membrane around the sides, maintaining the correct drainage detail and forming an overlap.

This application detail will produce a small gap on the angle of the door opening. This should be sealed using CDM OverTape. Alternatively, Newton DampSafe 601 Slimline or DampSafe 802-DPM can be used through the reveal, taped to the wall membrane with CDM Joint Tape and CDM OverTape.

7.7. OVERHEAD INTRUSIONS

Where service pipes, electrical wiring or other intrusions occur overhead or around the arch, these should be re-sited to a vertical surface where they can be better sealed and re-situated on the dry side of the system. Most services can be concealed between the battens. Services and protrusion should be collated where possible and passed through a pipe sealed with one of the Newton pipe sleeve options.

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SECTION 8. SEALING INSTRUCTIONS

8.1. GENERAL

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, the CDM Joint Tape or CDM Rope water should be pressed firmly against the Newton membrane for good adhesion.

There are two standard types of sealed joints that can be made: The flanged joint or stud/stud joint.

8.2. 8mm CAVITY DRAIN MEMBRANES

8.2.1. THE FLANGED JOINT (Drawing JN5022-A)

The flanged joint should be used whenever a flat flanged edge 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 Newton CDM Joint Tape, unroll this onto the studded edge sheet, beneath the flange. The 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 in place 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 tape. The flange must cover a minimum of two rows of studs.

Once the flanged edge is in position, remove the tape's backing paper. Press the two membrane layers together firmly as you remove the protective backing paper.

8.2.2. THE LOCKED FLANGED JOINT (Drawing JN5022-B)

This joint is similar to the 'Flanged Joint' above (8.2.1) but has the first line of studs of the next sheet of membrane interlocking with the last line of studs on the previous sheet of the membrane. This method is used where you wish to guarantee that the next sheet of membrane 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.

8.2.3. THE STUD INTO STUD JOINT (Drawing JN5022-C)

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. CDM Joint Tape is used to achieve a flat joint. Attach the CDM Joint 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.

8.2.4. THE STUD OVER STUD JOINT (Drawing JN5022-D)

Where a 'Flanged' or 'Stud into Stud' joint is not possible because the studs do not interlock, a 'Stud over Stud' joint is used. Overlap the membranes to be joined by a minimum of three rows of studs. The joint is then formed by using Newton CDM Rope.

This is done by lifting back the edge of the upper membrane to reveal the underside of the studs.

The CDM Rope is then positioned between the last two rows of studs and pressed firmly into place.

Checking that the upper membrane is still positioned correctly, remove the rope's backing paper. Press the two membrane layers together firmly as you remove the protective backing paper.

Note: When making a 'Stud over Stud' joint always position the rope between the studs on the reverse side of the membrane, and not on the surface you are sealing to. This will ensure an even seal.

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8.3. 20mm CAVITY DRAIN MEMBRANES

8.3.1. FLANGED JOINT (Drawing JN5023-B)

The flanged joint should be used whenever the flat flanged edge of the membrane is available. Consecutive membrane widths are laid on the floor so that the flange lays over the top of the studded edge of the previous sheet. The flange must cover 70mm of the previous sheet of membrane. Using the Newton CDM Joint Tape, unroll this onto the studded edge sheet, beneath the flange.

The 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 tape.

Once the flanged edge is in position, remove the tape's backing paper. Press the two membrane layers together firmly as you remove the protective backing paper.

8.3.2. BUTTED JOINT (Drawing JN5023-C)

Where the flange is not available, a butted joint is used.

Starting at one side of the room, unroll the membrane with the studs down.

The next membrane width is rolled out so that edges of the two rolls meet at a 'butt joint'. Clean both edges. Newton CDM OverTape (150mm wide) is then applied above the butted joint to join the two widths of membrane. CDM OverTape has a split backing paper, and it is easier to apply the CDM OverTape to one roll and then the other by removing half the backing paper at a time. This process is repeated until all areas are covered.

8.4. NEWTON DAMPSAFE 601 SLIMLINE

8.4.1. FLANGED JOINT (Drawing JN5023-B)

The flanged Joint should be used whenever the flat flanged edge of the membrane is available. Consecutive membrane widths are 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 Newton CDM Joint Tape, unroll this onto the studded edge sheet, beneath the flange.

The 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 tape.

