

**FORM-A-DRAIN®**

**CONTRACTOR HANDBOOK**



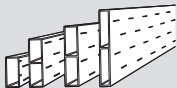








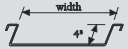
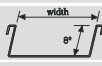

**FASTER, BETTER, SMARTER  
BUILDING SOLUTIONS**

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# FORM-A-DRAIN®

ACTUAL SIZE		PART #
<b>LINEALS</b>		
	4" x 12'	LN124
	6" x 12'	LN126P
	8" x 12'	LN128P
	10" x 12'	LN1210P
<b>FITTINGS</b>		
Coupling (extruded) 	4"	XCPL4
	6"	XCPL6
	8"	XCPL8
	10"	XCPL10
Coupling with Hole (molded) 	6"	COUP6
	8"	COUP8
	10"	COUP10
90° Corner (molded) 	4"	CN904
	6"	CN906
	8"	CN908
	10"	CN9010
45° Corner 	4"	CN454
	6"	CN456
	8"	CN458
	10"	CN4510
4" Outlet 	4"	OUT44
	6"	OUT46
	8"	OUT48
	10"	OUT410
4" Double Outlet 	6"	DOF46
	8"	DOF48
	10"	DOF410
Vertical 90° L 	4"	VL904
	6"	VL906
	8"	VL908
	10"	VL9010
<b>ACCESSORIES</b>		
Grade Stake 	18"	GS018
	30"	GS030
Space Strap For 4", 6", 8" 	4"d x 16"w	SS416
	4"d x 20"w	SS420
	4"d x 24"w	SS424
Space Strap For 10" 	4"d x 20"w	SS820
	4"d x 24"w	SS824
Snap-in Adapter 	4" fits all	AD004

The properties, dimensions, and weights of lineals and fittings listed here are subject to normal manufacturing tolerances. This information is supplied for user reference only and is subject to change without notice.

# RECEIVING, HANDLING & STORING

## Inspection

All shipments from our plant must be inspected as soon as possible after arrival. All of our lineal products are shipped in bulk quantities. Extremely rough handling en route may cause damage. Begin by making an overall inspection of the load. Visual inspection should indicate any apparent damage to the product. DO NOT discard any damaged material. Set this material aside and submit claims for any damage directly to the trucking company. Make a thorough check to ensure every item on the packing list is received. Any shortage must be shown on the signed receipt. Each bunk or carton is marked to indicate the footage, size, and type of product, making it easy to check a mixed load. DO NOT throw cartons off the truck; handle all material carefully at all times.

## Unloading - Full Truckloads

FAD is designed to withstand normal field conditions, but could be damaged by careless handling. Lineals can be easily unloaded in full bunks using mechanical equipment. Unload only one bunk at a time. Unloading in full bunks is the preferred method since it minimizes potential damage.

## Storage

Store lineals on a flat surface and always in a horizontal position. If product is to be stored for a prolonged period, it is recommended that it be left in the original bunk packaging. If product is stored outside, it must be covered with an opaque material for protection from the sun's rays, with adequate provision for air circulation. Product must be stored away from excessive heat, because PVC material can be temperature sensitive. Complete bunks of lineals must be stored in the horizontal or flat direction, with slotted side down and width equally spaced supports in at least three places along the 12' length. At the job site, individual pieces must be placed on a flat surface, out of direct sunlight.



## Exposure to Excessive Heat

Fittings are provided in cartons that shield the product from direct sunlight. Should fittings be subjected to moderate heat, a slight concave (inward) hourglass effect may occur. This does not affect product performance in any way. In the case of both lineals and fittings, it is important to avoid storing in a high heat environment. Temperatures above 150° - 160°F will result in permanent distortion.

## CONSTRUCTION FOOTING FORM/DRAINAGE

*Note: Refer to local building codes/standards regarding construction regulations pertaining to excavation, footing construction practices and foundation drainage requirements.*

### Rough Layout

Begin with the rough layout of the required number of standard 12' lineals, couplings, 90° corners, 45° corners, drain outlets and other necessary accessory parts.

