



**START
STRONG**
— FROM THE —
GROUND UP.

A guide to protecting foundations and reputations.



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INTRODUCTION: A GUIDE TO PROTECTING FOUNDATIONS AND REPUTATIONS.

While being able to use a basement as a livable and comfortable space is now an expectation of most homeowners, many builders' and contractors' building practices haven't caught up to this new normal. Building basements the same way it was done for the outdated purpose of storage ultimately puts the health of occupants at risk and the builder's reputation on the line.

Quality homebuilding begins and ends with applying the best products and building practices right from the start. Below-grade moisture management is your first step in making a lasting impression, keeping your reputation and your homes going strong. This is a job that should need to be done only once.

This guide will walk you through the science of building below grade, and help you build better basements while finding ways to correct existing moisture issues.



THE SCIENCE OF BUILDING BELOW GRADE

Building above grade is tough enough, but below grade? It is the most difficult space to get right. Not only does a basement hold the building up; it must keep groundwater, soil gas, and water vapor out, and keep the heat in during the winter and out during the summer. Once moisture has seeped into the wall assembly, it becomes a challenge to treat the problem, making basements even more vulnerable to mold, since they are often already damp and humid.

Common Basement Problems:

- Water leaks
- Dampness
- Rotting of building components
- Elevated relative humidity
- Poor air quality (bad smells)
- Soil gas infiltration (e.g. radon, methane)
- Low energy efficiency (thermal bridging or poor insulation of walls and floor)

These result in very uncomfortable living spaces, adverse health effects, high energy bills, shortened building life and reduced property value.

A 2009 World Health Organization report points to the fact that indoor air pollution, particularly from dampness and mold, is a major cause of morbidity and mortality worldwide. In addition, the U.S. Environmental Protection Agency states that one-third to one-half of all structures in the United States have damp conditions that may encourage the development of pollutants such as mold and bacteria—which can consequently cause allergic reactions, including asthma, and spread infectious diseases.

FUNDAMENTAL PRINCIPLES OF GROUNDWATER CONTROL

Basement foundations need to be water managed. Water-managed basement foundations rely on two fundamental principles:

1. Keep the rainwater away from the foundation wall perimeter; and
2. Drain the groundwater away from the foundation wall.

For groundwater, there are two things that need to happen – you need to control hydrostatic pressure, and you need to control capillarity. There is no better way of controlling hydrostatic pressure than by providing drainage. There is no better way of controlling capillarity than by providing a gap.

WHERE DOES THE **WATER** COME FROM?

CONSTRUCTION

Concrete and lumber combined contribute 530 to 790 gal (2,000 to 3,000 L) of water to indoor space, depending on size of the building.

For example:

A foundation size of 8' (2.5 m) high, 10" (25 cm) thick, 115' (35 m) of perimeter wall contains 29 yd³ (22 m³) of concrete. The basement floor contains about 5 yd³ (4 m³) of concrete. 1.3 yd³ (1 m³) of concrete mix requires 55 gal (210 L) of water or more during the mix. With hydration, concrete eventually retains less than 32 gal (120 L) of water.

Assuming an 18-month drying period, this represents a total of 1 to 1.3 gal (4 to 5 L) per day. It is not surprising that many complaints of high humidity and condensation problems appear in the first two years after construction.

Source: Moisture Sources in Houses, Richard L. Quirouette –
National Research Council Canada

INTERIOR SOURCES PRODUCED BY DAILY LIVING

Produced by household activities:

Shower/bath
Plants
Dishwashing
Cooking
Floor washing
Clothes drying

4-PERSON
HOUSEHOLD:
**0.6 GAL (2.4 L)
PER DAY**

Produced by occupants:

Respiration
Perspiration
0.3 gal (1.25 L) per
person per day

4-PERSON
HOUSEHOLD:
**1.3 GAL (5 L)
PER DAY**

**TOTAL: 2 GAL
(7.4 L) PER DAY**

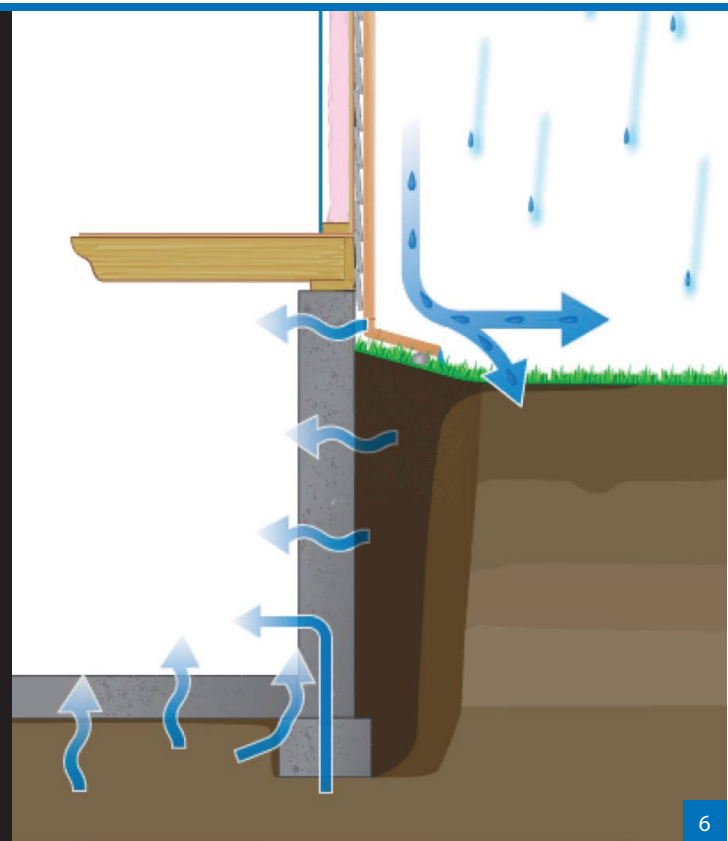
WHERE DOES THE **WATER** COME FROM?

EXTERIOR MOISTURE SOURCES

1. Rainwater / precipitation
2. Rainwater shedding
3. Surface water run-off
4. Water vapor
5. Sub-surface moisture
 - Groundwater
 - Vapor

Other contributing factors:

- Poor surface drainage
- Poor-quality backfill
- Lack of drainage layer
- High/rising water tables
- Improperly sealed tie rod holes
- Cracks in foundation wall (shrinkage, settlement, frost)
- Perimeter drainpipe clogged/not existing
- Insufficient moisture barrier/capillary break





HOW **MOISTURE** MOVES

1

HYDROSTATIC PRESSURE.

Ground water pressure builds up against foundation, caused by gravity flow.

2

CAPILLARY WICKING.

Movement of liquid moisture within small pores, voids, or fissures/cracks in the concrete or block.

3

VAPOR DIFFUSION.

Movement of water vapor through the basement wall and slab caused by a difference in vapor pressure (independent of air movement).



SYSTEMATIC APPROACH TO **WALL WATERPROOFING**

Wall waterproofing systems are a critical component for keeping foundations dry. Like air control above grade, it is important to consider water control below grade as a system solution, not as a single component.