Once the flanged edge is in position, remove the tape's backing paper. Press the two membrane layers together firmly as you remove the protective backing paper.

8.4.2. FLAT JOINT – NO FLANGE

Because the membrane is flat and not studded, where the flange is not available, the sealing is carried out as with the flange.

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SEALING AT:

8.5. SERVICES THROUGH FLOORS AND WALLS (Drawing JN5024)

Occasionally, service pipes and other intrusions will interrupt a continuous application of the membrane. In this instance the membrane should be trimmed neatly around the service and sealed using the CDM Rope or CDM OverTape, or if necessary, a combination of both. If necessary, a patch of DampSafe 809-HP DPC can be overlaid and sealed to the service around its perimeter using the Newton range of sealing products.

Alternatively, Newton Pipe Collar or Newton Pipe Seal preformed collars can be used to seal around the protrusion.

8.6. OVERLAP JOINTS

On walls, the membrane can be fixed either vertically or horizontally, and is overlapped either by the flanged edge or by a minimum of three rows of studs.

8.7. GENERAL

In all cases ensure that membrane overlaps are made to provide continuous drainage behind the System. Avoid making laps that would allow water to drain onto or to be trapped by the joints.

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SECTION 9. PUMPING SYSTEMS

The recommended pumping system is the CDM Pumping System, which is based upon the Titan-Pro sump chamber. The Titan, compact pumping system and the Trojan-Pro, which is available in depths of 1.2m to 2.1m can also be used. Please refer to the Technical Data Sheets and Installation guidance of the products for further information.

The general rule of thumb is that a sump is required every 50m of CDM BaseDrain. This rule of thumb is influenced by the watertightness of the structure and/or the likelihood of greater than normal water ingress, for example in flat ground or permeable soils, as well as the levels of the raft/slab.

In larger properties, the number of sumps can be reduced by using strategically placed sumps together with cross drainage channels of CDM FloorDrain, or by the use of Titan collection sumps (without pumps) connected by 110mm pipe to larger, centrally located Trojan-Pro pumping systems.

The size of chamber used will also be dependent on the size of the specified pumps, with factors such as pumping volume and pumping head dictating the size of the pumps needed. Most projects have a pump head of about 4m, with very little water entering the sump and therefore requiring 250W, 400W or 750W pumps. However, for very deep and large structures, much larger single-phase or even three-phase pumps may be required.

The size of the pumps will also dictate the diameter of the pump rising-main (discharge pipe), which will generally be 50mm for the smaller pumps and 63mm or even 75mm for larger systems.

British Standard 8102:2022 is for the first time recommending that the inclusion of a rising-main “flood loop” should be considered in areas that are prone to surface flooding. BS 8102:2022 also states that “each pump should be individually fused and provided with a dedicated discharge pipe of a suitable pressure rating. Water should be discharged appropriately, ideally into a suitable drainage or attenuation system, which can accommodate designed quantities. of water and is not susceptible to flood, freezing or surcharge back into the building. Pump discharge directly into a combined sewer should not occur without appropriate consent, and suitable non-return valves. Consideration should also be given to potential smells and vermin ingress.

Where contaminated water is anticipated, appropriate discharge consent should be sought.

To ensure that pumping continues during a power outage, a Newton Victron Battery Back-up system should be specified. These are supplied already matched to the pump motor size. Pease note that during a power outage, the pumps will only operate if there is sufficient energy within the batteries to pump the required volume of water out of the basement. It is recommended that a full assessment is carried out regarding the volume of water to be pumped during a power outage and that correctly sized batteries can therefore be specified.

Newton also supplies high water level alarms as well as pump control, pump monitoring and pump telemetry systems.

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SECTION 10. VENTILATION

10.1. GENERAL

Ventilation is an important requirement of the design of habitable building space and is necessary for providing a healthy environment for all of the building occupants.

Clause G4 - Ventilation G4.2 "*Spaces within buildings shall be provided with adequate ventilation consistent with their maximum occupancy and their intended use.*"

Part F (2021) of the Building Regulations 2010 deals with ventilation within buildings. Requirement F1 states that "There shall be adequate means of ventilation provided for people in the building".

