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A Guide to a Dry Basement

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# BASEMENT CONSTRUCTION

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THERE ARE BASICALLY THREE TYPES OF BASEMENT CONSTRUCTION:

## POURED CONCRETE & CONCRETE BLOCK

### ***Slab Concrete***



Poured concrete basement foundations set upon a wide concrete footer. The walls of the basement are all poured at one time inside either wood or metal forms.

The metal forms may have designs imprinted on the inside of them. These designs are then transferred to the concrete as it sets up and cures. The designs can resemble any number of shapes from brick to stone. Metal rebar is configured inside the forms before the concrete is poured for added strength to the solid wall. Although the cost of poured concrete is more expensive than block foundations, the overall strength is greater.

### ***Standard Block***



Concrete block basements, like poured concrete, must be laid upon a solid concrete footer. The block is stacked and held together with a Portland cement mortar mix. Sometimes the cavities of the block are filled with solid concrete after metal rebar rods are placed inside the cavities. This adds strength to the block wall. The advantage of a block basement over solid concrete is the lower overall cost in construction.

Once the walls have been constructed, gravel is dumped into the interior of the basement, and a 4"- 6" slab is poured over the gravel. This slab is the basement floor.

### ***Monolithic Pour***



Most basements are constructed on concrete footers, but some basements are built with monolithic slab. Instead of concrete footers, a thick floor slab is poured, then the foundation walls are built on top of the slab.

## WHY DO BASEMENTS LEAK?

Every basement will eventually leak. Let's take a look at some of the most common reasons.

### **Hydrostatic Pressure**

Exterior drain tile will eventually become clogged with sediment and dirt. Even if the pipe is clear, the small holes or slits that allow water to enter the pipe will clog. This allows a water table to rise around the house creating hydrostatic pressure.

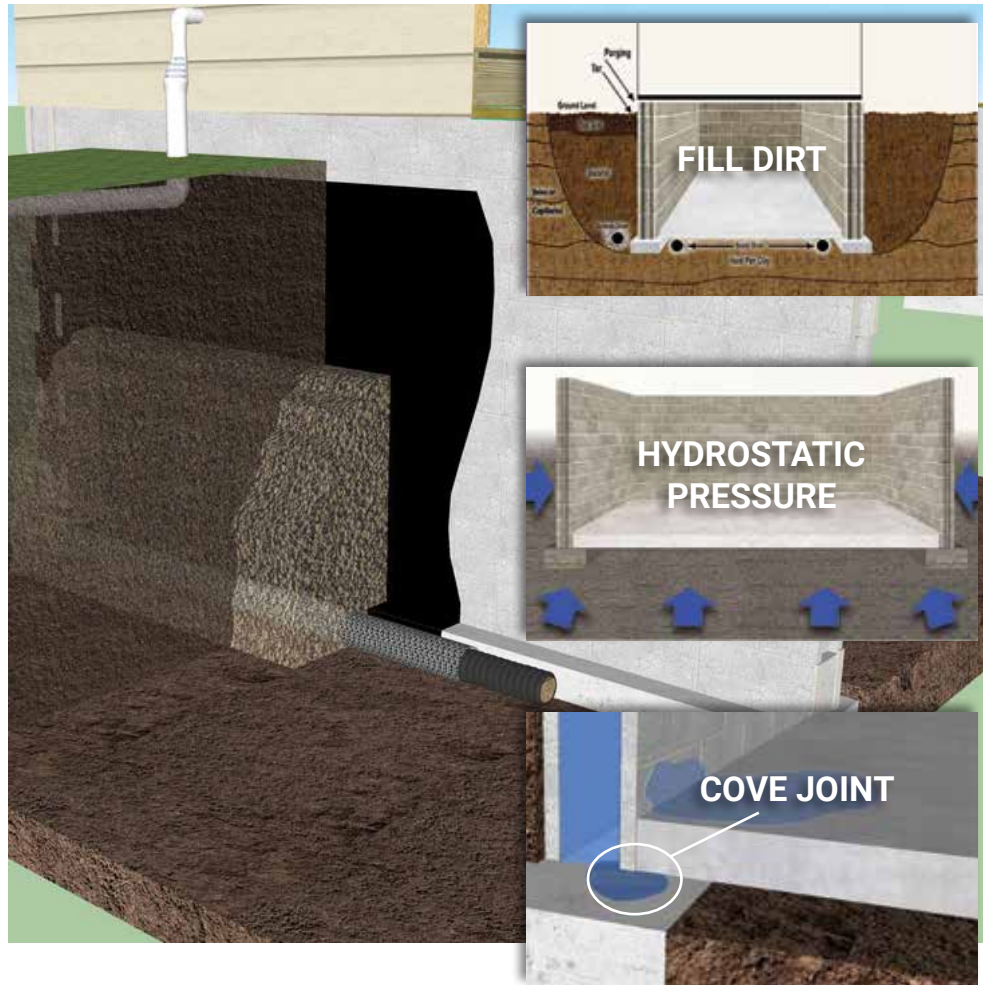
Once the water is at a level above your basement's lowest point, hydrostatic pressure is constantly applied to your foundation walls and floor. The water will find the path of least resistance in order to find its level.

