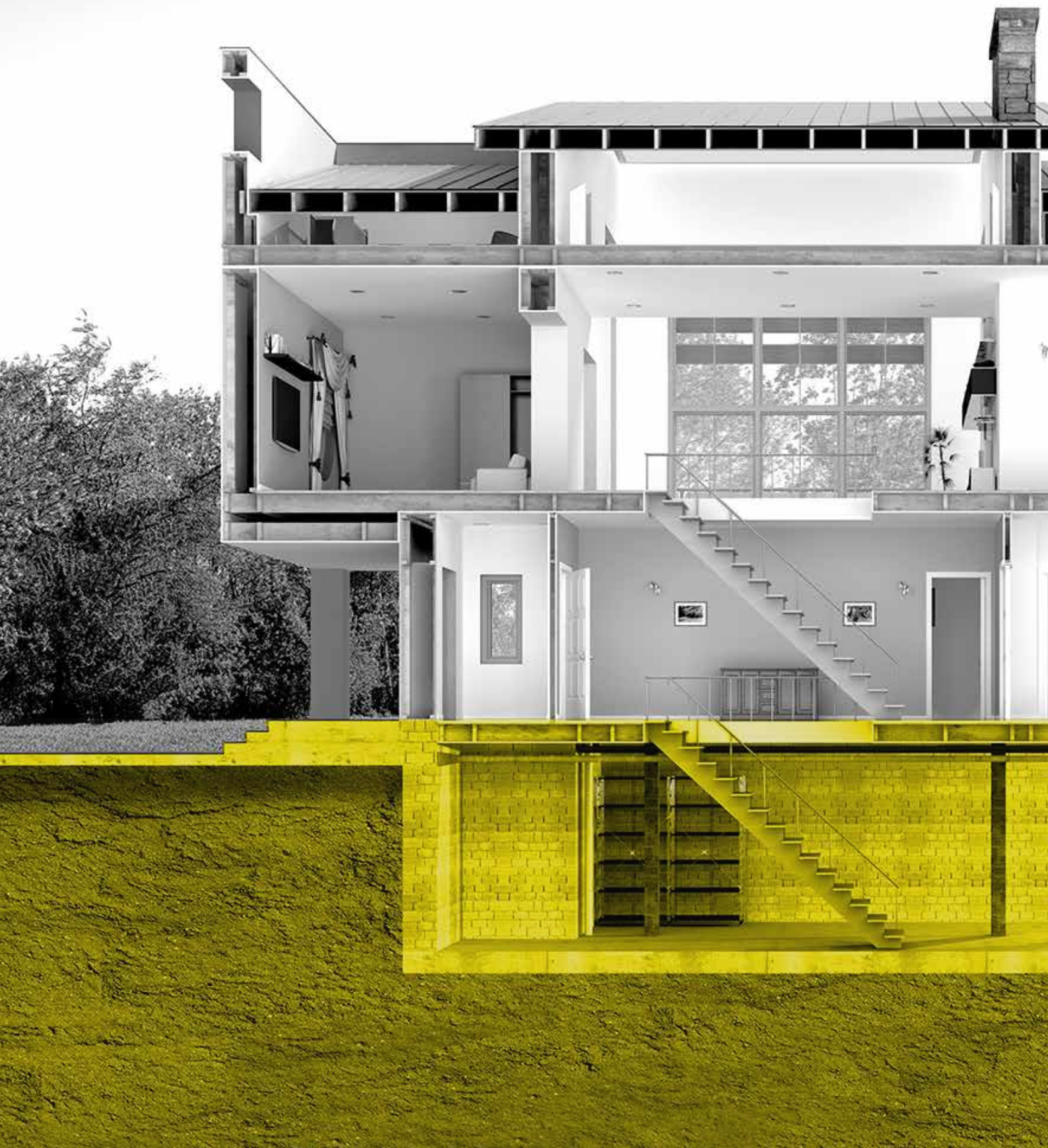


CAVITY DRAIN INSTALLATION GUIDE

WWW.DELTAMEMBRANES.COM

CONTENT

We offer a broad range of high performance structural waterproofing products – from waterproofing membranes to ground gas protection systems.



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The background is a black and white photograph of a construction site. It features several large, square concrete pillars supporting a ceiling. The ceiling is made of large, dark panels with visible joints and some staining. In the lower right, there are some construction materials and a small structure. A bright yellow rectangular overlay is positioned in the upper left quadrant, containing the section title and list.

Section 01

Introduction

- 1.1 OVERVIEW
- 1.2 TYPICAL FLOOR FINISHES
- 1.3 TYPICAL WALL FINISHES

Introduction

1.1 OVERVIEW

Delta Membrane Systems Ltd provides waterproofing for walls and floors above and below ground level, internally, externally and for vaulted construction and tunnels. Delta's range of waterproofing solutions conform to BS8102:2009 "Protection of Below Ground Structures Against Water from the Ground" and can also be used as protection against contaminants such as salts, carbon deposits, fertilisers, and radon.

Any water that enters through the structure is collected behind the System and is dealt with by ventilation and/

or dissipation into the solum. Where there is likely to be a build-up of water behind the System, a drainage facility must be created to drain such water away and prevent any hydrostatic pressure. Externally, water is filtered and drained via the Delta membrane cavity to a suitable drainage facility, which should be maintainable.

A wide range of finishes can be employed to walls and floors. These provide protection to the membrane and create a decorative finish.



1.2 TYPICAL FLOOR FINISHES

1. Sand and cement screeds - minimum depth 50mm on MS 500 or Delta FM or 70mm on Delta MS20
2. Fast drying screeds such as Ardex A35 or similar - minimum depth 35mm.
3. Water resistant wood-based sheets (flooring grade with t & g joints).
4. Timber boarding on floor beams.
5. Sports floors.

*All the above can be laid with insulation where specified.



1.3 TYPICAL WALL FINISHES

1. Dry lining with battens (with or without insulation)
2. Dry lining with dabs - use Delta PT.
3. Plastering direct - use Delta PT.
4. Independent timber frame (50mm x 50mm timbers) to receive sheet finish.
5. Independent metal frame system (such as Gypliner, or similar lining systems etc.).
6. Build new inner skin with brick, block or concrete.



The background is a black and white photograph of a construction site. It features several large, square concrete pillars supporting a ceiling. A bright yellow rectangular overlay is positioned in the upper-middle section of the image, containing the text for this section. The floor is a smooth, light-colored concrete surface.