### Cutting

Cut lineals to the required length using a hand or power saw. Do not pre-plan or pre-cut lengths. Simply cut to length when required and use remaining piece as the next piece to be installed. This approach will help minimize waste by ensuring that numerous short pieces are not left over. At a corner, cut lineal to required length insert into corner and start around the corner with the piece just cut off. Square cuts help ensure proper alignment into couplings, corners, and other accessories.



HAND SAW



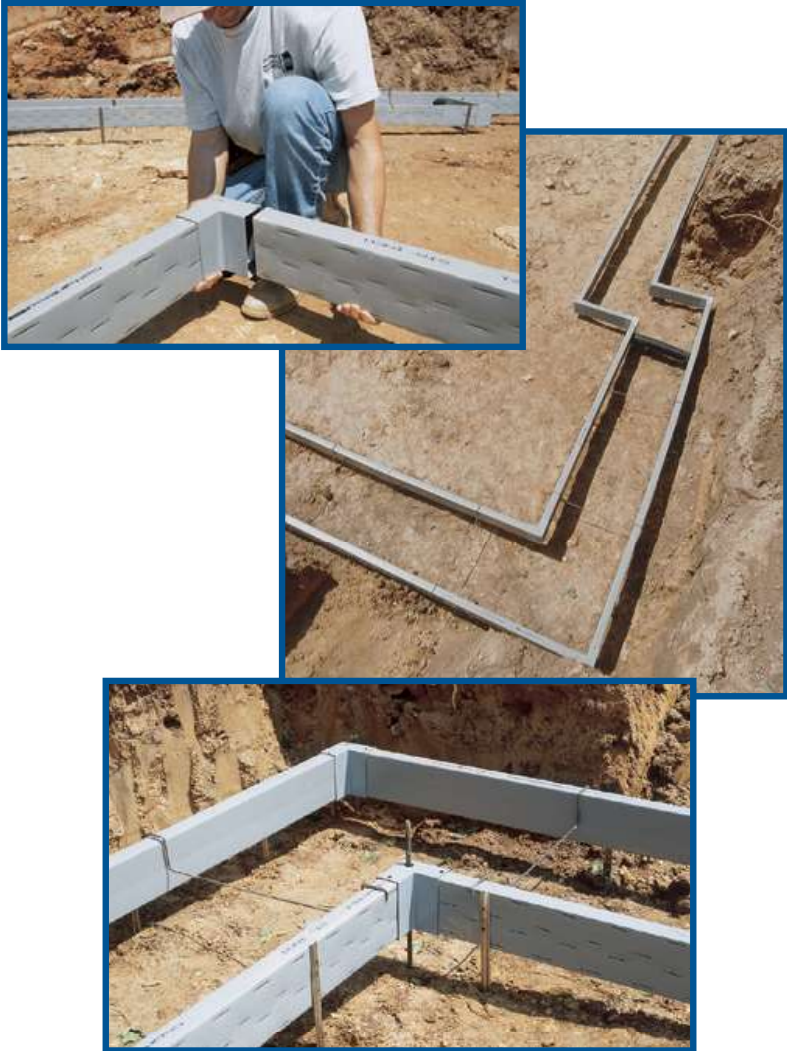
CIRCULAR SAW



RECIPROCATING SAW

## Assembly

Insert lineals into couplings, corners, or outlets to construct each side of the footing form. Slotted side of the lineal faces away from the concrete. Accessory items are manufactured to ensure a snug fit, so lubricant or solvent cement is not necessary. Space straps may be used to ensure proper footing width. Pin the corners in place during set-up by driving a rebar stake into the ground through the holes in the corners. This will keep the system aligned and make set-up easier.