A properly installed and performing wall waterproofing membrane is important, but without a proper drainage system to allow the water to flow away, water can damage virtually any construction project. An improperly conceived wall waterproofing system can allow hydrostatic pressure to build, making any crack in the foundation an access for water damage.

To properly protect a concrete foundation, the wall must be protected against water intrusion, and the water must be directed away from the wall.

When selecting a below-grade water management system, it is important to understand the overall water management system goals for the site conditions. Soil quality, water table location, and how the system will be installed are all important considerations.

Different soils drain differently. Some hold tons of water, and others will let water filter through. A geotechnical report will help outline soils, possible contaminants and chemicals that may need to be addressed before selecting a below-grade system.

Selecting an appropriate below-grade solution for buildings is one of the most important aspects of maintaining structural integrity, indoor air quality, and comfortable living or working conditions for all occupants.



ENERGY EFFICIENT — FROM THE — GROUND UP.

Basements can account for 20% of a home's total heat loss. While there are countless steps you can take to make homes more energy efficient, starting from the ground up is the best approach.

Most basements are basically concrete walls surrounded by dirt. Dirt can fluctuate in temperature, becoming wet and humid or frozen solid. These changes within the ground can affect the comfort of a basement and the health of homeowners. Choosing the right products and having proper installation can ensure a basement stays dry and protected for years to come. Good product choice can also improve energy efficiency of the home, which is good not just for the environment, but for homeowners as well.

To ensure building materials perform properly and maintain their R-value, basements and crawl spaces need to be well protected with durable foundation protection products that help keep the below-grade building envelope and structural components dry. Wet components, whether insulation, wood, or concrete, cannot provide the necessary insulation to keep heat and energy from escaping. Choosing the right below-grade water management system will ensure a basement stays dry, which is good not just for the environment, but for homeowners as well. More specifically, it is net-zero and high-performance-home compliant.

To better meet advancing building codes, modern construction, and green building practices, DELTA®-MS is the only below-grade dimpled membrane on the market with a Declare Label—contributing to the Living Building Challenge and LEED® v4 requirements.

THREE SIGNS OF A LEAKY BASEMENT

Basement leaks can either be slow and steady, gradually seeping into a dwelling over days, weeks, and months, or they can be fast and furious, bursting through walls unannounced to create a new and unwanted indoor pool. Either way, when left untreated, that unwanted moisture can cause major issues when it comes to homeowner comfort and health, and can lead to some serious structural concerns.

1

YOU CAN SEE IT.

Standing or pooling water is a dead giveaway a basement has sprung a leak. You may also notice unsightly water damage such as rust-colored stains or spots and peeling or cracking paint. Aside from poor aesthetics, uncontrolled moisture can damage building materials such as drywall, carpeting, and studs, making it challenging to properly finish and ultimately enjoy a basement.

2

YOU CAN SMELL IT.

If you can't see the mold or mildew, chances are you will get a whiff of it. Besides the displeasing smell, the main concern here is the adverse health effects. People with mold sensitivity may experience nasal stuffiness, throat and eye irritation, and coughing or wheezing, and symptoms can worsen for those with compromised immune systems. Recent studies also show a link between mold and the development of asthma in some children. The Centers for Disease Control and Prevention (CDC) recommends immediate clean-up of mold upon detection and encourages home and building owners to fix leaks, effectively eliminating any moisture needed for mold growth. Best practice, as noted by the CDC, is to remove the mold and work to prevent future growth.

3

YOU CAN FEEL IT.

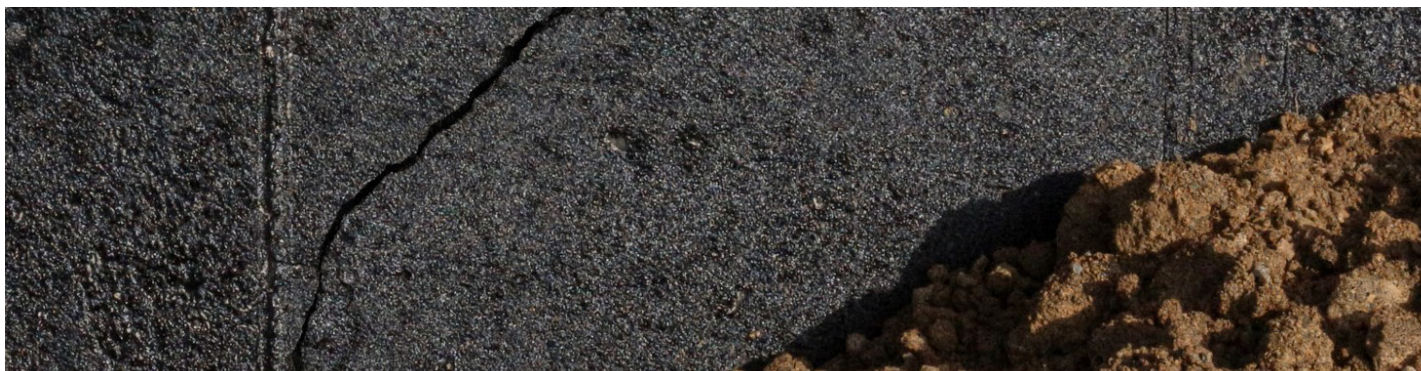
More moisture, more problems. In addition to the presence of mold, mildew, or rot, an increase in moisture – whether through windows, cracks, or around pipe penetrations – will introduce humidity to the basement air. This combination is well known to create an overall uncomfortable or dingy feeling within the basement space.

FIXING **A LEAK**

There are a number of products and methods available to fix leaky foundations and basements. However, not all are created equal. Many are presented with a polarizing choice between the cheaper quick fix or the astronomically extensive and expensive repair.

For example, according to HomeAdvisor, the average homeowner spends around \$4,094 to seal a basement or foundation, with minor repairs costing as little as \$600. Temporary solutions such as waterproof paint and sealants that will eventually bubble, peel, and flake cost between \$500 and \$1,000. Fixing cracks or adding gutters and downspouts can run upwards of \$10,000. The next step up is dampproofing, which can come in at approximately \$15,000. Dampproofing involves digging up the outside, adding an exterior perimeter drain and an exterior full-height dampproofing layer, and then backfilling and re-landscaping. Although this is a highly effective solution, especially for new builds, it can be a lot of work and a significant investment when done retroactively.





3 STEPS FOR SUCCESSFULLY STOPPING LEAKS

A properly installed interior drainage system is not only cost effective, ranging from \$700-\$2,600, but also provides long-term performance and peace of mind for a safe and dry basement that won't require surprise service calls or create a cozy habitat for dangerous mold. Dr. Joe Lstiburek, the founding principal of Building Science Corporation, one of the most influential, innovative, and respected building science firms in North America, supports the following approach:

1. Install an interior perimeter drain.
2. Use a vapor- and air-tight drainage mat to control hydrostatic pressure as well as entry of water vapor and soil gases.
3. Direct the water to a sump pit with a pump that has both a battery back-up (in the event there is a heavy downpour and power outage) and an airtight lid to protect against the release of harmful soil gases such as radon, pesticides, termiticides, and herbicides.