Section 02

Preparation

2.1. PREPARATION

Preparation

2.1 PREPARATION

Delta's Cavity Drain System can be installed over a wide range of substrates in varying situations such as walls, floors, ceilings, soffits etc. However, before the system is installed, the area must be assessed to determine what preparation is required.

a) All timber fixtures and other organic material must be removed to prevent the risk of fungal or bacterial growth behind the system, e.g., skirting boards, timber plates, old wallpaper, etc.

b) If evidence of dry rot (*Serpula Lacrymans*) exists, this must be dealt with by a specialist contractor prior to installation of the System.

c) If the walls are uneven or areas have deteriorated, then any large depressions should be levelled and made good to ensure a solid fixing.

d) When assessing floor applications, consideration should be given to the type of finish that is required. The floor must be cleared of all loose material and any sharp edges levelled out. When a screed finish is to be used, any holes or severe depressions When a timber floor is preferred, then more consideration should be given to achieve a flat substrate prior to laying the membrane.

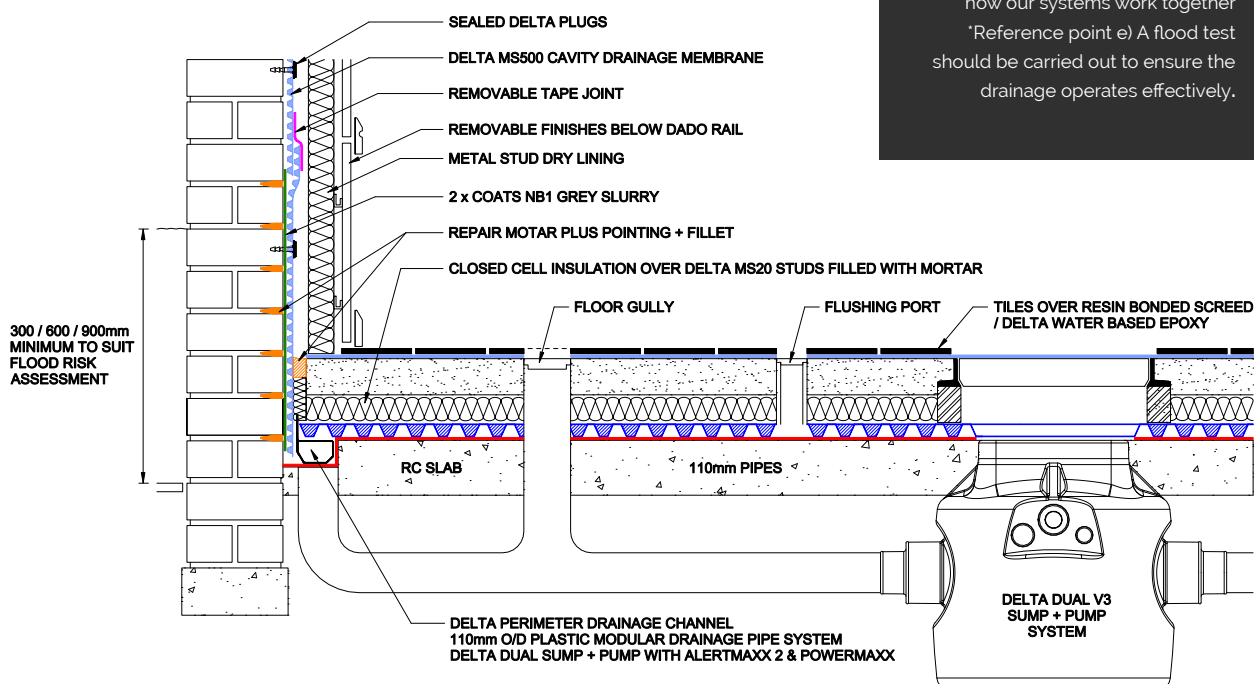
This will relieve any undue movement when fitting the floor finish.

e) Where a drainage facility is required, this should be designed and created prior to installing the system. A Flood test should be carried out to ensure the drainage operates effectively.

f) When fixing the System to ceilings or soffits, you must ensure that there is a fall to create proper drainage and prevent ponding. Also, any sagging of the membrane between fixing points should not be great enough for ponding to take place. It is important to consider the risks of condensation in soffit situations.

g) 'Free Lime' Risk. When new concrete forms the structure, to walls or particularly floors, there is a risk of excess free lime leaching out during the curing process. When a cavity drainage system is used in this type of application, a silicification pre-treatment of the concrete should be used to prevent the risk of free lime build up, and blockage of the drainage cavity. Polysil-TG500 is applied as a spray coat for this purpose, at an application rate of 0.15kg/m² should be filled before laying the membrane. Alternatively, Delta Water Based Epoxy can be used.

"GOLD STANDARD" FLOOD RESISTANCE + RESILIENCE MEASURES
TYPE A INTERNAL BARRIER PROTECTION IN CONJUNCTION WITH TYPE C DRAINED CAVITY WITH MOISTURE RESISTANT FINISHES AND RECOVERABILITY



Drawing: DW-406-1-FP Flood Resilience Existing, showcasing how our systems work together
*Reference point e) A flood test should be carried out to ensure the drainage operates effectively.

The background image shows a construction site with several large, square concrete pillars. A wall made of large, light-colored panels is visible in the background. The floor is a smooth, light-colored concrete. The overall scene is in black and white, with a yellow overlay on the left side.

Section 03

Wall Application

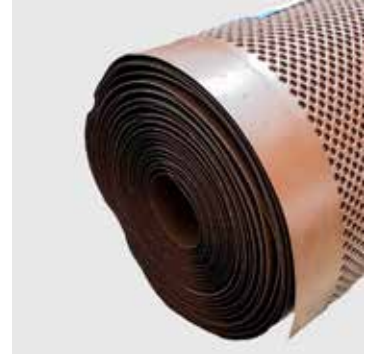
- 3.1 WALL APPLICATION DELTA MS 500/FM
- 3.2 BATTENS
- 3.3 ALTERNATIVE FINISHES

Wall Application

3.1 WALL APPLICATION DELTA MS 500/FM

The Delta membrane is cut to size and fixed to the wall with the studs against the wall to create an air gap.

The membrane can be fixed either vertically or horizontally. Our experience shows that most contractors prefer the vertical method. The membrane is then fixed using the Delta Plug. Alternatively you can use the Delta Qwik-Seal Plug or Flexidri Plus Plug.



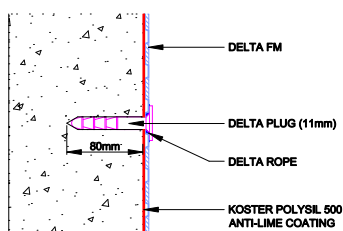
When using Delta Plugs, first you must apply a waterproof gasket around the rim of the plug using the Delta Rope. These should be made up in advance of fixing to save time. Do not use excess rope. Using an 11mm drill bit, drill through the centre of the stud to a depth greater than the fixing. The fixing is then hammered into the pre-drilled hole until the plug sits flush in the stud.

The rope gasket re-seals the hole.

The plugs are fixed at approximately 600mm centres following the line of studs chosen. This is determined by the required position of the battens, to receive plasterboard or dry lining.