In the Secretary of State's view, requirement F1(1) as in G4 is met if the dwelling has a means of ventilation that achieves all of the following.

a. Extracts water vapour and indoor air pollutants from areas where they are produced in significant quantities (e.g. kitchens, utility rooms and bathrooms) before they spread through the building, following the guidance on extract ventilation in paragraphs 1.17 to 1.22.

b. Supplies a minimum level of outdoor air for occupants' health, following the guidance for whole dwelling ventilation in paragraphs 1.23 to 1.25.

c. Rapidly dilutes indoor air pollutants, and disperses water vapour, when necessary, in habitable rooms, following the guidance for purge ventilation in paragraphs 1.26 to 1.31.

d. Minimises the entry of external air pollutants, following the guidance in Section 2.

e. Achieves all of the following, as far as is reasonably practicable:

i. Produces low levels of noise, following the guidance in paragraphs 1.5 to 1.7

ii. Offers easy access for maintenance, following the guidance in paragraph 1.8

iii. Provides protection from cold draughts.

In the Secretary of State's view, requirement F1(1) is met for work on an existing dwelling by following the guidance in Section 3.

Ventilation is increasingly more of an issue because of the requirements in documents such as of Part L of the Building Regulations 2021, NZS 4218:2009 and NZS 4246:2016, to make houses more air-tight and more energy-efficient.

The codes and Regulations can appear to be almost at odds with each other resulting in the requirement for mechanical ventilation in most cases.

Basements present even more of a problem as natural ventilation, even in older properties not subject to requirements, is a real problem where the living space walls may be earth retaining to all elevations.

BS 8102:2022 and NZ Code Clause E3.3.1 makes reference to mechanical ventilation in a number of areas, stating that 'Mechanical heating and ventilation often play an important role in creating the internal environment and controlling condensation, particularly where higher grades are required.

The definition of Grade 3 within Table 2 states that "Ventilation, dehumidification or air conditioning necessary; appropriate to the intended use".

BS 8102:2022 also confirms that the design of such systems is a specialist activity, outside the scope of this British Standard'.

Waterproofing works to provide a Grade 3 level of protection will not comply with BS 8102:2022 or Part F unless mechanical ventilation is included, and so we recommend that mechanical ventilation is included within the design of all Newton Waterproofing Systems.

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10.2. CONDENSATION RISK

Condensation occurs when water vapour held in the air (humidity) condenses on a surface that is below the 'dewpoint'. Warm air holds more moisture than cool air, and so if a cool surface reduces the local air temperature, the air is unable to hold all of the moisture previously held when the air was warmer, resulting in condensation forming as droplets to the cold surface in question. This becomes interstitial condensation when the dew-point temperature occurs within the main fabric of the building, such as the inner face of the waterproofing membrane where an internal block wall has been built in front of the membrane for example.

The warmer the air, the more moisture that can be held – the cooler the air, less moisture can be held. Therefore, the risk of condensation can be massively reduced by removing the amount of humidity in the air, and as Clause G4 & Part F confirms, one of the reasons we have ventilation is for the control of excess humidity arising from water vapour within internal atmosphere.

The risk of condensation has been increased in recent years with the requirement for more and more insulation to comply with the Building Regulations. Insulation prevents heat loss due to the insulation having high thermal resistance values. As a result, less heat is arriving at the face of waterproofing membranes and so these surfaces are cooler and therefore more likely to reach the dew-point temperature. Again, this risk can be very much reduced by controlling the Relative Humidity (RH) with ventilation.

10.3. COLLECTION OF CONDENSATION WITH THE NEWTON CDM SYSTEM

Even though ventilation is required for all Grade 3 and some Grade 2 spaces, we have included within the CDM System a safety mechanism that will intercept condensation on the face of the membrane, should there be a short-term failure of the mechanical ventilation system. This is in the form of spacers to the rear of the CDM BaseDrain drainage channel, or where floor finishes are deeper, Newton CDM Condensation Strip should be used. Vapour is prevented from rising up from the condensation gap by a blanket of positive air pressure due to differential vapour pressure.

10.3.1. BASEDRAIN SPACERS

Newton CDM BaseDrain has a series of spacers on the reverse side of the up stand to the side that contacts the Newton wall membrane. If condensation did form on the face of the Newton wall membrane, the gap provided by the spacers will receive the condensation into the drainage channel.

10.3.2. CONDENSATION GAP USING NEWTON CDM CONDENSATION STRIP

Where the screed depth is greater than the 60mm back flange of the CDM BaseDrain, Newton CDM Condensation Strip provides the condensation gap. The conclusion of the Technical Committee of the Structural Waterproofing Group was that the condensation gap be left open unless there is a good enough reason for it to be closed, and we agree with this conclusion.