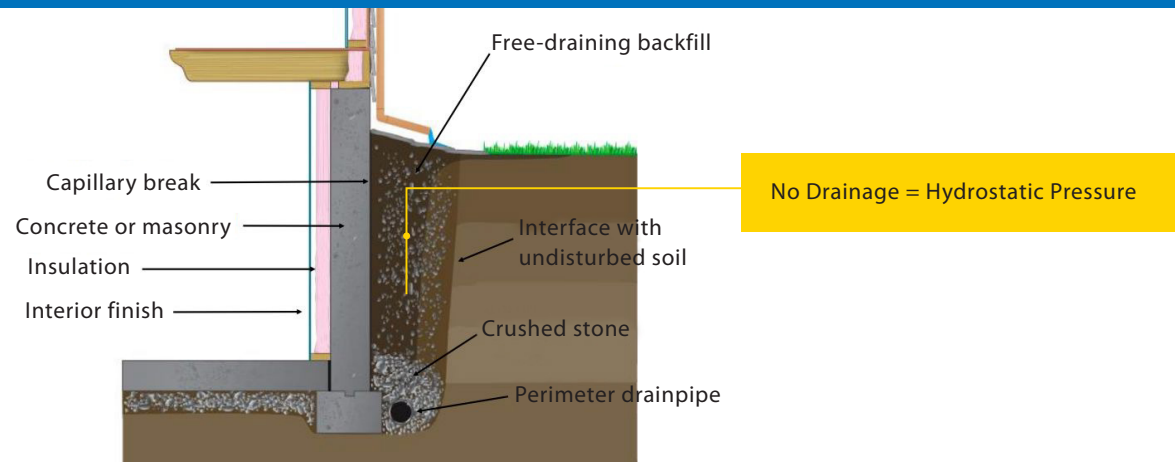
Specifically, Dr. Lstiburek speaks to the DELTA®-MS foundation protection system. Used in this approach, DELTA®-MS also acts as a critical barrier to unwanted soil gases such as radon and/or methane. It's important for those applying the product to properly seal the DELTA®-MS barrier to prevent ingress of these gases. It is important to note that this solution is best when a foundation cannot be properly addressed from the outside for a number of reasons, like big decks in the way or no room between residences. The degradation of the concrete from water ingress will continue.

THREE LINES OF DEFENSE

Wet soil around and under any type of foundation needs to be managed. There are three lines of defense for effective risk management and below-grade moisture control.

- 1. Drainage of Surface Water.** Slope all grading away from buildings. This includes walkways, patios, driveways, and garage floors. According to the International Residential Code, grade needs to be a minimum of 6 inches within the first 10 ft.
- 2. Perimeter Drainage.** Free-draining backfill and a perimeter drainpipe will move water away from the foundation wall and prevent it from pooling around the building.
- 3. Below-Grade Building Enclosure Drainage Sheet.** This is the last line of defense for groundwater control.

Designing the foundation to prevent rainwater and groundwater intrusions is the most cost-effective method to keep basements dry.





WALL WATERPROOFING SOLUTIONS

Though code compliant, many spray-on applications aren't doing builders any favors when it comes to avoiding foundation moisture and the problems that accompany it. Following building code requirements alone – spraying then proceeding with backfill – is a short-sighted approach, leaving concrete foundations vulnerable to moisture, compromising the longevity and satisfaction of the build for builders and homeowners.

What's wrong with spray-on products? Spray-on dampproofing or waterproofing products present many challenges that can lead to risk of moisture ingress, but also the application process itself can take longer and requires expensive equipment.

1. Backfilling Hazards

The best intentions when selecting foundation protection systems can be undermined by damage from construction. Sprayed-on applications are particularly susceptible as they are not as durable as other materials to withstand all the final stages of foundation construction.

2. Settling Cracks around the Foundation

Even when backfilling is done to perfection, spray-on coatings are still vulnerable over the long term. Although sprays or roll-on applications do provide dampproofing properties, they don't bridge the inevitable shrinkage cracks that will appear once the foundation settles. Asphalt sprays (i.e. tar), for example, are incapable of spanning any cracks that can occur along the wall. This leaves the wall open to leaks and all the problems that moisture can bring to a basement. It only takes a minimal amount of hydrostatic pressure to push water through even a small crack.

3. Application Challenges

Tar and asphalt sprays emit toxic fumes, requiring specialized safety equipment for application and additional time for teams to wait for fumes to dissipate.

So, while builders and contractors are investing extra time and resources to apply these materials, the pay-off just isn't there because home protection is not actually being ensured.





A MORE EFFECTIVE SOLUTION

Dimpled membrane barriers provide a better solution overall compared to spray-on applications. They're more durable and cover foundation settlement cracks while being safer and more efficient to install.

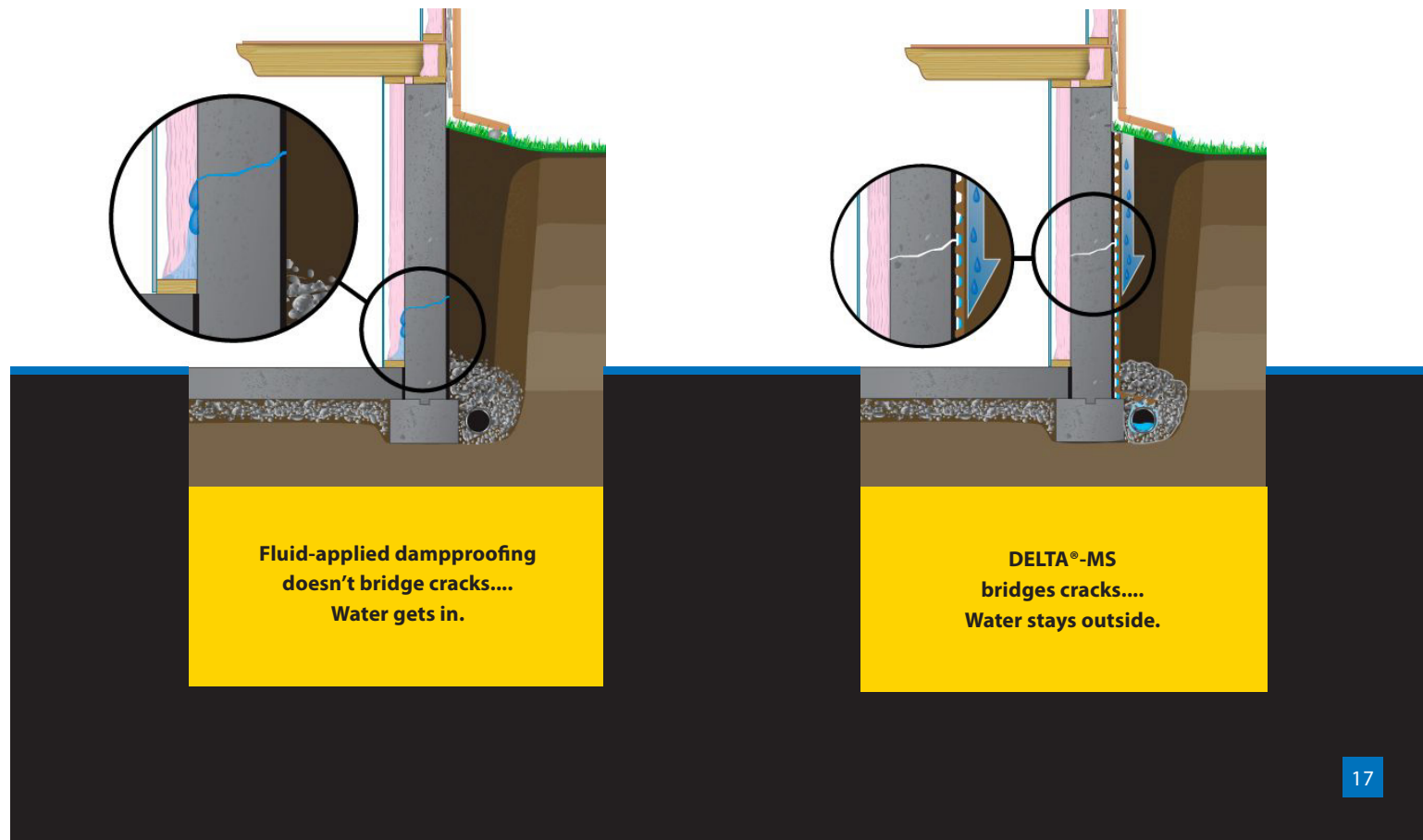
Since spray-on compounds are at risk for puncturing or cracking during backfilling or due to settling, the much more resilient material to consider is instead a dimpled membrane sheet, which offers heavy, physical protection, impact resistance, and is generally tear proof. Due to its high compressive strength, it ensures superior performance and much longer-lasting protection.