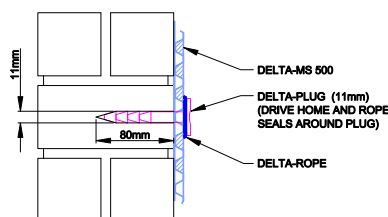


DELTA-PLUG WITH DELTA-FM



ACCEPTS 6mm DIAMETER / SIZE 12 SCREW

FIXING DETAIL - DELTA PLUG



USE SIZE 12 SCREWS TO FIX BATTENS
OR METAL LINING SYSTEMS
USE 11mm DRILL BIT



Wall Application

3.2 BATTENS

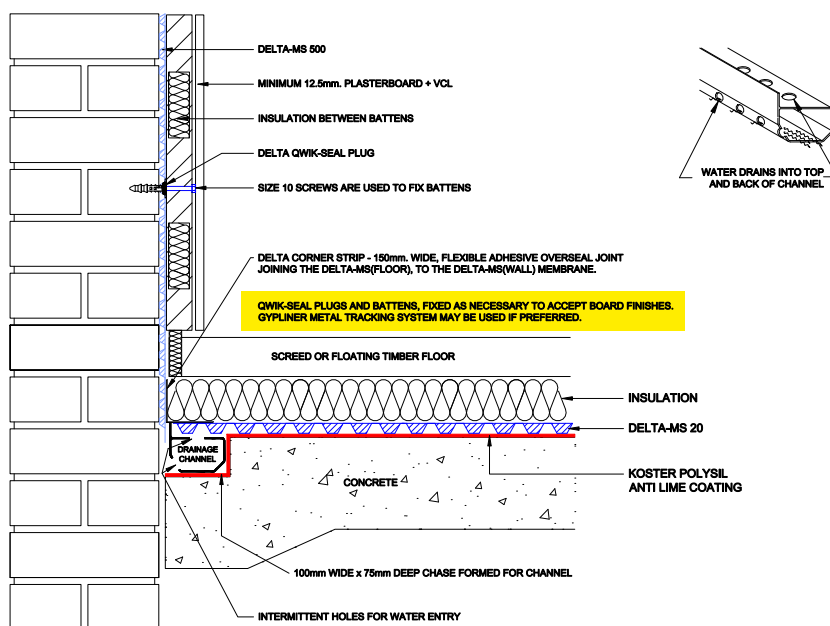
Battens should be pre-treated and of a minimum dimension of 25 x 38mm.

The battens can be fixed into the Delta-Plugs without piercing the membrane, by using size 12 screws or size 10 screws into the Qwik-Seal or Flexidri Plus Plug.

TYPE C, DRAINED PROTECTION, EXISTING WALL AND FLOOR APPLICATION

Drawing: DW-123-1-C,
Delta Cavity Drain/
Perimeter Channel

DELTA SYSTEM 500 WITH DELTA DRAINAGE CHANNEL



TYPE C, DRAINED PROTECTION, WALL AND FLOOR APPLICATION

3.3 ALTERNATIVE FINISHES

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

FREE STANDING FRAME

This method can 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 top and bottom, and would reduce the number of fixings required into the membrane.

PROPRIETARY FIXING SYSTEMS

Fixing systems such as the Gypliner System or similar, can be used with Delta MS 500. It is also possible to use metal profile systems when constructing new internal walls. These can be fixed without bridging the Delta System using Delta plugs.

When 'gypliner' or similar independent systems are specified as the finish, it is acceptable to use PT- LATH plugs sealed with delta rope, to install the system. However the recommended Delta Plug must be used when fixing GL2 Brackets to the Delta System. Once the battens are fitted into position, plasterboard can then be fixed to them using clout nails or preferably plasterboard screws. Care should be taken not to exceed the depth of the battens with the screws, and thereby puncture the membrane.





Section 04

Floor Application

- 4.1 PREPARATION
- 4.2 DRAINAGE REQUIREMENT
- 4.3 INSTALLATION

Floor Application

4.1 PREPARATION

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

4.2 DRAINAGE REQUIREMENTS

Where the System is being installed to cope with capillary held moisture this can be done without the need for elaborate drainage facilities.

When you are dealing with free water or there is a risk of this, then you must incorporate a suitable drainage facility. This could be Delta channels cut into the floor, soak-aways, Delta sumps and mechanical pumps or various other methods in line with BS. 8301: 1985, BS. 12056 and BS. 752.

See section 11 - Drainage.

We suggest you contact our Technical Department if you have a specific project to discuss. Please contact 01992 523 523 or info@deltamembranes.com for more information.

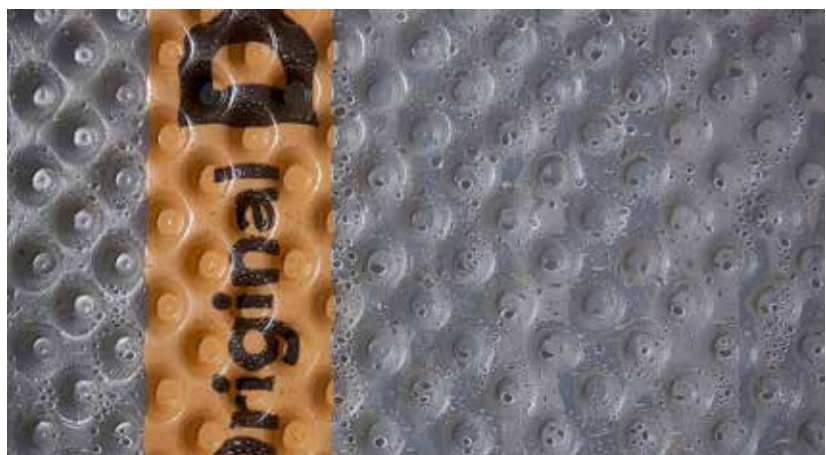


4.3 INSTALLATION

Starting at one side of the room, unroll the Delta membrane with the studs down and the flanged edge against the wall. Turn the membrane up the wall by a minimum of five rows of studs or by a sufficient amount to protect the floor finishes.

Where the membrane meets corners, see our section on corners.

Where the membrane meets a wall you must allow an up-turn as above.

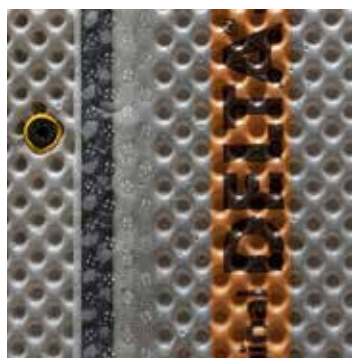


Floor Application

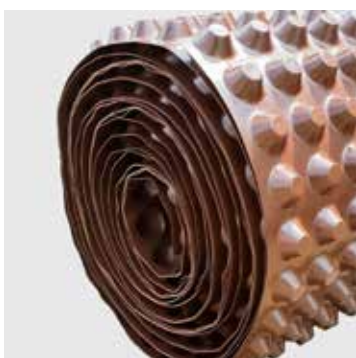
4.3 INSTALLATION (CONTINUED)

The next membrane width is rolled out so that the flanged edge overlaps onto the studded edge of the last width. Clean both edges.