### **Cove Joint**

The cove joint (where the footer, wall, and floor meet) is the most common area to leak because it is the weakest point in the foundation.

### **Fill Dirt**

The fill dirt around your house is less dense than the original soils that have not been disturbed. Settlement of the fill dirt can continue for 7 to 10 years. Combined with seasonal expansion and contraction, it will put much pressure on your foundation walls.



Water that flows and settles around your house in the fill dirt decomposes the lime in your concrete or concrete block and mortar joints. Concrete and concrete blocks are made of sand, stone and lime (lime is the bonding agent in the formula).

Exterior waterproofing treatments deteriorate over time as they are subjected to hydrostatic pressure and freeze/thaw cycles. Once this occurs, the water starts seeping through the porous concrete walls creating leaks and possible structural damage.

# HOW DO INTERIOR DRAINAGE SYSTEMS WORK?

THE GOAL IS TO CAPTURE THE INTRUDING WATER AND RELIEVE HYDROSTATIC PRESSURE

## BEFORE

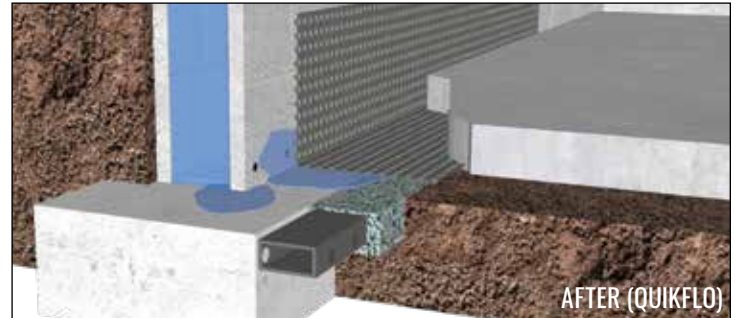
Rain and groundwater push against foundation walls, causing hydrostatic pressure. Porous block and cement can take on water if the exterior drainage is blocked. Water will eventually find its level, often at the cove joint, causing a basement to leak.



Based on the how your structure was built and the water intrusion points, there are generally 2 different systems to choose from. Upon inspection, our specialist will recommend the best solution for your home.



On the Footer: **TopDrain** is designed to sit on top of the footer and is the premiere choice for solving cove joint seepage.



Next to the Footer: **QuikFlo** is also designed to capture water intrusion through cove joints, but it is the go-to solution for structures showing signs of significant hydrostatic pressure.

# WHERE DOES THE WATER GO?

## GROUNDWATER COLLECTION AND REMOVAL

Each drainage system is designed to collect and direct water into a sump basin, typically placed in the corner of the basement floor. When the water reaches a certain level, a sump pump will pump the water up and out of the house.

The discharge line typically is a 1 1/2" PVC pipe that opens up to a 4" pipe. This drainage pipe carries the water away from the foundation and can sometimes be tied into a city's storm sewer line.



# SIX COMPONENTS OF A WATERPROOFING SYSTEM



## DRAINAGE

Drainage products are placed under the floor in the basement to collect and discharge all storm water from the basement. It is very important that the drain system can accommodate a high volume of water. An undersized drain system won't be able to handle the demand during heavy rainfall and flooding will occur.



## DIVERTERS

Diverters establish and maintain open water pathways to direct any and all water into a drainage system. Diverter products relieve hydrostatic pressure by facilitating water flow and removing resistance. Waterproofing systems without diverters are easily overwhelmed when heavy rainfall occurs.



## MOISTURE BARRIERS

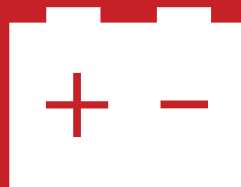
Moisture barriers are non-porous products applied to the interior of the foundation. All moisture and vapor is prevented from entering the interior of the basement. A basement that is waterproofed without moisture barriers will continue to have moisture and dampness on the interior walls.