## Leveling

Leveling can begin during or upon completion of the assembly of the footing form, using grade stakes (GS018, GS030), steel forming pins or wood stakes. Elevate lineals slightly above the desired elevation level when fastening lineals to stakes or pins; once fastening is complete, tap the forms back down to the desired level. To fasten grade stakes, place stake against outer (slotted) side of lineal and drill drywall screw through hole in stake directly into lineal. Wood stakes can be secured using nails. To do so, place the wood stake against the outer side of the lineal and drive nail from inner (non-slotted) side of lineal into stake; this allows for easy removal. If using forming pins, which are pulled after footing is poured, small, fine-thread drywall screws (instead of coarse thread or bugle screws) are recommended for fastening. Drywall screws “take” into the lineals better, and simplify pin removal.

TIP: It's not necessary to back out drywall screws when pins are pulled. A sharp rap downward and outward on the pin will snap off the screw head.



GRADE STAKE



WOOD STAKE



FORMING PIN

## Reinforcing

After leveling, use grade stakes between leveling points to reinforce forms. To minimize bowing from the lateral force of the concrete pour, stake at recommended distances of 3' -5' for 4", 6", and 8" lineals, and at a maximum of 3' for 10" lineals. Place stakes on the outer (slotted) sides of the forms, or use rebar stakes, as required, through holes in coupling/ corner pieces. Drive stakes into ground for lateral reinforcement.



## Spacer Straps

Use of spacer straps are available in 16", 20", and 24" widths. Straps speed up the setting of forms. Spacer straps can be removed prior to concrete pour for re-use.



## Change in Elevation

Should there be a requirement for changes in elevation within the foundation plans, FAD is fully adaptable through the use of vertical 90° L fittings. The flow of drainage remains continuous throughout the system.





## Drainage

Drainage outlets can be created in two ways:

1. Outlet fittings - Use when the outlets are located at transition point between lineals.

2. Outlet adapters (AD004)  
Use when the outlet must be positioned somewhere along the length of the lineal, rather than at a transition point. Install with outlet positioned at a bottom of lineal, by cutting a hole in the lineal using a 3-1/2" standard hole saw with a pilot bit and insert adapter.



OUTLET ADAPTER

Crossovers connecting inner and outer lineals to facilitate drainage can be made by connecting outlet fittings or adapters with corrugated pipe. Another option is to use 2", 3", or 4" PVC pipe: Cut the correct size holes in the lineals, and cut the ends of the connecting pipe at an angle to keep pipe ends from blocking flow into lineals after pipe is inserted. Drainage disposal must comply with local codes and practices. (See "Form-A-Drain Plus Inspector Guide" for more detailed information.)



PVC PIPE/DRILLED HOLES



CORRUGATED PIPE/OUTLETS

## Concrete Pour & Screeding

Proceed with the concrete pour, filling the footing form with concrete. Screenshot the top of the lineals upon completion. The system is left permanently in place to act as the foundation drainage and radon reduction system. **DO NOT REMOVE FORM-A-DRAIN PLUS!**

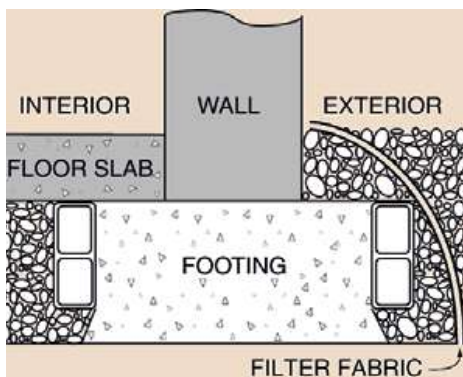


**TIP:** To make sure lineals stay tight against the footing after the concrete pour and prior to backfilling, drywall screws can be used as anchors. Simply screw them partially into the inner (unslotted) surface of the lineals at regular intervals prior to the concrete pour.



## Stone

Place stone in the same manner as current practice. In some cases, putting stone in place prior to the concrete pour can hold the Form-A-Drain Plus system in place. Separate filter fabric must be installed as required by code. Partially backfill outside of footing with appropriate stone, apply geotextile or filter fabric as illustrated (right) and complete backfilling with stone.