Delta Tape is then applied to the studded edge of the membrane over the second row of studs with the backing paper still intact. Check the two widths for alignment, with the flange covering the backing paper. Starting from the middle 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.



When a stud to stud joint occurs, this should be overlapped and sealed with sealing rope as per our joint instructions, or this can be oversealed using Delta Corner Strip or Fleece Tape.



When Delta MS 20 is used on floors, for greater drainage capacity, the sheets should be lined up and overlapped by 3 rows of studs. The studs should interlock, and can be sealed using Delta Tape or oversealed using Fleece Tape or Delta Corner Strip. The latter is also used to seal the MS-20 at the perimeter edges

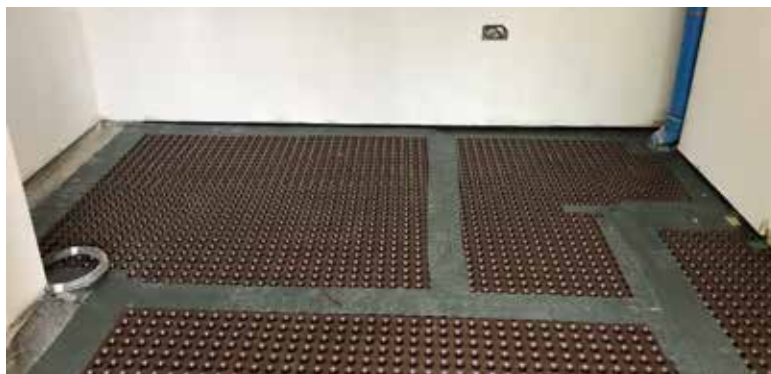
If there are any services up through the floor, the membrane can be cut and trimmed around them, and the gap filled and sealed using the Delta range of adhesives. If necessary, a patch of membrane or plain D.P.C. (P.V.C.) is laid over and sealed to the service with sealing rope, and around its perimeter with Delta Tape.

The specified floor finish can now be laid directly over the Delta MS 20/FM which must not be punctured by any fixings through the floor. When a timber floor finish is preferred you must allow a 10mm gap around the wall edge to allow for expansion of the timber finish.

If a ventilated floor is required, then the excess membrane above the final floor level can be cut off flush. The skirting board, when fixed, will cover the gap around the edge. The skirting boards can then be vented or a gap left at the bottom edge.

If System 500 is being installed as a damp-proof membrane without ventilation, as in Newbuild, the membrane should be sealed to the D.P.C. in the wall. When this is not compatible, a new piece of plain D.P.C. can be chased into the mortar joint and then sealed to the membrane with Delta Tape.

As an alternative method, the base of the walls can be primed with Bitumen Primer or S.B.R. and the membrane sealed to this using a Delta rope joint. It should be noted that the wall should be relatively flat for this type of seal. Alternatively, Corner Strip can be used.





Section 05

Vault Application

Delta MS 500

- 5.1. VAULTS
- 5.2. DRAINAGE
- 5.3. APPLICATION
- 5.4. VAULTS - END WALLS
- 5.5. FLOORS
- 5.6. DOOR OPENINGS
- 5.7. OVERHEAD INTRUSIONS

Vault Application

5.3 APPLICATION



Where Delta MS 500 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 down turn at each end of 200mm. Unroll the sheet and cut to size.

Estimate the approximate centre of the arched ceiling and mark it. Measure down the arch half width of sheet from there and again mark it. Strike a horizontal line along the wall from back to front.

This will give you a guide line for your sheet edge as you fix it along the length of the ceiling, thereby keeping your sheet sections symmetrical.

Offer up your first section of membrane to the ceiling allowing a down turn on the back wall of 200mm. Using your guideline keep the sheet square and using an 11mm drill bit, drill and fix the sheet along the apex of the arch following the same line of studs. You will use the Delta plug with rope for this application.

The fixings should be fixed through the centre of the studs at approximately 600mm centres. Once the first row of fixings are in, repeat the process maintaining the correct line and centres.

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 Delta Tape joint should be applied to the studded edge of the first sheet. Either on the flanged edge or between the last two rows of studs on the non-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 side walls and arched detail down to floor level, maintaining a 200mm lap onto the end walls.

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

5.4 VAULTS - END WALL

At the end of vaulted construction, the Delta System along the arch and side walls must be turned down and round onto the end walls by a minimum of 200mm. Around the arch the turndown is cut to fit the curve and sit neatly against the wall. 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 membrane is cut to size and fixed to the end walls in front of the ceiling membrane. The membrane is then trimmed to fit neatly into the curve of the ceiling. In certain situations it may be necessary to stabilise the Vault first, Koster sewer and shaft mortar is ideal for this.

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

5.5 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 and sealed to the walls using Delta Rope or Corner Strip according to the type of joint. However, if the floor is not being done then you should provide for the correct drainage facility. **See section 11**

Advice from our Technical Department is available in this situation.

5.6 DOOR OPENINGS

When you fit the Delta 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 Delta Corner Strip. It is also advisable to inject expanding foam behind the membrane at these points to help divert any water away.

5.7 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.



Section 06

Vault Application

Delta PT

- 6.1. PREPARATION
- 6.2 VAULTS/SOFFITS
- 6.3 DELTA MS FOR FLOORS
- 6.4 APPLICATION
- 6.5 VAULTS - END WALL
- 6.6 DOOR OPENINGS
- 6.7 SEALING PIPES/ELECTRICAL WIRING ^{ETC.}
- 6.8 FINISHES
- 6.9 FIXING TO WALLS

Vault Application

6.1 PREPARATION

Delta Cavity Drainage System 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.

a) All timber fixtures and other organic material must be removed to prevent the risk of fungal or bacterial growth behind the system, e.g. skirting boards, timber plates, old wallpaper, etc.

b) If evidence of dry rot (*Serpula Lacrymans*) exists, this must be dealt with by a specialist contractor prior to installation of the System.

c) If the walls are uneven or areas have deteriorated, then any large depressions should be levelled and made good to ensure a solid fixing and to avoid any creasing of the membrane. Any render/plaster that has debonded should be removed, and made good, flush with existing levels. If this involves a large percentage of the surface area it may be quicker and more economical to remove it all. If the surface is of poor condition, you may consider a scratch coat to tighten it up.

d) When fixing the System to ceilings of flat soffits, you must ensure that there is a fall to create proper drainage and prevent ponding. Also, any sagging of the membrane between fixing points should not be great enough for ponding to take place.

e) If there is an existing sound plaster/render surface, this may be left in place. This will provide a good background to fix to, and will avoid the risk of damage to the surface by trying to hack it off. We suggest Gypsum based plasters are removed.

6.2 VAULTS/SOFFITS

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 properly to allow correct drainage, and prevent water from sitting on joints. 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 see Technical Drawing ref: 107, and 115 or ask our advice.