Using dimpled membranes also provides superior coverage for foundation cracks, meaning no water intrusion, optimal comfort and healthy living spaces for homeowners, along with fewer warranty claims and call-backs for builders.

Choosing not to use a spray-on system speeds up the construction schedule and reduces labor costs. The installation of dimpled membrane sheets can be done as soon as the forms are removed. There's no waiting for curing time like there is with tar and asphalt spray, which means you can also backfill quickly after installation. Finally, since expensive spray equipment isn't needed when using a dimpled membrane, it can cost less to install.

Dimpled membranes create an air gap, producing a way for water to drain incidental moisture to the footing tile and diffuse hydrostatic pressure. DELTA®-MS acts as a drainage plane in the system, which the sprays alone are not. They require an additional component to have drainage in the system. Deciding on a dimpled membrane for a foundation's protection system is arguably the right choice for most buildings. Dimpled membranes have many advantages over other systems, including the ability to be installed over virtually any foundation type: poured concrete, concrete block, insulated concrete form, or preserved wood foundations.

INEFFECTIVE VS. EFFECTIVE PROTECTION





COLD-WEATHER WALL WATERPROOFING

Seasonal changes shouldn't impact our ability to build. Most trades can perform in nearly all weather conditions. There are even a fair number of workers who prefer the cold to working in heat and humidity, so workmanship need not suffer during the winter months. However, cold-weather construction projects come with winter-specific complications. Cold can throw disruptions into productivity schedules and affect the safety of workers.

Some construction during winter can have an impact on temperature-sensitive tasks like spraying insulation, working with electrical wire, curing concrete, or drying indoor muds and adhesives. When it comes to below-grade moisture protection, cold weather and snow limit the use of any fluid-applied products. This can be avoided by selecting a better below-grade wall waterproofing solution that is designed specifically with cold climates in mind.



When protecting foundations, the feasibility of applying wall waterproofing below temperatures of 40°F (4°C) is a common question. Particular products require above-freezing temperatures to be applied. If a fluid-applied product is selected for installation during lower seasonal temperatures, the field applicator may face some of the following issues, compromising the integrity of the liquid membrane:

- Substrate can accumulate condensation, frost, or a thin film of ice—often invisible to the naked eye; and
- Slower cure times as a result of lower-than-optimal substrate and/or outdoor temperatures.

Proper product selection and installation can help you maintain the success of your project. To address the challenges that low temperatures present when wall waterproofing, it is best to select a high-density polyethylene (HDPE) dimpled membrane.



SELECTING THE RIGHT **DIMPLED MEMBRANE**

A dimpled membrane offers many benefits that sprays simply do not. Dimpled membranes provide an even application, factory-controlled quality, and the ability to bridge foundation cracks. This means no water intrusion, optimal comfort and healthy living spaces for homeowners, and fewer warranty claims and call-backs for builders. The dimples also create an air gap between the membrane and the foundation, which removes hydrostatic pressure from any incidental water getting behind the membrane, allowing it to flow freely to the perimeter footing drain.

You choose a product based on project requirements, decent specs, and apparent good quality, but how can you know if the product you've chosen is truly appropriate for the job? When selecting a drainage membrane, you should consider the following:

- What type of protection do you really need?
- What type of protection do you believe you're getting?
- Do you know the best/recommended way to install or secure the drainage membrane to the foundation?
- What accessories are provided, and how do they affect performance?
- Might the product sag, tear, or collapse? How do you avoid this?
- Would you recognize the signs of a problem with your foundation protection?
- Do you know the damages that can result from a failed drainage membrane, or from an improper installation?
- Do you know the proper recourse should an issue/damages arise?

The type of protection homeowners can expect depends a great deal on the quality of the drainage membrane you select. The dimple height, sheet thickness, and compressive strength vary between manufacturers. Understanding the true requirements for the project will allow the selection of the appropriate drainage board by calling for the appropriate performance criteria.

DIMPLED MEMBRANE APPLICATION

The DELTA®-MS foundation protection system maintains an air gap that keeps moisture and damp soil away from the foundation. The membrane itself is impermeable to both water vapor and liquid water. As a result, it maintains a complete capillary break between ground moisture and foundation walls. The innovative, high-compression design offers reliable protection to foundation walls as deep as 12 ft below grade.

Unlike sprayed-on coatings, DELTA®-MS successfully bridges big cracks and other imperfections in foundation walls that inevitably appear as settling occurs. For extra protection, DELTA®-MS can also be used in combination with sprayed-on systems.

Is waterproofing or dampproofing required behind DELTA®-MS?

- DELTA®-MS is approved as a stand-alone system
- DELTA®-MS may also be applied over other dampproofing or waterproofing systems

GREEN AND DURABLE

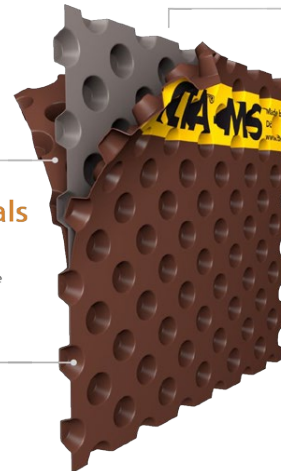


40% New Materials

Outer layers of virgin HDPE give the membrane a higher stress-crack resistance and compressive strength and help to maintain the membrane's integrity and durability.

60% Recycled

Embedded layer of recycled HDPE keeps it green.