There are six critical components of a complete waterproofing solution. If any one of the components is eliminated, the chances of system failure and potential flooding greatly increases.



## **SUMP PUMPS**

All water must be properly discharged from the drain system. A pumping system is installed to remove all collected water from the structure. It is important to have a pump that is capable of removing the volume of water collected by the system. If a sump pump cannot meet the demands of the system, basement flooding occurs.



## **BACK-UP PUMPS**

A backup system takes over pumping duties whenever power service is disrupted. Without a backup system, flooding will occur when power to the home is disrupted. A proper backup system will maintain the required pumping capacity of the system until power is restored.



## **STRUCTURAL REPAIR**

The foundation walls must be inspected for any damage caused by hydrostatic pressure. If there is damage, the integrity of the entire foundation could be at risk. By permanently repairing any damage, the foundation will remain structurally sound.

# INTERIOR DRAINAGE SYSTEMS

## INSTALLED ON TOP OF OR NEXT TO THE FOOTER

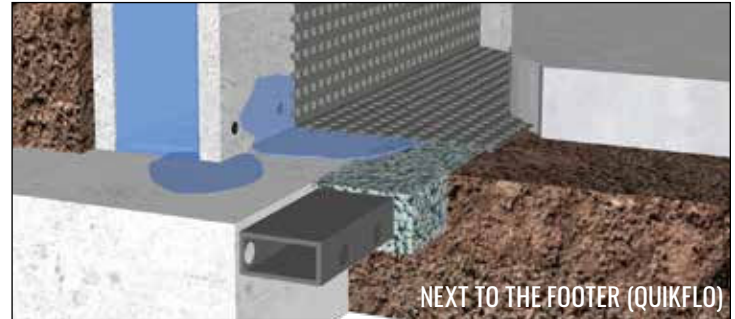


TopDrain is a revolutionary on-footer French drain system for interior basement waterproofing. Its rear angle leaves space for non-removable dirt or debris that rests against the wall.

The top of the pipe is sloped downward, which allows for a thicker concrete floor that better disperses weight and reduces cracking.

TopDrain features a 4" flange that extends up the wall, acting as a built-in diverter. This flange helps direct water down from the weep holes into the pipe and away from the foundation.

The angle at the top of the flange and the notched ridge below keep the drain away from the wall and help water flow freely into the pipe.



QuikFlo is an advanced water drainage product designed specifically for interior foundation waterproofing. Utilizing air space, QuikFlo eliminates the need for gravel, installs faster and drains more water than standard pipe and gravel (you can still use gravel with this product).

QuikFlo is installed in a shallow trench alongside the footer. It also has a higher flow capacity than 4" corrugated or PVC pipe and oversized water inlets eliminate clogging.

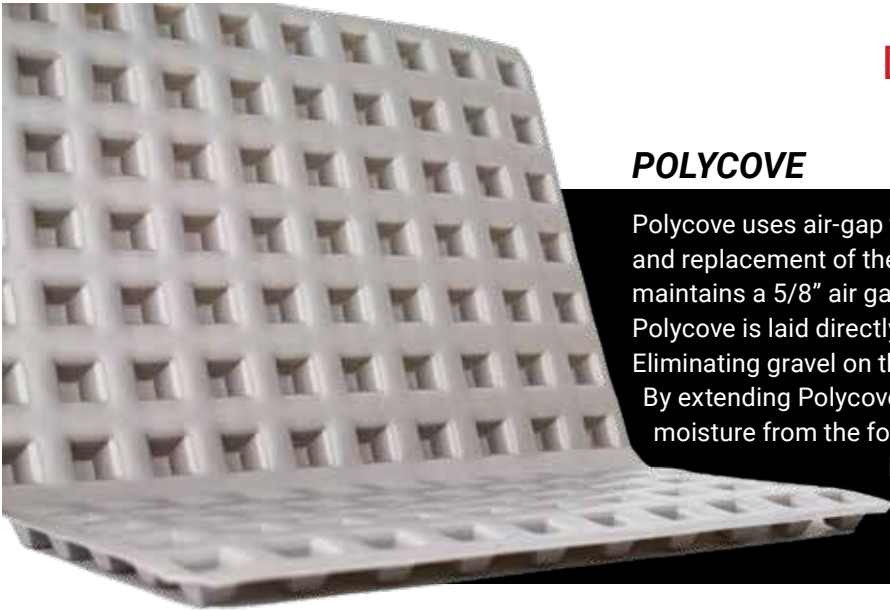
QuikFlo can be installed horizontally (2" tall) or vertically (4" tall) alongside the footer.