10.3.3. SEALING THE CONDENSATION GAP

There are situations where the sealing of the condensation gap is a necessity, such as where the Newton Waterproofing System is also used as a gas barrier. If the condensation gap is sealed, it is imperative that the ventilation system is always working as designed.

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SECTION 11. REPAIRS

11.1. REPAIRS TO STUDS

If the wrong stud is drilled in error this can easily be repaired by cleaning out the stud with a clean cloth and plugging it with CDM Rope. This can then be covered with a small patch of CDM OverTape.

The same repair can be used where a successful fixing has not been achieved due to drilling into unsound joints or structure and where the CDM Fixing Plug expansion pin has not been successful. Simply make the repair and re-drill another stud.

11.2. REPAIRS TO MEMBRANE – VERTICAL WALLS

11.2.1. CLEAN CUTS

If the membrane is accidentally cut or pierced this can be repaired by cleaning the surfaces with a clean cloth and sealed with CDM OverTape. Seal along the length of the cut bridging both edges and also extending beyond the two furthest points of the cut by 25mm.

11.2.2. RIPS AND TEARS

If the membrane is ripped causing a ragged cut, this will need to be sealed using CDM OverTape, using the same method as above.

11.2.3. DAMAGED MEMBRANE

If the membrane is damaged and a hole is created, this can be bridged by using CDM OverTape providing the hole can be bridged in one piece with at least a 25mm margin around the damaged area.

Larger damaged areas can be bridged by cutting a piece of wall membrane that is large enough to cover the hole and allowing a margin beyond the hole size. This can then be sealed in two ways:

1. If the repair membrane sits neatly into the studs the edges can be sealed using CDM Joint Tape over the repair section and lapping onto the main section. Seal around perimeter.
2. Alternatively, if the studs don't interlock, a ridge will be formed, and you will need to use CDM OverTape to bridge around the perimeter of the repair patch onto the main section.

11.3. REPAIRS TO FLOORS/VAULTED CEILINGS

Where damage to a floor or vaulted ceiling occurs, this can be repaired using the same methods as above, but you must always use the CDM OverTape to bridge or seal the damage.

It is imperative that all surfaces to be sealed are clean and dry before making the repair. In some instances, it is acceptable to warm the membrane and the CDM OverTape prior to making the seal with a hot air gun to alleviate any surface moisture.

11.4. GENERAL

All the above repair procedures require access to the System to achieve a proper repair. This will involve removing any finishes to gain access, although it should be said that once the finishes are in place damage should not occur. In the case of screeded floors, the screed must be removed to access the damage. This must be done with extreme caution to prevent further damage to the membrane.

Note: Where multiple damages have occurred on a section of membrane it may be advisable to cut out the section and replace it with a large section of membrane.

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SECTION 12. MAINTENANCE

12.1. MAINTENANCE

The Newton CDM System requires very little maintenance. However, there are a number of points you should be aware of, and indeed your client should also be made aware of in the content of your survey report/contract documents.

12.2. CHECKS PRIOR TO FINISHES

During the installation of the System, any repairs that are required should be carried out as they occur. This will save time later and reduce the risk of overlooking a potential problem.

Once the System is installed, but before the finishes are applied, the membrane should be checked for damaged areas and repaired as necessary. Also joints and seals should be checked to make sure they are adequate. Any repairs found necessary should be carried out in accordance with Section 11 of this manual.

12.3. MAINTENANCE TO MECHANICAL PUMPS & DRAINAGE SYSTEM

The maintenance inspection should cover the following items plus any additional requirements as required by the specific pump manufacturer.

1. Cleaning and de-scaling of pumping system as required.
2. Checking for and ensuring free movement of the pump impeller.
3. Checking pump seals for leakage and renewing as required.
4. A pump impeller test ensures free movement.
5. Inspect pump discharge pipes for damage and leaks.
6. Remove any debris from base of sump that may interfere with pumping.
7. Check electrical connections and fuses.
8. Flush through the CDM BaseDrain and CDM FloorDrain drainage system.

All the above should be carried out at least once per year as a minimum requirement by a competent person.