TECHNICAL DATA:

Dimple Height

5/16" (8 mm) ASTM D6364-06

Compressive Strength

Approx. 5,200 psf (250 kN/m²)
ASTM D6364-06

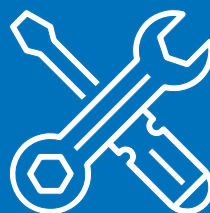
- DELTA®-MS is non-toxic and non-polluting
- Contains 60% post-consumer recycled material directly from household Blue Boxes
- 100% recyclable at the end of its life cycle
- Declare Label: Red List Free

DELTA®-MS INSTALLATION BASICS



Install in almost any temperature

Temperatures above -24°F
(-31°C)



With inexpensive equipment and tools

Hammer or automated nailing gun (i.e. TrakFast-1200 or Hilti GX3)

Concrete nails
1¼" (3 cm) – 1½" (3.8 cm)

Utility knife or tin snips
Large caulking gun,
chalk line, broom



Using basic safety methods and protective gear

Hard hat, safety boots, gloves,
safety glasses

Follow all safety precautions
as directed by: Occupational Safety
Health Administration (OSHA-USA)
and Construction Safety
Association (Canada)



BUILDING CODE REQUIREMENTS

Building code requirements vary by country. More specifically, Canada requires below-grade drainage while the U.S. does not. DELTA®-MS meets building code requirements outlined by both countries in one, easy-to-install product. If selected, U.S. builders and installers will end up beyond code by adding the drainage component as well as wall waterproofing, though only wall waterproofing is required by IRC.

If it's known to be the appropriate approach based on building science knowledge, the right solution is to always increase your building standards even if that means you've exceeded building codes.

BUILDING CODE REQUIREMENTS

USA

International Code Council (US)

- ICC-ESR # 2303 Dampproofing & Wall Waterproofing Membrane

2018 International Residential Code

Section R406 Foundation Waterproofing and Dampproofing

"R406.1 Concrete and masonry foundation dampproofing. Except where required by section R406.2 to be waterproofed, foundation walls that retain earth and enclose interior spaces and floors below grade shall be dampproofed from the higher of (a) the top of the footing or (b) 6 inches (152mm) below the top of the basement floor, to the finished grade."

- DELTA®-MS Code Approval: ICC ESR-2303

CANADA

Canadian Construction Materials Centre

- CCMC # 12658 Damp Proofing
- CCMC # 12788 Drainage Layer

2015 National Building Code of Canada

Section 9.13 Dampproofing, Waterproofing and Soil Gas Control

"Section 9.13.2.1 (1) Required Dampproofing. Except as provided in Article 9.13.3.1, where the exterior finish ground level is at the higher elevation than the ground level inside the foundation walls, exterior surfaces of foundation walls below ground level shall be dampproofed."

- DELTA®-MS Code Approval: CCMC #12658 (Dampproofing)

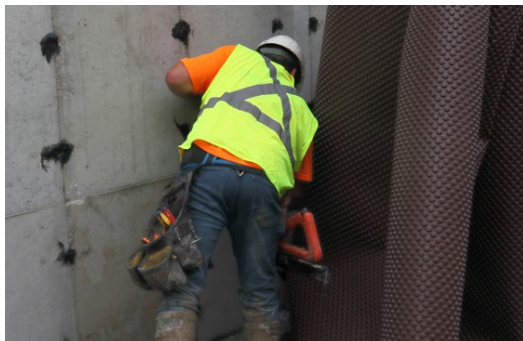
2012 Ontario Building Code

Section 9.14 Foundation Drainage

"Section 9.14.2.1 Foundation Wall Drainage.

(2)(b) a system shall be installed that can be shown to provide equivalent performance to that provided by the materials described in Clause (a). (See Appendix A)."

- DELTA®-MS Code Approval: CCMC #12788 (Drainage)



INSTALLATION - SITE PREPARATIONS

1. Inspect the substrate

- Parge block (CMU) walls (building code requirement)
 - Cove at footing / first course of block
- Patch any tie holes
- Remove any protrusions and bulges
- Fix any honeycombing/areas of unconsolidated concrete
- If the concrete is frozen or you suspect any other issue, contact the site Superintendent about repair before proceeding

2. Final Grade Line

- As per lot plans
- Make sure final grade lines are marked on foundation walls
- DELTA®-MS to be installed min. 12" beyond common wall of conditioned area and at inside of garage common wall to basement

3. Perimeter gravel

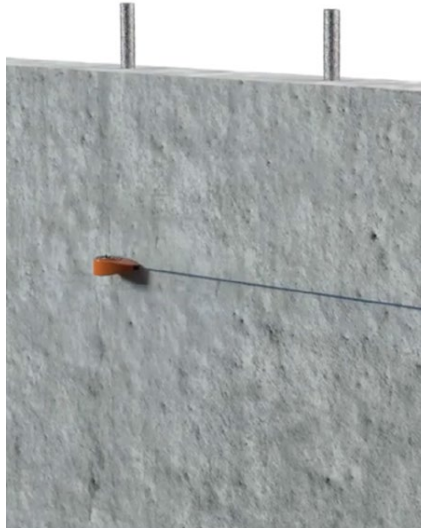
- Perimeter gravel to be placed before and after installation of DELTA®-MS
- Minimum 6" above top of footing, covering bottom of DELTA®-MS

STEP 1

For ease of installation,
work with 2 people

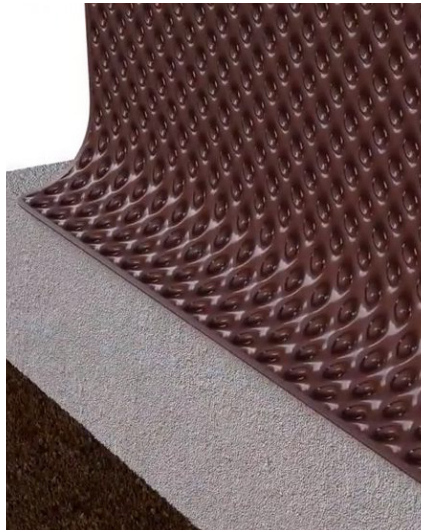
Snap a chalk line at expected
final grade line as a starting point

Clean top of footer of any gravel
and debris with broom

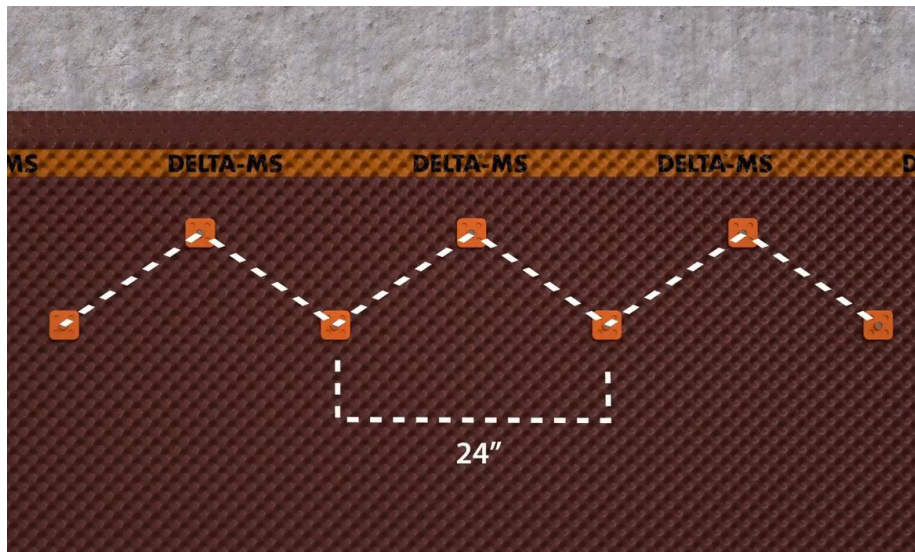


STEP 2

With flat tab lined up along
chalk line, roll out DELTA®-MS
continuously with membrane
draping over top of footing



The "flat tab" and orange
stripe should always be at the
top and facing the installer.