6.3 DELTA MS FOR FLOORS

When assessing floor applications consideration should be given to the type of finish that is required. The floor must be cleared of all loose material and any sharp edges levelled out. When a screed finish is to be used, any holes or severe depressions should be filled before laying the membrane. This is more critical where a timber floor is specified, when the surface should be flat to avoid undue movement caused by ridges. Where a drainage facility is required, this should be designed and created prior to installing the System.

DRAINAGE

In this type of application floors should have a definite drainage outlet point. There should either be a natural fall towards an outlet point or a Delta drainage channel can be inserted made around the perimeter of the floor so that water can flow to an outlet or collection point. Where there are low areas on a floor it may be necessary to create channel runs to provide correct drainage to a collection point. If the floor area is below that of the adjacent ground, and no existing drainage is available, you will have to consider mechanical drainage methods to evacuate the water. Water from a Cavity drainage system must not be taken directly into mains drainage under gravity.

Vault Application

6.4 APPLICATION

Where Delta PT 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 down turn at each end of 200mm. Unroll the sheet and cut to size.

Estimate the approximate centre of the arched ceiling and mark it. Measure down the arch half width of sheet from there and again mark it. Strike a horizontal line along the wall from back to front. This will give you a guide line for your sheet edge as you fix it along the length of the ceiling, thereby keeping your sheet sections symmetrical.

Offer up your first section of membrane to the ceiling allowing a down turn on the back wall of 200mm.

Using your guideline keep the sheet square and using an 8mm drill bit, drill and fix the sheet along the apex of the arch following the same line of studs. You will use the PT-Lath plug sealed with rope for this application. The fixings should be fixed through the centre of the studs at approximately 250mm centres. Once the first row of fixings are in repeat the process maintaining the correct line and centres. Your next section of membrane is again cut to size allowing a 200mm lap at each end. Offering up the next sheet into position, this should lap over the edge of the first sheet by 200mm.



Once you have the sheet in position, you can form a joint in two ways:

- a)** Sealing to the unmeshed edge of the sheet. This is done by fitting sealing rope between the back of the studs of the overlapping sheet, and pressing into place. Line up the studs to keep the joint as flat as possible. Alternatively, use Delta Tape or Mastic.
- b)** Sealing to a meshed edge. This is done by applying Delta Mastic into the gap created by the two sheets, overlapping by 200mm.

You can now carry on fixing the sheet as previously described. This process is repeated until you have covered the side walls and arched detail down to floor level, maintaining a 200mm lap onto the end walls.



6.5 VAULTS - END WALL

At the end walls of vaulted construction, the Delta PT membrane along the arch and side walls must be turned down and round onto the end walls by a minimum of 200mm. Around the arch the turndown is cut to fit the curve and sit neatly against the wall. 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 membrane is cut to size and fixed to the end walls in front of the 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 Delta Mastic a joint is made by method b) in **6.4** with the exception that around the arch the mastic follows the contour of the ceiling curve.

6.6 DOOR OPENINGS

When you fit the Delta PT to the wall with the door openings, 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 Delta Corner Strip and expanding foam to fill void at corner, this will also divert any water ingress, should it occur.

6.7 SEALING PIPES/ELECTRICAL WIRING ETC.

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.

6.8 FINISHES

- a)** The walls and vaults can now be rendered using a mix of 6:1:1 (sand, cement, lime). This must be applied in two coats, to a minimum final depth of 15mm. The first coat must be trowelled well into the mesh to a thickness of 8mm and then lightly scratched. This must be left to set before applying subsequent coats.
- b)** Tarmac Whitewall, applied in two coats (min 15mm depth). A skim coat can be applied when required.
- c)** Koster restoration plaster finished with Koster restoration plaster fine or can be left as a rubbed up finish for external applications

6.9 FIXING TO WALL

There are two options when fixing items to wall areas after installation:

- a)** Use proprietary mastic adhesive to surface mount items, thereby not breaking through the membrane
- b)** If you can pre-determine where items need to be fixed, then provision can be made by using our Delta Plugs with rope gasket prior to rendering. The Delta Plugs provide a fixing point in the head which takes a size 12 screw or Qwik-Seal, Flexidri plugs take a size 10 screw. These can then provide fixing points to screw battens into place which in turn are used to fit your services, etc.. Alternatively, you can screw directly into the Delta Plug, Qwik-Seal or Flexidri Plug.

General

All other installation procedures apply, as stated in our installation manual.

Variations

From time to time, variations on our installation procedures are requested because of unusual site conditions, uncommon types of structure, or a specific problem detail, which needs to be addressed. Whilst we cannot compromise the general principles of our systems, we do understand that awkward situations arise, and we would suggest that you seek advice from our technical department.



Section 07

Sealing Instructions

- 7.1 GENERAL
- 7.2 THE FLANGED JOINT
- 7.3 STUD/STUD JOINT
- 7.4 CORNERS
- 7.5 INTERNAL CORNERS
- 7.6 EXTERNAL CORNERS
- 7.7 SERVICE THROUGH THE FLOORS & WALLS
- 7.8 OVERLAP JOINT

Sealing Instructions

7.1 GENERAL

It should be noted that all membrane and sealing component surfaces must be clean, dry and dust free before applying sealing materials. When making a joint between two sections of membrane, the Delta Tape should be used and pressed firmly against the Delta membrane for good adhesion.

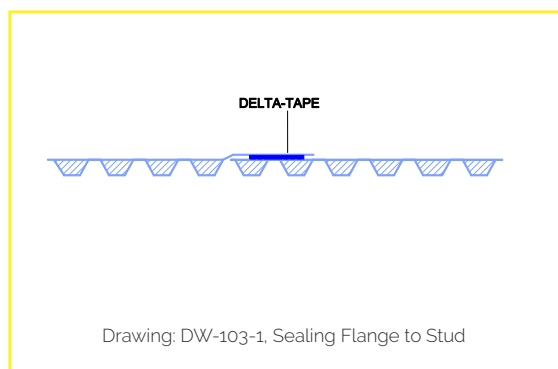
7.2 THE FLANGED JOINT

The flanged joint should be used whenever the flat edge of Delta membrane can be facilitated. 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 Delta 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 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, starting from the middle of the joint. Press the two membrane layers together firmly as you remove the protective backing paper.



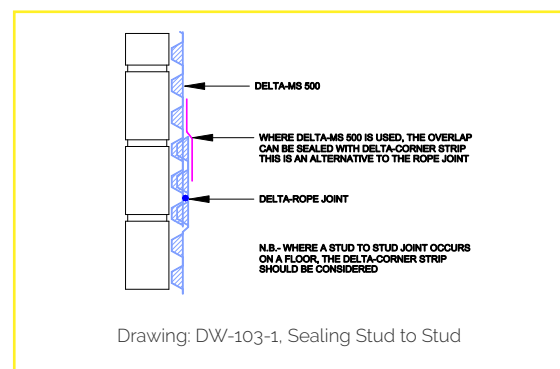
7.3 STUD/STUD JOINT

Where a flanged joint is not possible, overlap the membranes to be joined by a minimum of three rows of studs. The joint is then formed by using the Delta Rope adhesive.