Note: Sump pumps are powered by electricity. It is important to maintain a constant power source to achieve maximum drainage capacity. Newton Victron battery back-up systems are available for continuing the discharge of the sump during failure to the power supply.

12.4. ALTERATIONS

Newton CDM membranes, like other waterproofing membranes, should not be pierced in any way.

If works are proposed in the basement area that is likely to penetrate or disturb the membrane, advice must be sought from the specialist installing company or Newton Waterproofing, prior to such work being carried out.

Even if minor modifications are proposed to the waterproofed areas such as shelves, cupboards etc. the contractor who installed the system should be contacted so that they can advise on the correct fixing method.

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SECTION 13. PRODUCT GUIDE

BASIC GUIDE FOR ESTIMATING CDM SYSTEM MATERIALS

PRODUCT	A CDM 508	B CDM 520 eco	C CDM 508 Mesh CDM 503 Mesh	D CDM 503
Wall membrane	**48m² rolls** Wall area ÷ 46 = N° of rolls **40m² rolls** Wall area ÷ 38 = N° of rolls	N/A	Wall area ÷ 38 = N° of rolls	Wall area ÷ 57 = N° of rolls
Floor membrane	**48m² rolls** Floor area ÷ 46 = N° of rolls **40m² rolls** Floor area ÷ 38 = N° of rolls	Floor area ÷ 38 = N° of rolls	N/A	Wall area ÷ 57 = N° of rolls
Fixing plugs to wall membrane	See TDS for number of plugs required relative to the wall finish	N/A	500 plugs per roll of wall membrane	See TDS for number of plugs required relative to the wall finish
CDM Joint Tape (22.5m roll)	1 roll of tape for each roll of membrane			
CDM Rope (4.75m roll)	1 roll per roll of membrane for 'stud over stud' joints	N/A	1 roll per roll of Newton 500 for 'stud over stud' joints	N/A
CDM OverTape (20m roll)	1 roll per 20 linear metres of perimeter. 1 roll per 3 rolls of wall membrane for repairs	1 roll per roll of membrane, plus 1 roll per 20 linear meters of perimeter	1 roll per 3 rolls of membrane for repairs	1.7 rolls per roll of CDM 503, plus 1 roll per 20 linear metres of perimeter
CDM BaseDrain (2m lengths)	Linear run of wall / floor junction ÷ 2 = N° of lengths			
CDM FloorDrain (2m lengths)	Linear run of construction joints ÷ 2 = N° of lengths			
CDM BaseDrain Inspection Ports	One port for each linear run to a maximum of 10m (needs to be discussed and agreed), close to the next corner with 1 x port adjacent to each turn to the sump. Where the wall has columns, 1 x port either side			
Pump System	The rule of thumb is that a sump is required for every 50m of CDM BaseDrain. This is influenced by the watertightness of the structure and/or the likelihood of greater than normal water ingress, for example in flat ground or permeable soils, as well as the levels of the raft/slab			

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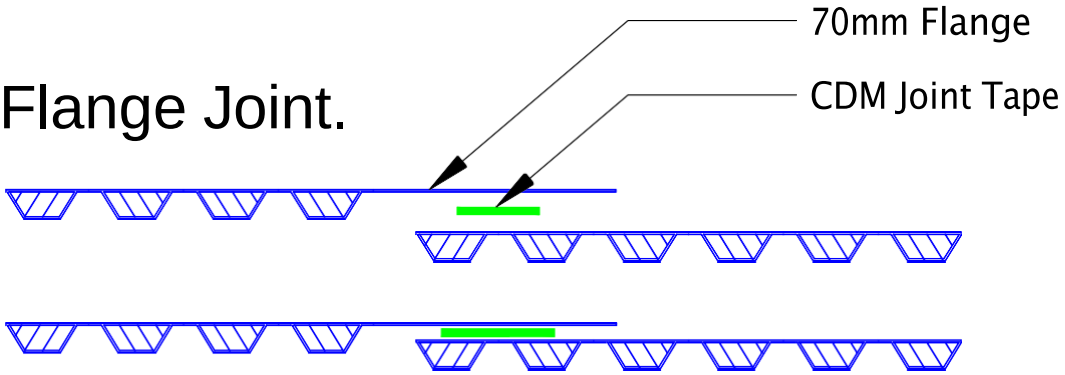
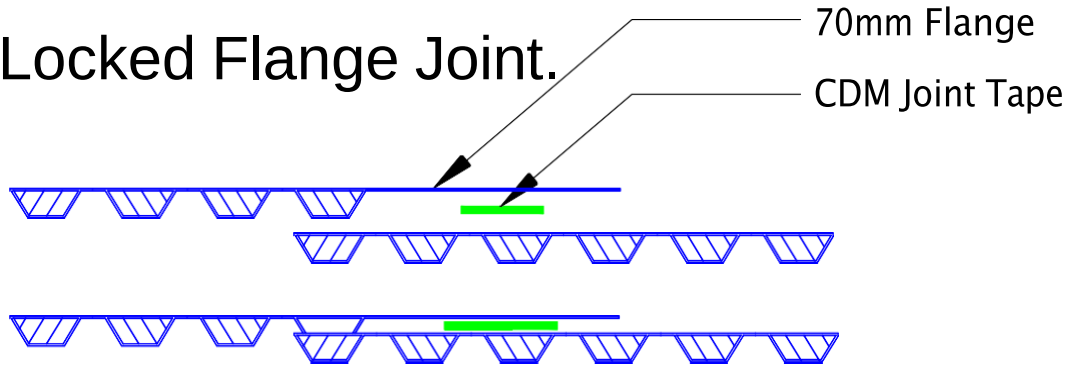
SECTION 14. APPENDICES - TECHNICAL DRAWINGS