INSTALLATION – STEP 3

**As one person holds DELTA®-MS,
other person installs**

DELTA®-FAST'ners in body

- Always 4"–6" below orange stripe in "W" pattern
- 24" horizontally on center
- 4" to 6" vertically on center
- Second row offset 12" from first
- The sheet should fit tightly and be evenly installed over the entire wall

DELTA®-FAST'ners vs.

Single Nail Application

- They are designed to distribute the pressure of the nail across a larger area, creating a tighter and more secure hold against the foundation
- When installed in the "W" pattern as shown, the DELTA®-FAST'ners maximize load distribution, eliminating tear-down during backfill and seasonal thaw



FASTENERS FOR FOUNDATIONS OTHER THAN POURED CONCRETE

Concrete Masonry Unit Foundations (CMU)

- Depending on age of CMU foundation (for older and fragile CMU you should pre-drill and use Tapcon screws):
- DELTA®-FAST'ners
- 1¼" – 1½" concrete nails
- 1¼" – 1½" concrete anchors (i.e. Tapcon screws)
- Parge surface prior to installation of DELTA®-MS per building code requirements
- Cove at footing / first block course

Preserved Wood Foundations (PWF)

- DELTA®-FAST'ners
- 1¼" – 1½" corrosion-resistant wood screws

Insulated Concrete Form Foundations (ICF)

- Many different makes and designs of ICF
- Most ICFs have webbing, centered at intervals on blocks
- Webbing can be used as attachment points
- Install DELTA®-FAST'ners into webbing
- Spacing not to exceed 12" o/c
- Follow standard "W" fastening pattern
- Use 1¼" – 1½" corrosion-resistant screws
- Use approved caulking for ICF foundations as recommended by manufacturer



HOLDING POWER

DELTA®-FAST'ner 0.95 kN / anchor

DELTA®-PLUG 0.54 kN / anchor

Plastic Washers 0.39 kN / anchor

Testing by Sageos labs according to CCMC 07 11 19.01 (2018) Appendix C 1.1.10

WHY THE CORRECT FASTENER MATTERS

A good fastener resists tearing when all of the downward pressure from the settling soil is focused on a single nail. Since nails are one of the most expensive individual components, the DELTA®-FAST'ner was developed based on the need for better holding power. Fewer nails are required for superior hold, with the load spread amongst five dimples (four nubs, plus the center with the nail) eliminating tear-down during backfill and seasonal thaw.

Other companies allow washers to be installed on the top flat tab of their drainage boards every 6"-8". However, installers often incorrectly put them at wider intervals, causing the dimple space next to the wall to fill with dirt and stop water from draining. Some will wrongly argue this doesn't matter, as they are spraying the wall with asphaltic dampproofing behind the drainage board.

This is inadequate building practice. Firstly, one loses any capillary break with this installation method. Wet soil is directly against the wall. Secondly, liquid water can begin to pool above the accumulated debris, creating hydrostatic head. Since the spray-on asphalt is rated as dampproofing, it cannot resist hydrostatic head. This means wet concrete and capillary action. If this pool happens near a crack, which the spray-on asphalt cannot span, then you will get liquid water ingress. Otherwise known as a leak.

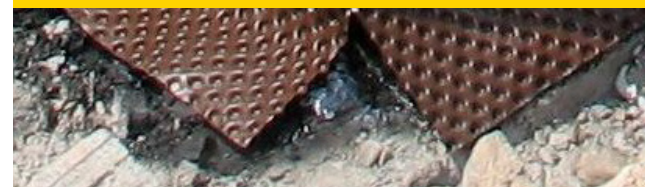
Don't make this mistake.



To avoid damage, do not install DELTA®-FAST'ners within three inches of corners.



Unlike other products, DELTA®-MS has off-set dimples to allow for tight and straight corners



Cut membrane at corners from the outside edge of the footer to wall footer junction

DEALING WITH CORNERS

OUTSIDE

- Press the membrane around the corner as tightly as possible, then anchor it in place with DELTA®-FAST'ners
- Do not install DELTA®-FAST'ners within 3" (8 cm) of outside corners to avoid damage

INSIDE

- Push the membrane into the corner, then anchor it in place with DELTA®-FAST'ners



JOINTS **AND** OVERLAPS

VERTICAL

- Overlap DELTA®-MS by 6" (15 cm)
- Apply ½" bead of DELTA®-SEALANT
- Install DELTA®-FAST'ners along length of joint at 12" (30 cm) o/c

HORIZONTAL

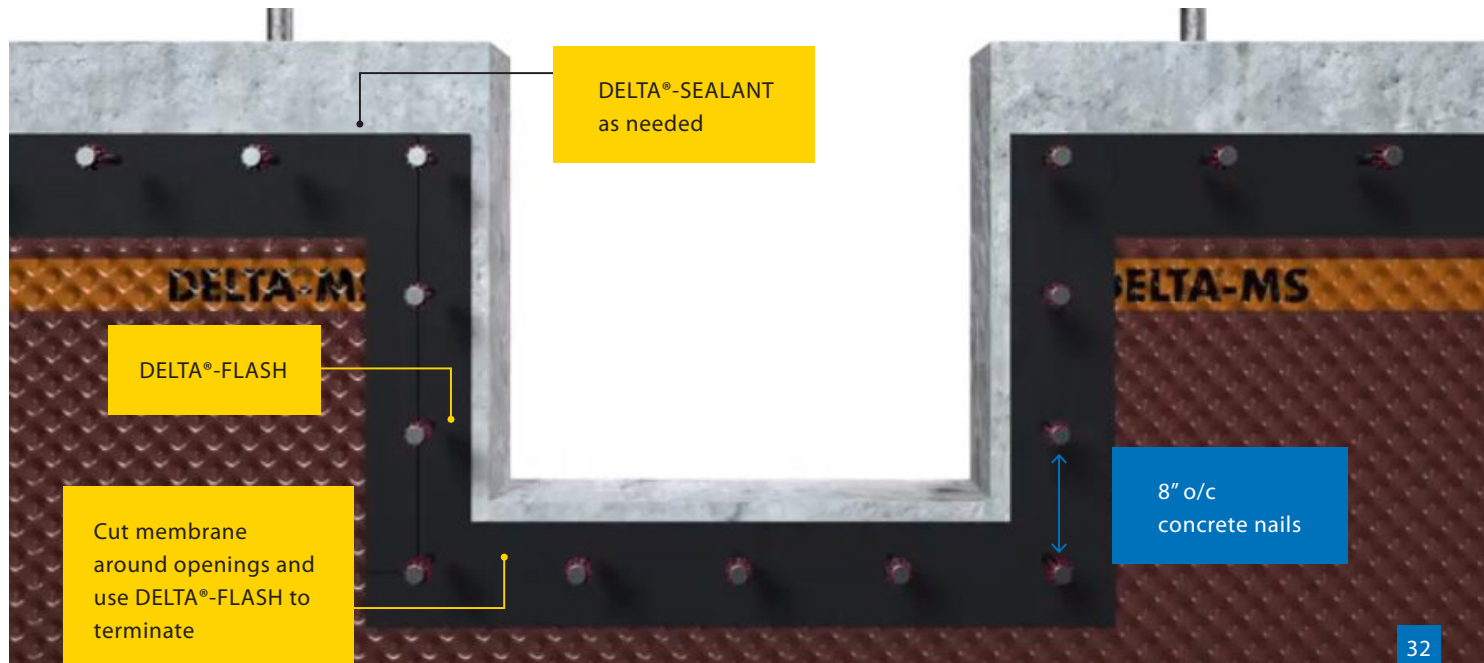
For foundations higher than roll height:

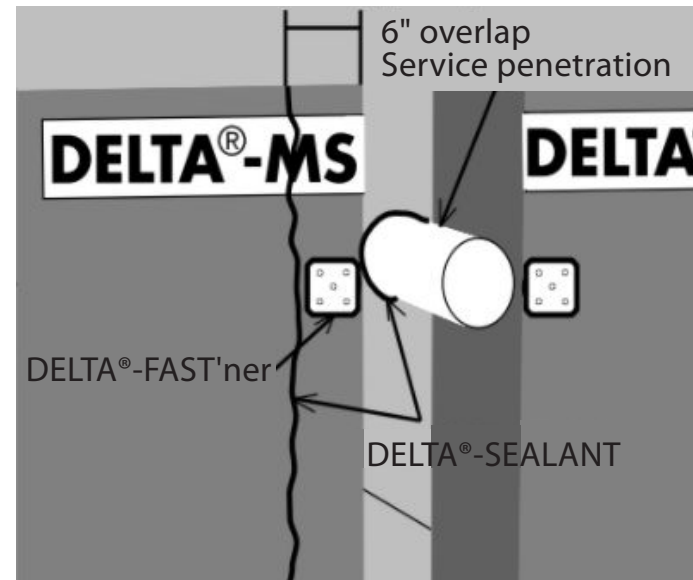
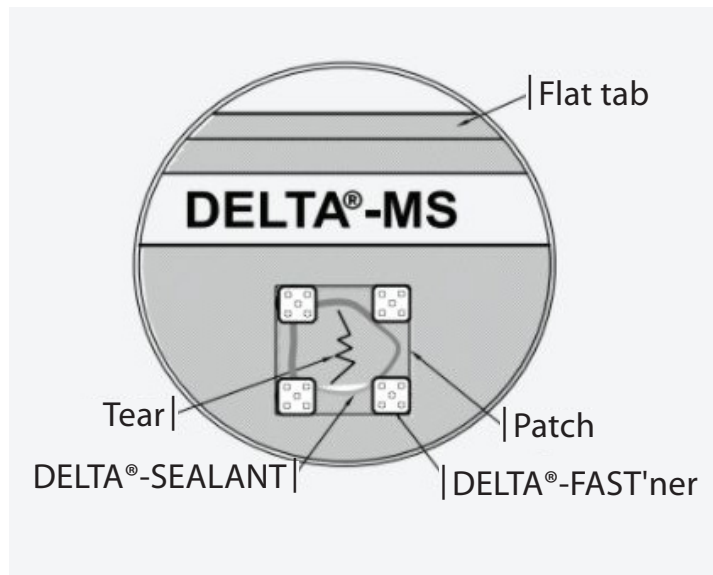
- Install first course by rolling out DELTA®-MS at bottom of wall
- Next course of DELTA®-MS shall overlap bottom layer by at least 6" (15 cm), shingled downwards
- Install DELTA®-FAST'ners along length of joints at 3' (0.9 m) o/c
- DELTA®-FLASH and DELTA®-SEALANT are not required on lower overlap



INSTALLATION – STEP 4

Install at all below-grade cuts of membrane such as at window wells, walkouts, vertical terminations, etc.





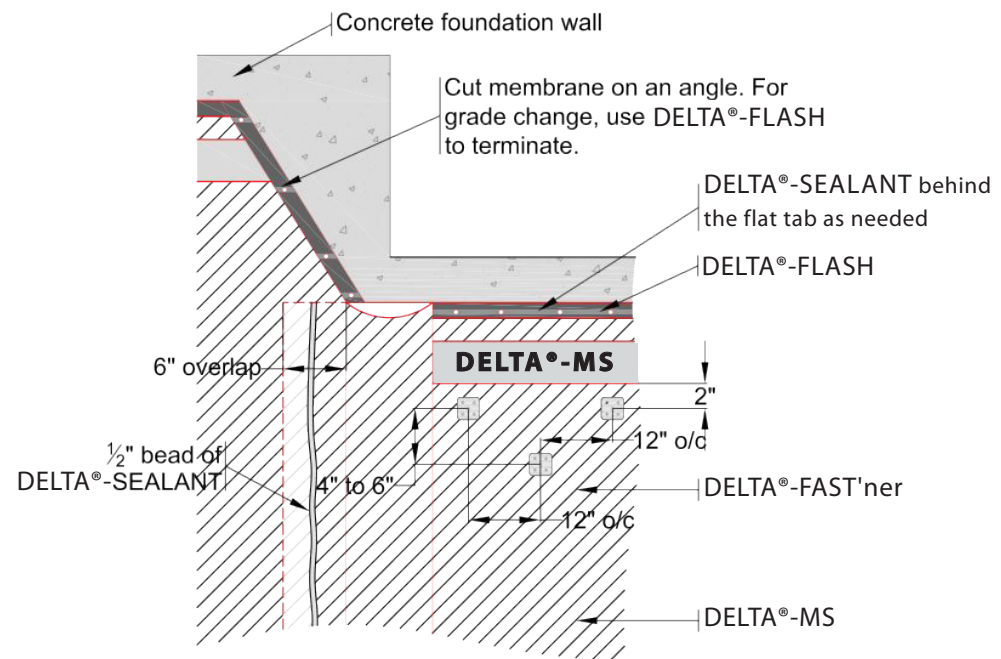
REPAIRS

- Cut patches of DELTA®-MS large enough to cover any tear.
Minimum 6" (15 cm) around damaged area
- Apply a bead of DELTA®-SEALANT around tear
- Apply patch over tear and install DELTA®-FAST'ners to hold the patch tightly
- Interlock dimples

SERVICE PENETRATIONS

- Roll DELTA®-MS flush to penetration
- Cut DELTA®-MS vertically. Fasten cut end with DELTA®-FAST'ners to keep in place 3' (0.9 m) o/c vertically
- Restart application on other side of service penetration
- Unroll enough DELTA®-MS to go around service penetration plus another 6" (15 cm) for overlap
- Cut length of unrolled portion horizontally
- Pull slit portion around penetration and trim DELTA®-MS to fit snugly
- Push cut membrane back around penetration
- Treat as standard vertical lap

SLOPED GRADES





BEST PRACTICES

- Do not expose DELTA®-MS to UV (sunlight) for more than 30 days
- Always have sufficient and functional perimeter drain
- Do not place perimeter drain on top of footing
- Do not pour floor slab level with top of footing
- Apply DELTA®-SEALANT where the space between DELTA®-FLASH and foundation wall is greater than 1/8". Best practice is to seal completely, leaving no visible gaps.