This is done by lifting the back edge of the upper membrane to reveal the underside of the studs. The Delta 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, starting from the middle of the joint. Press the two membrane layers together firmly as you remove the protective backing paper.

Where a stud/stud joint is unavoidable on a floor application (not the floor/wall upturn), this should be over-sealed using the Delta Corner Detail. **6.3.1 Note: when making a stud/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.**



Vault Application

7.4 APPLICATION

When the Delta membrane is being laid as a floor only application, or a part of a sealed application, the membrane is turned up the walls.

7.5 INTERNAL CORNERS

The membrane is worked into the corner and the membrane upturn is cut, allowing it to overlap, and sit neatly into the corner.

This is then sealed using corner strip. The Corner Strip is folded and cut to form an angled section to fit neatly into the corner. Once formed, care should be taken to remove the backing paper and position neatly into the angle of the corner.

7.6 EXTERNAL CORNERS

When fitting the membrane around an external corner the sheet is cut at 45 degrees from the lower point of the corner.

This allows the membrane to continue along the floor and maintain an upturn. This will also create a 'V' shaped gap at the corner. This gap requires sealing using Delta Corner Detail. This is a self adhesive product which is cut and folded to wrap around the corner allowing a 50mm lap onto the floor. Care should be taken to ensure that the lowest point of the corner is sealed correctly. This is done by overlaying an extra piece of corner strip. When a floor application is being installed, an extra lapping piece of membrane will be required to bridge the gap before sealing.

7.7 SERVICE THROUGH THE FLOORS AND WALLS

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 Delta Rope or Delta Mastic, whichever is applicable.

If necessary, a patch of membrane or plain D.P.C. (plastic type) can be overlaid and sealed to the service around the perimeter using the Delta range of products.

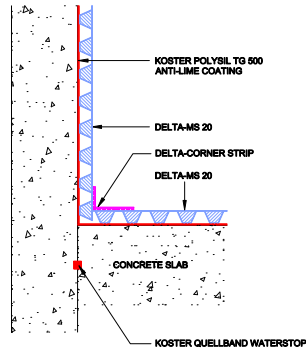
7.8 OVERLAP JOINTS

On walls, both Delta PT and Delta MS 500 can be fixed either vertically or horizontally. The Delta PT is overlapped by 200mm. Facilitating the unmeshed edge of the roll.

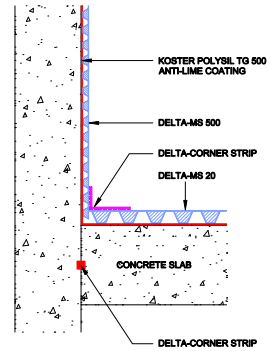
Delta MS 500 is overlapped either by the flanged edge or by a minimum of three rows of studs, when these are sealed. Alternatively, the upper sheet must be overlapped by a minimum 200mm, when left unsealed. If the decision is made to fix the System horizontally, the upper sheet must be overlapped by the lower sheet.

In all cases, but particularly in sealed applications, ensure that membrane overlaps are made which provide continuous drainage behind the System. Avoid making laps that would allow water to drain onto the joints.

**WALL/FLOOR JOINT BETWEEN DELTA-MS 20
USING DELTA-CORNER STRIP TO FORM
FLEXIBLE WATERPROOF JOINT**

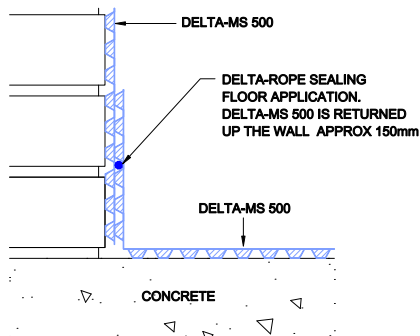


**JOINT DETAIL BETWEEN DELTA-MS 20 & MS 500
USING DELTA-CORNER STRIP TO FORM
FLEXIBLE WATERPROOF JOINT**

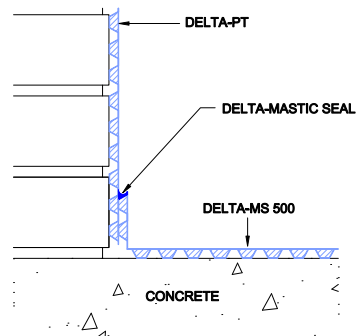


Drawing: DW-117-1-F, Joint Detailing

**WALL / FLOOR DETAILS
ON SEALED SYSTEM**



**DELTA SYSTEM 500 INCORPORATING
DELTA-PT ON WALLS**



Drawing: DW-108-1-F, Wall/Floor Delta MS 500 & PT Sealing Detail





Section 08 Ventilation

8.1 VENTILATION

Ventilation

8.1 VENTILLATION

When installing Delta MS 500 or Delta PT, a number of options are available to vent the systems, depending on which type of application is employed. The cavity behind the system can be vented to relieve vapour pressure. Generally speaking this is done either into the room, into the ceiling/floor void, or externally via an air brick or passive vent, which is the preferred method.

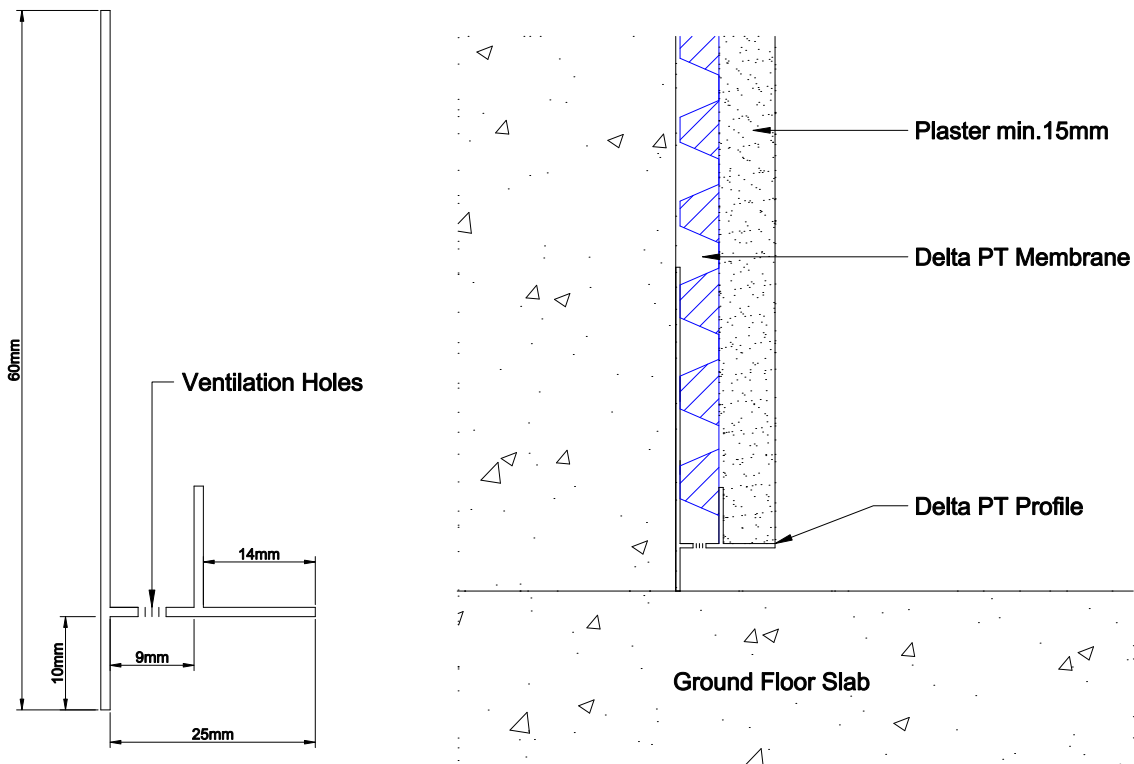
Air bricks should only be fitted on one elevation to prevent cross ventilation behind the system, and preferably on the sheltered side of the building. Mechanical extraction of ceiling voids is another option for consideration, depending on the type of project you are dealing with. When ventilating the system into the room the amount of increased moisture into the volume of room space is minimal. Under normal conditions this is vented away naturally.