# ALTERNATIVE FORM METHODS

FAD can accommodate various footing depths. Proceed as current practice or code in your area dictates for wood or metal forms. Following are suggestions for installation. For maximum drainage, FAD should be installed on both sides of the footing.

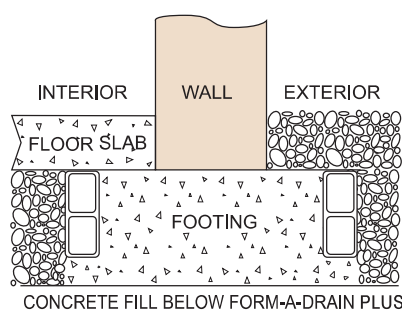
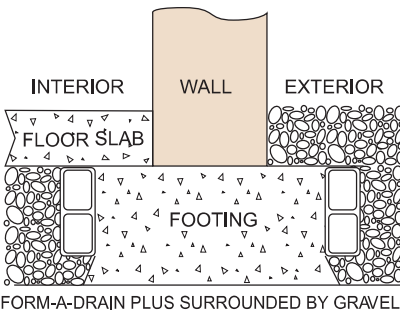
## One-sided Forming

Either the inside or outside FAD lineal may be replaced by a form for one-sided drainage. Form can be wood, metal, plastic, composite, etc.

## Two-sided Forming

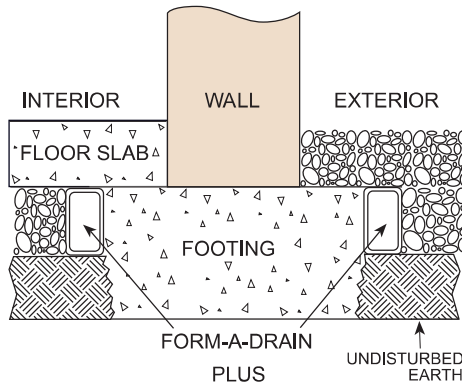
### Raised/Elevated-FAD: Low-Slump-Concrete

Depending on the footing depth required, raise the top of the lineal to meet the top elevation of the footing. For example, if 8" lineals are being used to form a 10" footing, there would have to be 2" of space between the bottom of the lineal and the excavated ground (which would be filled in with gravel or concrete). Likewise, 6" lineals may be used to form 8" footings, or 4" lineals may be used to form 6" or 8" footings.



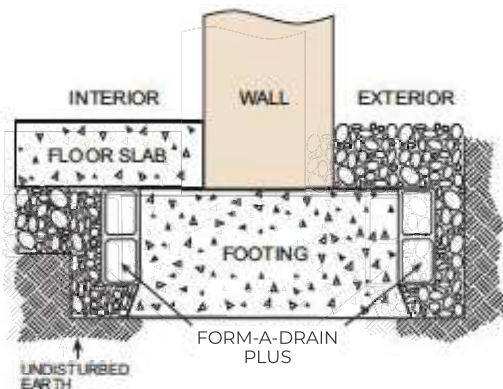
## Combination FAD with Earth or Trench Forming

This method involves using both lineals and undisturbed earth to form the required footing depth. For example, 4" lineals may be used to form an 8" footing in combination with a trench excavated 4" below the bottom of the lineal; there would be a total of 8" of concrete — 4" formed by the lineal plus 4" formed by the earth. Similarly, a 10" footing could be formed by combining a 6" lineal and 4" trench; a 12" footing by combining a 6" lineal and 6" trench or an 8" lineal and 4" trench.



## Perimeter Excavation Only: Higher Slump Concrete

Some contractors prefer this method to save an excavation and gravel cost. A wide (typically 3' to 4') area around the perimeter of the floor plan is dug 4" to 6" deeper than the center. Undisturbed earth remains in the center of the excavation. The lineals are installed such that 4" of the footing height is above the undisturbed earth, and 2" to 4" is below. The trench is filled with gravel, and a 4" layer of gravel is spread on the undisturbed earth serving as the sub-base for the basement slab.