# DIVERTERS

## DIRECT WATER INTO THE DRAINAGE SYSTEM



### **POLYCOVE**

Polycover uses air-gap technology to significantly increase water drainage and replacement of the foundation floor at the original thickness. Polycover maintains a 5/8" air gap between the footer and the replacement slab. Polycover is laid directly onto the footer and extends over the drain system. Eliminating gravel on the footer boosts water flow by removing resistance. By extending Polycover up the wall, the weep holes are protected and any moisture from the foundation wall is channeled into the drainage system.

Polycover is made from Ultra-High Molecular Weight (UHMW) thermoplastic, and can be bent and folded as needed with no cracking.

### **CHANNEL COVE**

Channel-Cove is a seamless water diverter that gets the water where you want it! Fluted channels collect water from the wall and weep holes and directs it under the floor into any sub-floor drain system. The smooth white facing is attractive and can be trimmed with Channel-Cove cap molding for a professional finish.

#### **AVAILABLE IN GRAY OR WHITE**

- Tough high molecular weight material
- Pre-scored for 10" x 5" angle
- 250 ft. of seamless product per roll
- Easy installation



Close-up of Channel-Cove's drain channels

# SELECTING THE WALL BARRIER

## VAPOR AND MOISTURE BARRIERS



### **FLEXI-SEAL**

Flexi-Seal is a fiber-reinforced flexible membrane used to create a continuous, permanent barrier from external moisture and earth gases in basements.

Flexi-Seal resists tears and stands up to abuse. It transforms a dirty, damp basement into a clean, dry storage space. Flexi-Seal is strong and durable enough to be walked on. Flexi-Seal also exceeds all ASTM E-1745 requirements for a vapor and moisture barrier.



### **DURAWALL, SAFEWALL & DRAINWALL**

Durawall and Safewall are non-permeable moisture and vapor barrier panels that are permanently installed to the foundation walls. Moisture entering the foundation is directed down the wall and into any subfloor or surface drainage system, keeping the basement interior dry.

Drainwall improves upon the smooth-back design of Durawall and Safewall by adding small bubbles that channel the water down the wall and into the drain. Drainwall essentially is a cove diverter that runs the whole height of the wall.



BEFORE



AFTER

# SUMP PUMP SYSTEMS

THE HEART OF YOUR WATERPROOFING SYSTEM



## 3/4 HP PITBOSS

The 3/4 horsepower PitBoss Stainless Steel Sump Pump is one of the most popular on the market. Capable of moving up to 3480 gallons of water per hour, this pump is designed to handle whatever mother nature throws at it.

Features an energy-efficient 5 amp motor, top suction design to prevent air-locking, heavy duty switch tested to 1,000,000 cycles and a 5-Year Warranty.



## 3/4 HP PITBOSS COMBO

The PitBoss 3/4 horsepower pump features submersible, cast-iron and stainless steel construction, along with an energy efficient 5 amp motor. The top suction design eliminates clogging and air-locking.

The PitBoss pumps 3480 gallons per hour at a 10' lift, is assembled in the USA and includes a 5 Year Warranty

The optional battery backup system has the highest output backup pump available. The battery backup also automatically self tests weekly, so you'll always know the status of your system.



## PITBOSS+ WIFI MONITORING SYSTEM

The PitBoss+ is the ultimate in basement security. It includes the Pitboss 3/4 horsepower primary pump, PitBoss+ backup pump and free 24/7 monitoring service.

PitBoss+ automatically monitors and tests your primary sump pump, backup sump pump and battery status. If an issue is detected, PitBoss+ sends updates and alerts to your smart phone, tablet or computer, allowing you to take action before flooding can occur. You'll always be able to check on your system, anytime and from anywhere.

# STRUCTURAL REPAIR SYSTEMS

## WALL REPAIR WITHOUT EXCAVATION

### STABILIZER STEEL REINFORCEMENT

A pre-engineered, effective and permanent solution that restores structural integrity to a foundation wall utilizing top and bottom brackets, a slab spike and a steel beam. Bowed, sheared and tipped walls can be quickly repaired and restored with just one product. No outdoor excavation required.