JN5022 - Joint Sealing Details - 8mm Membranes

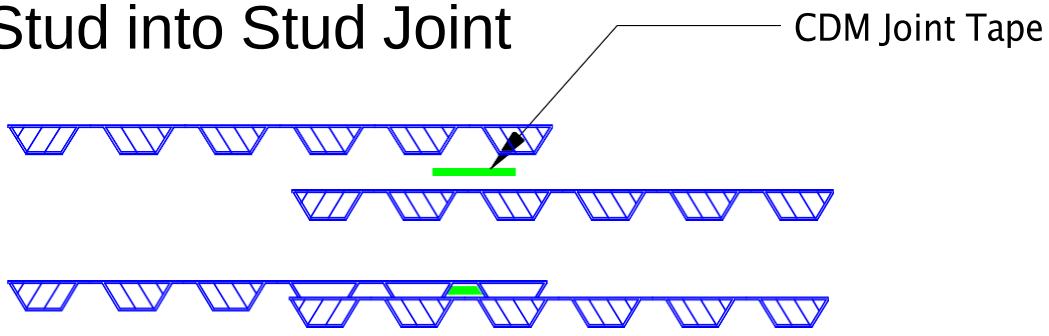
A - Flange Joint.



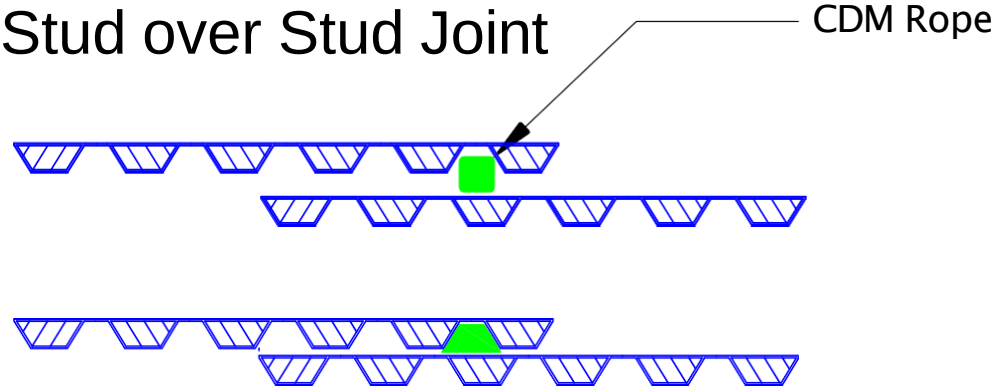
B - Locked Flange Joint.