# RADON COLLECTION & EVACUATION

## Sub-slab Perimeter System Installation

Install FAD and related system components according to all applicable codes and following instructions for conformance with the EPA “Model Standards and Techniques for Control of Radon in New Residential Buildings.”

One of the many advantages of Form-A-Drain Plus is that it can function as part of a radon reduction system with only one simple modification to the basic installation procedure: installation of one additional outlet in the system for use as the radon gas outlet. This should be placed in position near an interior chase where the vertical stack vent pipe run is going to be located. The outlet must be installed “upside down” with the round adapter at the top.



## For Passive Systems

1. Passive venting systems, without a fan, must have the vertical stack vent pipe installed to the interior of the structure, not through the outside wall. This is to ensure sufficient temperature differential within the stack to foster an adequate draft (see drawing page 15).
2. The vertical stack vent pipe must be either 3” or 4” diameter PVC.
3. Connect the vertical stack vent pipe to FAD by running a horizontal pipe from the radon vent outlet to a PVC tee placed in the gravel. Position the tee directly beneath where the vertical stack vent pipe run is to go. If the tee branch is not long enough to “stub out” above the basement floor when poured, place a small section of PVC pipe in the tee branch.

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## For Passive Systems (cont'd)

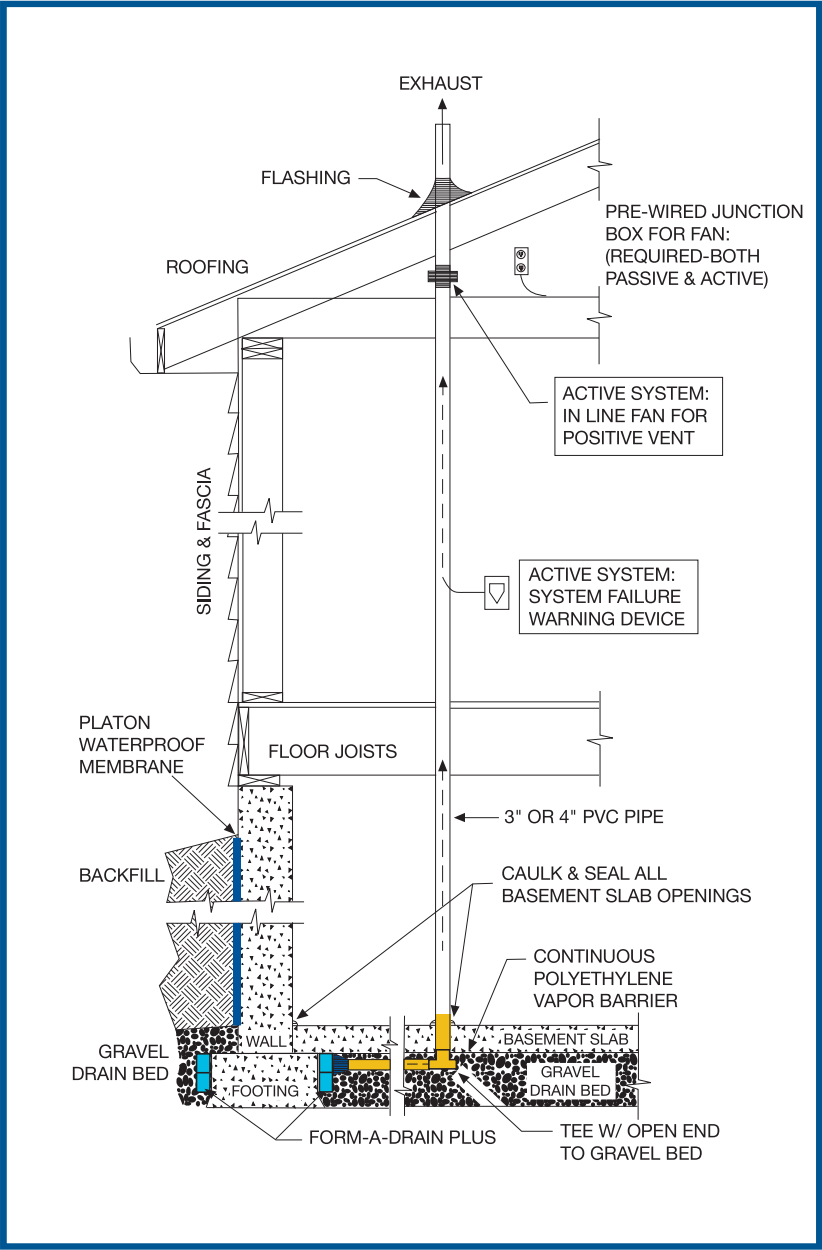
4. Fill the sub-slab space with a 4" layer of gas-permeable material, such as clean gravel.
5. Place a continuous layer of polyethylene sheeting or an air-gap membrane (Platon®) under the entire slab, overlapping at seams, to serve as a soil-gas retarder.
6. After the basement floor has been completed, seal, and caulk any openings in the slab and foundation walls, such as drains, sumps, utility entries, cracks, and floor-wall joints to retard soil-gas entry.
7. Install the vertical stack vent pipe run of 3" or 4" PVC pipe, which extends from the tee branch stub out through the roof. Do not use 90° elbows in the vertical stack vent pipe run above the tee. Properly seal and flash the vent outlet at the roof line.
8. All exposed and visible interior radon vent pipes shall be identified with at least one label on each floor level. The label shall read: "Radon Reduction System."
9. Provide for rough-in wiring in the attic area near the vertical stack vent pipe for later installation of the fan and system failure warning device. This step is required! Should subsequent tests indicate an elevated radon level in excess of 4 pCi/L or the maximum level defined by local code or practices, the passive system must be converted to an active system.