BEFORE

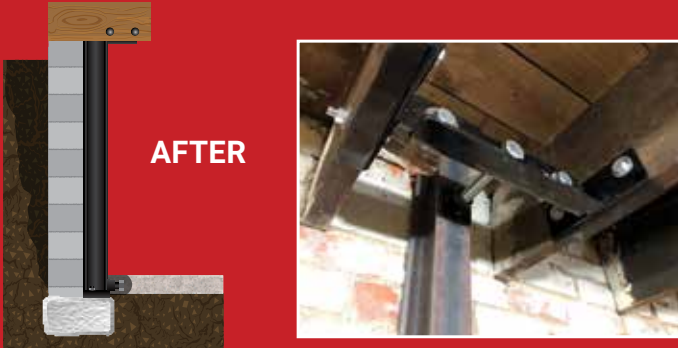


Tipped Wall

Bowed Wall

Sheared Wall

AFTER



### CARBON FIBER SYSTEM

Offers secure, permanent wall repair against tipping, shearing, and bowing. Industrial grade epoxy provides more strength than other carbon fiber products.

- Largest surface area coverage on the market
- Lifetime Warranty
- Made in the USA



### WALL CRACK INJECTION

Permanently and immediately stops actively leaking cracks.

- Quickly expands 400% to 600% and cures to form a flexible gasket in voids
- Solvent-free and non-corrosive
- Excellent bonding capabilities
- Withstands shifting as a result of thermal cycles





MODEL #E100

**Energy Efficient | Expanded Capacity | Ease of Install**

- Smaller, quieter and more effective dehumidification than competitive products
- We offer models that range in water removal from 70 - 130 pints per day (PPD) depending on your needs.
- Stationary models can be hung from the joists with a hanging kit (sold separately).
- Dehumidifiers can also be incorporated into the ductwork, and the E100 series can be configured to bring fresh outdoor air into the living space.
- Quiet running
- Easy to operate digital control
- Designed, tested and assembled in the USA
- World Class Tech Support and Customer Service

# DEHUMIDIFICATION

CONDITION THE AIR IN YOUR SPACE



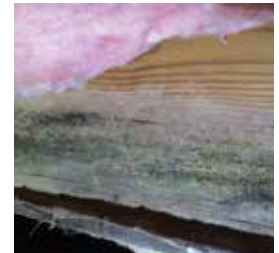
## Why Add a Dehumidifier?

After waterproofing a basement, prevent moisture in all of its forms with a high-capacity dehumidifier. High relative humidity leads to odors, structural damage and mold in basements—many of the same issues as water intrusion.

A dehumidifier is recommended for a complete job. Protect your home and increase your peace-of-mind by installing a high-capacity dehumidifier from Aprilaire.

## MOLD REMEDIATION

Have your basement or crawlspace inspected for moisture damage and install a dehumidifier to inhibit structural damage and prevent mold growth in the future.



# INSTALLATION OPTIONS

## BASEMENT WATERPROOFING SOLUTIONS

### Standard System



**Barrier:** NONE  
**Diverter:** Polycove  
**Drain:** QuikFlo  
**Sump Pump:** PitBoss  
**Backup Pump:** None

Notes:

### Premium System



**Barrier:** NONE  
**Diverter:** Polycove  
**Drain:** QuikFlo  
**Sump Pump:** PitBoss  
**Backup Pump:** PitBoss+

Notes:

### Platinum System



**Barrier:** Safewall  
**Diverter:** Polycove  
**Drain:** QuikFlo  
**Sump Pump:** PitBoss  
**Backup Pump:** PitBoss+

Notes:

# INSTALLATION OPTIONS

## CRAWLSPACE ENCAPSULATION SOLUTIONS

### Standard System



**Barrier:** Flexi-Seal  
**Diverter:** NONE  
**Drain:** NONE  
**Sump Pump:** NONE  
**Backup Pump:** NONE  
**Dehumidifier:** AprilAire

Notes:

### Premium System



**Barrier:** Flexi-Seal  
**Diverter:** Polycove  
**Drain:** QuikFlo  
**Sump Pump:** PitBoss  
**Backup Pump:** NONE  
**Dehumidifier:** AprilAire

Notes:

### Platinum System



**Barrier:** Flexi-Seal  
**Diverter:** Polycove  
**Drain:** QuikFlo  
**Sump Pump:** PitBoss  
**Backup Pump:** PitBoss+  
**Dehumidifier:** AprilAire

Notes:



***Thank You For Your Business!***