C - Stud into Stud Joint



D - Stud over Stud Joint



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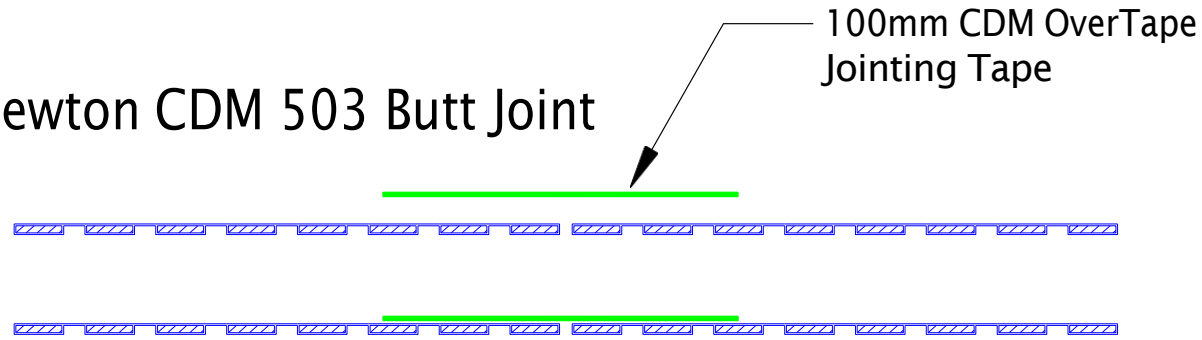
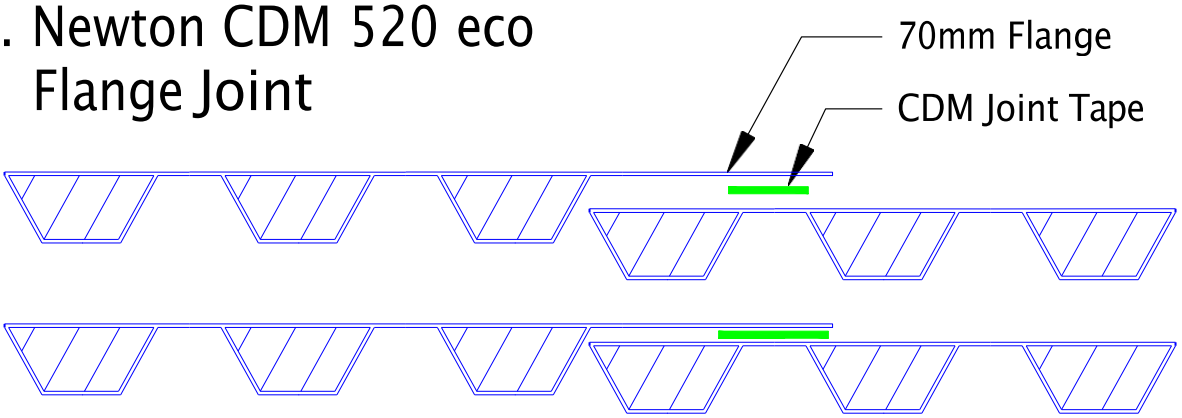
SECTION 14. APPENDICES - TECHNICAL DRAWINGS