When you are dealing with confined basement areas with poor or restricted ventilation, then you must consider the risk of condensation. The introduction of mechanical extraction systems with humidistat sensors are recommended.

This advice applies whether or not you are using our system or any other type of system, although it should be said that our system can reduce the risk of condensation when specified correctly.

Refs: BS. 5250: 2011 Control of condensation in buildings The Building Regulations 2000: Part F1 CIRA Report 139 & 140.

Delta PT Profile



Drawing: DDP-159-PT Ventilation Profile



Section 09 Repairs

- 9.0 REPAIRS
- 9.1 REPAIRS TO STUDS (VERTICAL)
- 9.2 REPAIRS TO MEMBRANE - SYSTEM 500 (VERTICAL WALLS)
- 9.3 REPAIRS TO FLOORS/VAULTED CEILINGS
- 9.4 GENERAL
- 9.5 REPAIRS TO DELTA PT

Repairs

9.0 REPAIRS

As indicated earlier in this manual one of the advantages of using Delta Systems is the achievement of 'damp pressure equalisation'.

i.e. the damp pressure through the structure is divided into the total volume of space behind the system, thereby eliminating localised weak spots normally associated with other types of waterproofing systems.

Even hydrostatic pressure does not have a direct influence on the membrane because this type of 'cavity drain' system allows the water ingress to drain to a suitable collection point where it can be easily dealt with.

9.1 REPAIRS TO STUDS (VERTICAL)

When the wrong stud is drilled in error this can easily be repaired by cleaning out the stud with a cleaning cloth and plugging it with Delta Sealing Rope. This can then be covered with a small patch of Delta Sealing Tape.

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

9.2 REPAIRS TO MEMBRANE - DELTA MS 500 (VERTICAL WALLS)

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

9.2.2 If the membrane is ripped causing a ragged cut, this will need to be sealed using Delta Corner Strip, using the same method as above.

9.2.3 If the membrane is damaged and a hole is created, this can be bridged by using the corner detail providing the hole can be bridged on one piece with a least a 25mm margin around the hole.

Larger holes can be bridged by cutting a piece of Delta MS 500 to cover the hole and allowing a margin beyond the hole size.

This can then be sealed in two ways:

a) If the repair membrane sits neatly into the studs the edges can be sealed using sealing tape over the repair section and lapping onto the main section. Seal around perimeter.

b) Alternatively, if the studs don't interlock, a ridge will be formed and you will need to use corner strip to bridge around the perimeter of the repair patch onto the main section.

9.3 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 corner strip 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 corner strip, prior to making the seal to alleviate any surface moisture. This can easily be done with a warm air gun.

9.4 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 damage has occurred on a section of membrane it may be advisable to cut out and replace a large section of membrane.

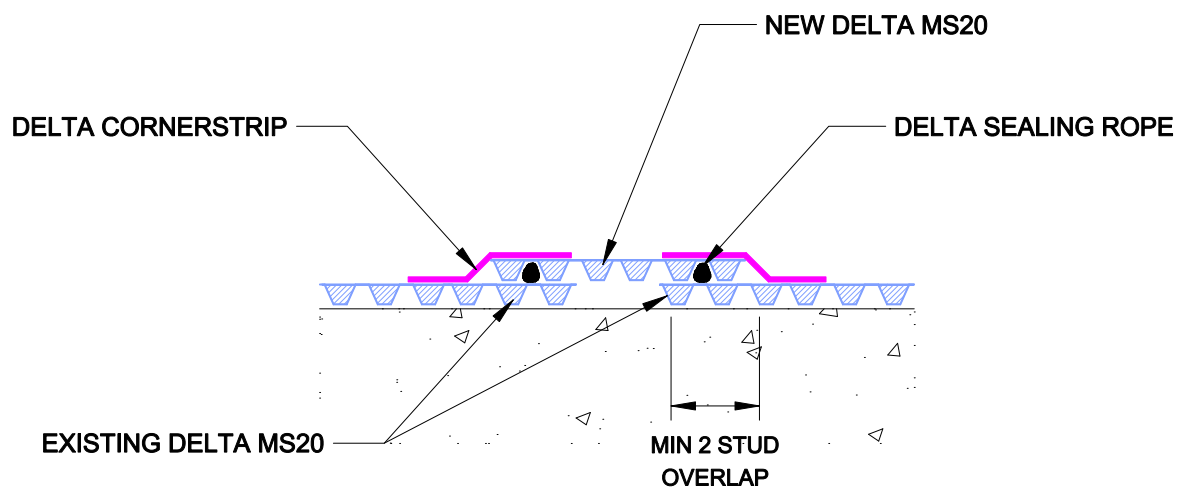
9.5 REPAIR TO DELTA PT

When Delta PT is used on vertical wall applications. Any drill hold repairs can easily be sealed using Delta Mastic. If the membrane is accidentally cut, then this can be sealed using the Delta Mastic. Any sections of Delta PT more seriously damaged should be cut out and replaced.

NOTE: See Appendix (i) Delta PT Clear.

Any areas above the vertical plane on the arch can be repaired by injecting W.R. expanding foam behind the PT to divert the water, then effect minor repair. Any serious damage should be removed completely and replaced with a new section.