Contact the United States Environmental Protection Agency and/or state and local environmental agencies for more specific information on radon control.

## For Active Systems

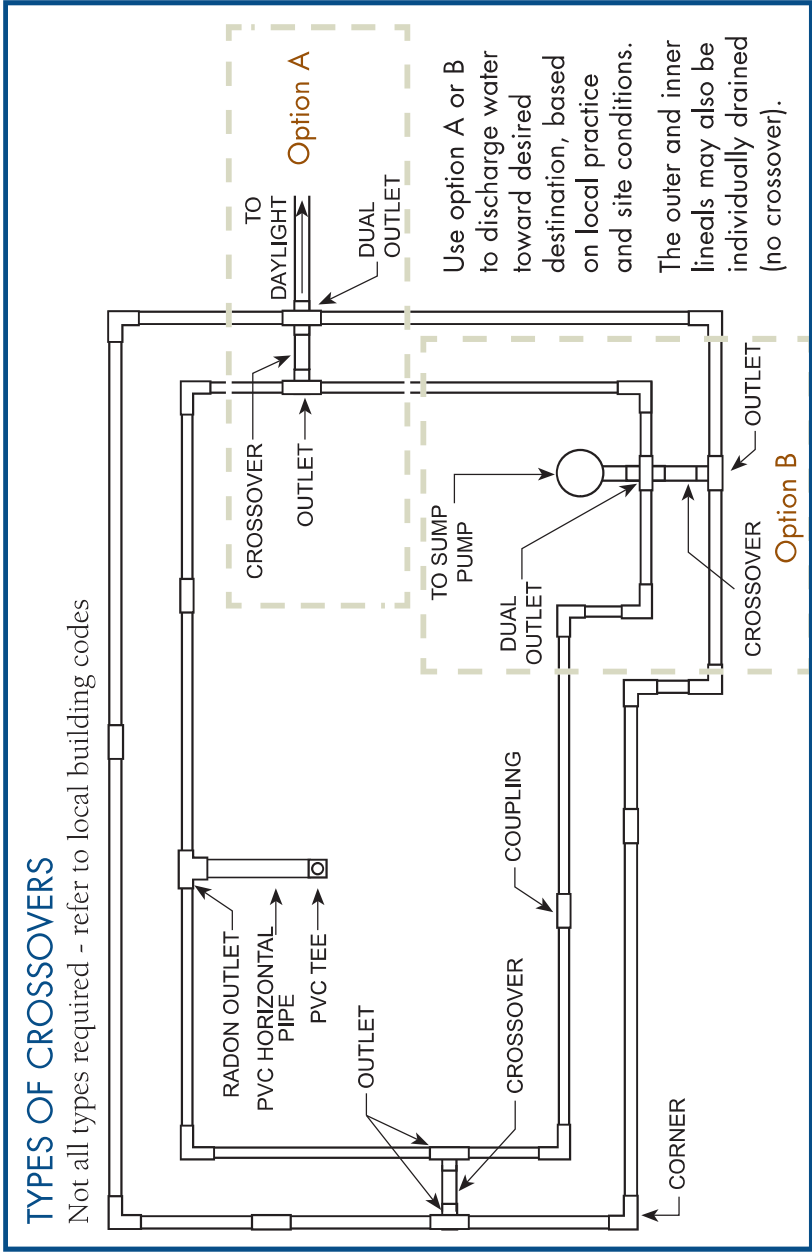
1. Follow step 1 for passive systems. For active systems with a fan, a vertical stack vent pipe within the exterior wall is permitted (see drawing page 15).
2. Follow step 2 through 8 for passive systems.
3. Install a ventilation fan in the attic to convert system from passive to active.
4. Install a system warning device in an easily accessible location.