Why use DELTA®-FAST'ners?

- Multi-stud fastener fits into dimples of DELTA®-MS
- Spreads load
- Provides optimum holding power to prevent tear-down during backfilling
- Easy to handle on job site
- Designed for use with automated nailing guns (i.e. TrakFast – TF1200 or Hilti GX3)

Preventing tear-down:

- Use additional DELTA®-FAST'ners in middle of body
- When installing rolls larger than 7' (2 m) use additional DELTA®-FAST'ners in middle of body at 3' o/c
- Grading should always slope away from the foundation
- Downspouts must drain away from foundation
- Backfill in lifts when soil is frozen
- Frozen soil leaves large voids. When thawing, soil gets into dimples and pulls downward on DELTA®-MS

INSTALLATION CHECKLIST

Excavation

- Safely accessible
- Sloped properly (shored)
- Clean of debris
- Free of water, ice, snow
- Communicate deficiencies to site super

Footings

- Forms removed
- Perimeter drain installed
- Gravel installed at footing

Foundation

- Forms removed
- Form ties removed and sealed
- Honeycombing repaired and sealed
- Cracks/defects repaired
- Grade line marked by site super
- CMU (concrete block) wall parged

Installation Inspection

- Inspect for deficiencies
- Repair any deficiencies
- Proper fastening pattern
- DELTA®-SEALANT applied as required
- DELTA®-MOLD STRIP and/or DELTA®-FLASH used where required
- Window openings detailed properly
- Vertical terminations sealed/flushed/overlapped as required

Clean up

- Remove excess material and recycle where facilities allow
- Collect tools from excavation
- Final job inspection with site super
- Obtain completion slip (where applicable)

Backfill

- Take care when backfilling

Certified-Installer Program

DELTA®-MS is supported by an extensive certified-installer program. This certification provides the confidence, reliability, and trust to ensure materials are properly applied, and buildings are properly protected. The certified-installer program allows builders and contractors to provide customers a 5-year leak-proof warranty and 10-year material warranty.



CASE **STUDY**





BILL HOFFMAN ELITE NATIONAL WATER MANAGEMENT

Bill Hoffman has spent over 20 years in the business of foundation moisture protection in the mid-Atlantic region of the United States. Starting out as a salesman, he grew his career and eventually purchased the company for which he worked. Now, Bill is leading the way for a paradigm shift in the basement business. His company, Elite National Water Management, LLC (operating as National/American Water Management), protects over 2,000 foundations a year for the biggest builders in the United States.

Minimum code is minimum value.

The 1990s were a build-to-code-only market. Builders' top concerns were to save time and money. And when it came to foundation protection, most builders were dampproofing either by spray or roller. This coating may repel some moisture, but not bulk water.

As Bill and his sales team continued to gain experience with the builder market, a need for better basement protection became evident. At that time, Bill's company installed polymer-modified asphalt spray emulsions that were code approved for waterproofing. Despite the expert experience of his crew, the spray emulsions revealed limitations. When Bill asked for manufacturer warranty support, it was hard to come by. In fact, Bill's company was audited by the manufacturer because they believed his applicators must be applying the spray incorrectly. After the audit, however, it was proven that application was not the problem.



Any poured concrete or block foundation can develop cracks as the house settles, typically from 1/16 to 1/4 of an inch wide. A spray emulsion product may bridge small cracks up to 1/16 of an inch. With cracks greater than that, the cured spray emulsion cannot bridge the space, so the foundation leaks. This leads to moisture behind drywall, wet carpets, mold, mildew, and all sorts of unpleasant situations for the homeowner. Bill was getting dozens and dozens of call-backs a year due to leaky sprayed foundations. Many of these issues resulted in back charges and very unpleasant conversations with builders and homeowners.

Modern homeowners are using their basements as an extended part of their daily living spaces. They have workout rooms, studios, bedrooms, and even home theaters in what was once often viewed as a dark and dingy place. To protect the homeowner's basement, along with his own reputation, Bill's goal became to convert builders from minimum to high-performance moisture protection by using a dimpled membrane system in place of the spray emulsion.

Bill says that switching to the dimpled membrane system took the crack issue out of the equation and made sure that homeowners don't have leaks. Elite National Water Management now consistently approaches builders to present the dimpled membrane system as a better option, and the prevalence of giving homeowners the most reliable moisture protection system is seeing a steady rise in the building industry.



Today, they don't worry about call-backs.

Instead, Bill gets calls asking what he is using and how to get it. His choice is DELTA®-MS by Dörken, a dimpled air-gap membrane. Bill says it is designed for high-performance moisture protection, and he sells it as an upgrade over spray emulsion. Elite National Water Management has adopted a category shift to the DELTA®-MS dimpled membrane and has seen a huge amount of success. Bill says he can tell a homeowner that if Elite National Water Management is protecting their basement from water, they will not have moisture issues.

“ WE DIDN'T WANT THE BUILDERS WE INSTALL FOR
TO BE KNOWN AS THE ONES WITH LEAKY BASEMENTS. ”

Bill Hoffman, President, Elite National Water Management

A Top-5 construction technique to change everything.

Elite National Water Management is finding ways every day to improve its schedules. By using DELTA®-MS dimpled membrane, the company is saving costs and finding schedule efficiencies for the short and long term with its clients. Bill says he saves thousands of dollars on out-of-pocket labor and materials costs because of fewer call-backs and warranty issues. Moreover, builders save countless dollars by adhering to their construction schedules and keeping homeowners happy and loyal customers.

CONCLUSION

Experienced home builders understand how much work goes into building a good reputation, getting referrals, and growing their business. They also know just how quickly a bad experience for the homeowner can undo all of that hard work.

Quality homebuilding begins and ends with applying the best products and building practices right from the start. Below-grade moisture management is your first step in making a lasting impression, keeping your reputation and your homes going strong.

For more information and tips for creating an interior drainage solution, visit dorken.com.



ABOUT **DÖRKEN** SYSTEMS INC.

Dörken is the North American division of Ewald Dörken AG in Germany. Ewald Dörken AG has been in business since 1892, longer than almost any building materials company.

For more than 125 years, Dörken has been delivering innovative, high-performance air and moisture barriers for both commercial and residential construction, protecting all types of buildings from around the world in the most extreme weather conditions.



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