DELTA MS20 PATCH REPAIR



Drawing: DW-266-1 (F) - MS20 Patch Repair





Section 10

Maintenance

- 10.0 MAINTENANCE
- 10.1 CHECKS PRIOR TO FINISHES
- 10.2 MAINTENANCE TO MECHANICAL PUMPS
- 10.3 ALTERATIONS

Maintenance

10.0 MAINTENANCE

Generally speaking, Delta Membrane Systems are maintenance free. 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.

10.1 CHECK 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 9 of this manual.

10.2 MAINTENANCE TO MECHANICAL PUMPS

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

1. Cleaning of the filter base and descaling as required
2. Checking for and ensuring free movement of the impeller
3. Checking seals for leakage and renewing as required
4. An independent test of the switch float, ensuring free movement
5. Checking impact discharge pipes for any form of blockage, and clearing as necessary
6. Inspect discharge pipes for any damage or signs of leaks, and repair or renew as necessary
7. Remove any debris from base of sump which may interfere with pumping
8. Cleaning, renewing as required, seals on double seal sump access covers

All the above should be carried out per annum as a minimum requirement or in accordance with the pump manufacturers recommendations.

The above can be carried out by the client or under a maintenance contract.

NOTE

- a)** The pumps must never be activated whilst dry, as this will damage the effectiveness and life span of the unit
 - b)** Mechanical sump pumps are powered by electricity. It is important to maintain a constant power source to achieve maximum drainage capacity, particularly at times of peak water inflow.
- We recommend the use of an alarm with rechargeable battery, plus our battery backup system

10.3 ALTERATIONS

Delta Systems are flexible high density Polyethylene membranes. Our systems, like other waterproofing systems should not be pierced in any way. If works are proposed in the basement area which are likely to penetrate or disturb the membrane, advice must be sought from the specialist installing company, prior to such work being carried out.

Even if minor modifications are proposed to the waterproofed areas, such as shelves, cupboards, etc. The specialists should be contacted so that they can advise on the correct fixing methods. Alterations may also affect any guarantees that have been issued, so it's important to notify the installing company, to maintain cover, replaced.



Section 11

Drainage

11.1 DRAINAGE

11.2 DRAINAGE OPTIONS

Drainage

11.1 DRAINAGE

As a guide, generally, reference should be made to:

BS. 12056

BS. 752

BS. 8301: 1985 Building Drainage.

BS. 8102: 2009

Cavity drainage systems operate on the principal that they are installed to control dampness or free water without putting the structure into tension by creating hydrostatic pressure. They provide a dry waterproof inner skin, which is also a vapour control layer.

They are not designed to withstand hydrostatic pressure, (in relation to running water jobs), and therefore it is important to assess drainage requirements to evacuate any water ingress.

RUNNING WATER SPECIFICATIONS (SUMPS, PUMPS, CHANNELS, ETC)

Always seek advice and site attendance from Delta technical staff or registered installers who will advise on a specification for any particular application.

When installing Delta Systems to deal with capillary held moisture only, then a drainage requirement is not necessary. This would be deemed a ventilated application, and must be qualified.

However, you must consider proper ventilation and you should include the scope of the system performance in your report, as agreed with the client. As a 'duty of care' you must inform the client of any risk or limitations associated with the specification, in respect of damp proofing.

11.2 DRAINAGE OPTIONS



PACKAGED PUMP SYSTEMS

The concept of a Drained Cavity System is to collect and manage any group water which breaches the integrity of a structure by managing, collecting and discharging such free water via a suitable evacuation point such as a Delta Package Pump Station.

Delta offer a comprehensive range of Package Pump Stations which are suitable for the evacuation of Ground water, Surface water, Foul water and Flood water. In addition we offer bespoke chambers for larger properties. Delta's sump pumps offer complete peace of mind.



ALARM & CONTROL PANEL

High level water alarms or high level alarms are used to provide a warning. The high level alarm has been designed to detect high water or if there is an increase in volume of water entering a property. The purpose of the high level alarm system is to monitor and send an audible and visual alarm to property owners.



BATTERY BACKUP

With a Battery Backup, peace of mind is a standard. Our reliable Battery Backup will keep your pumps running during power failure, ensuring your package pump station remains working. Our Battery Backups are leading the industry in performance.

- Specifically designed for sump pump application
- During power failure will automatically run the sump pump station.
- Able to sit in standby mode
- Free standing and can be installed in any dry ventilated area
- Fitted in the power line meaning no additional electrical spurs are required.
- Can operate as a standby unit or can be used in conjunction with the AlertMaxx2 EC.

Appendix

APPENDIX

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i) FINISHING MATERIALS (WALLS) DELTA PT

- 1) Delta PT is to be rendered in two coats with sand, cement and lime at a ratio of 6.1.1. respectively. Finish plaster of 3mm thickness is to be applied to give a smooth finish. Min. Thickness 15mm.
- 2) Delta PT is to be plastered with Tarmac White Wall plaster to a thickness of 15mm in a two coat application finish. Plaster of 3mm is then applied to a smooth finish.
- 3) Gypsum bonding plaster to BS 1191 to be applied to Delta PT in two coats to a thickness of 15mm, followed by a 3mm coat of finishing plaster to a smooth finish.
- 4) Gypsum plasterboard to BS 1230 is to be 'dab fixed' to Delta PT dabs are to be placed over fixing centres, a 3mm finish plaster is then applied.
- 5) Koster restoration plaster followed by Koster restoration plaster fine if a smooth surface is required.

j) FINISHING MATERIALS - FLOORS (DELTA MS 500 ONLY)

- 1) 65mm sand and cement screed is to be applied directly to Delta MS 500 in accordance with BS. 8204 - 1: 2003 to give a strong durable finish capable of withstanding extremely high loadings.
- 2) Insulation board of x thickness is to be applied to membrane after which a 65mm sand and cement screed is to be applied to give a strong and durable finish and also achieve decreased 'U' values.
- 3) Tongued and grooved Type | or ||/||| flooring grade chipboard panels to BS EN 312:2010 18mm or 22mm are to be laid over membrane with panels staggered joints are to be glued together with PVA adhesive.
- 4) Insulation board is to be laid over membrane. Tongued and grooved chipboard is to be applied with joints staggered and joints glued with PVA adhesive.

DELTA MS 500 CLEAR AND DELTA PT CLEAR

We have for some time, recognised that in some cases the walls can be of variable strength and consistency. Also, there are many regional differences in construction which present varying fixing problems.

While we would recommend taking advice on the more obscure types of structure that you may be considering fixing to, one factor is constant.

When you are fixing our standard membranes to walls you are working "Blind". This does not present any problems in the majority of applications where the background is stable. Where this is not the case, a lot of time and effort can be wasted locating a decent fixing point, and then repairing mis drilled holes.

The problem can be dramatically reduced by specifying 'Delta MS 500 Clear' or 'Delta PT Clear'. These products being translucent allow the registered installer to see the most suitable fixing point in the structure, thereby eliminating the above when our clear membranes are being applied. Another benefit of the system is in Heritage situations where drilling into historic masonry can be avoided and the mortar joints selected.

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