JN5023 - Joint Sealing Details - 3mm and 20mm Membranes

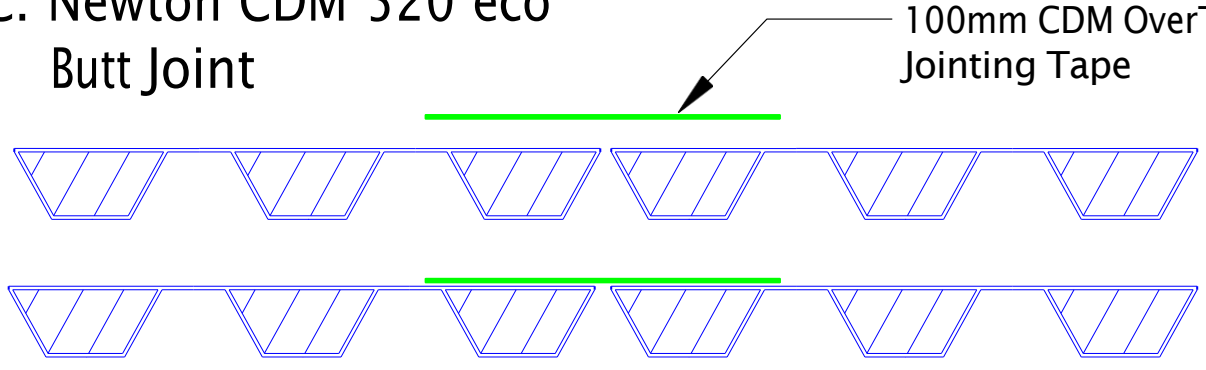
A. Newton CDM 503 Butt Joint



B. Newton CDM 520 eco Flange Joint



C. Newton CDM 520 eco Butt Joint



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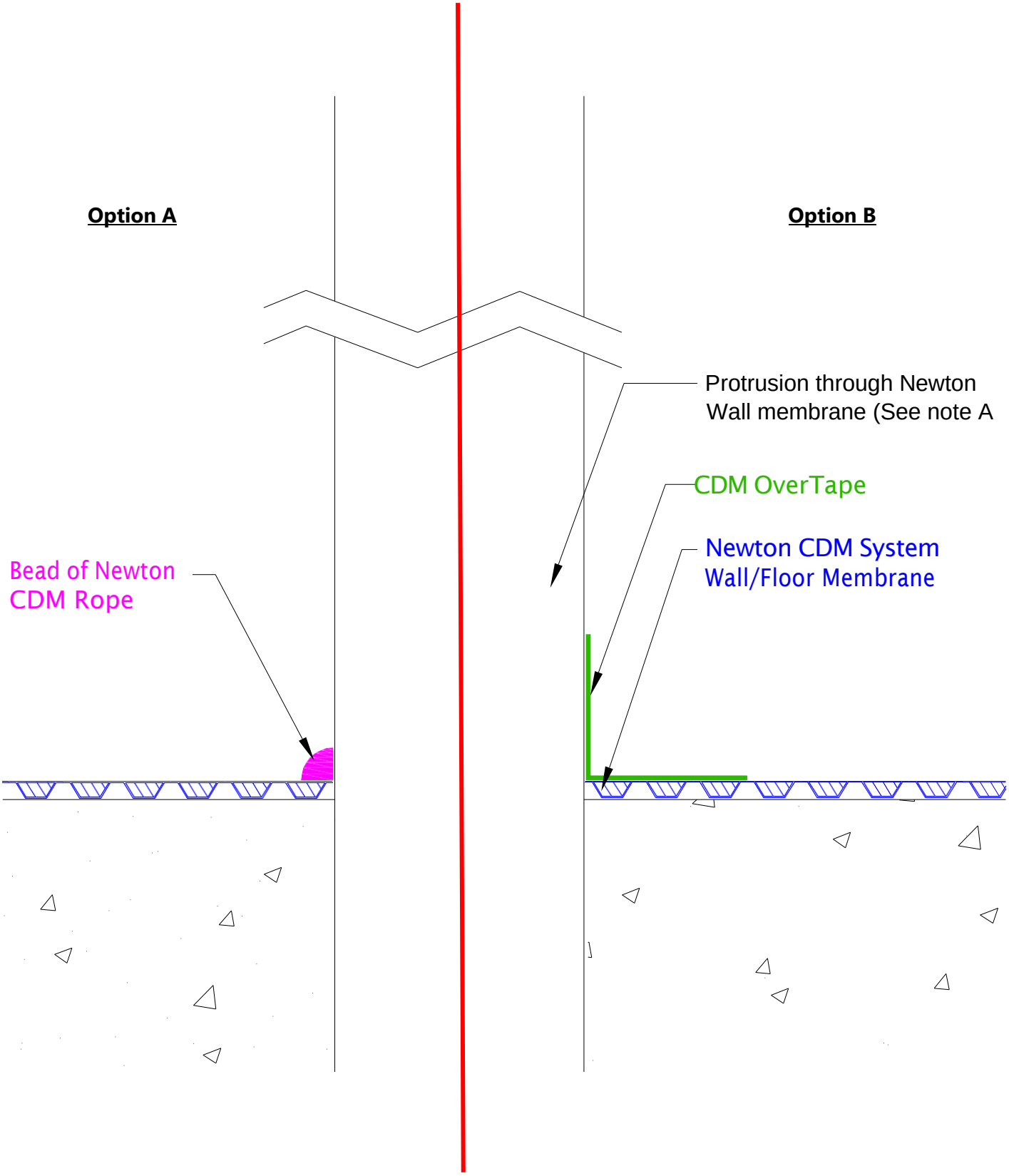
SECTION 14. APPENDICES - TECHNICAL DRAWINGS

JN5024 - Sealing Details - Protrusions Through Newton Membranes



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