# Form-A-Drain Radon Ready

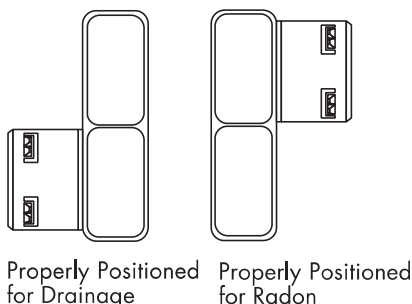


# INSPECTOR GUIDE

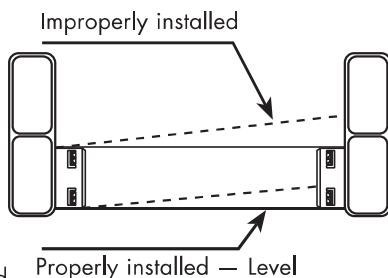
Form-A-Drain Plus performs multiple purposes: footing form, drainage system, and radon reduction system.



**FIGURE 1**  
**OUTLET POSITIONING**



**FIGURE 2**  
**CROSSOVER DRAINAGE**



It is possible that changes in the sequence of inspections may be required. Stone should be placed in the same manner as current practice. Filter fabric should be used in accordance with local codes and practices, as required. FAD is subject to CCMC report 13492-R.

1. Lineals must be installed with the water intake slots facing toward the gravel, away from the footing.
2. Drainage outlet adapters must be installed with the round adapter positioned at the bottom of the fitting (Figure 1).
3. In situations where only one-sided drainage is accepted, FAD may be used together with wood or other solid forms. Follow installation instructions to form either the inside or outside with lineals, and use solid forms for the opposite side.
4. In installations using crossovers, a minimum of 12 square inches of crossover drainage area is required. This can be accomplished with corrugated drain tile attached to Form-A-Drain Plus Outlet Adapters or Outlet Fittings. Cross-overs can also be made using rigid PVC pipe(s) (see Drainage, Page 4). Crossover installations must be level (Figure 2). An alternative to the crossover is to drain the inside system to a sump pit and the outside system to daylight (drain ELD).

Continued on next page.

## Inspector Guide (cont'd)

5. The transfer pipe leading to the sump pit or daylight should be 4" in diameter; otherwise, the overall carrying capacity of the system will be affected accordingly.

6. Should lineals become damaged or cracked, repair of lineals can be accomplished through one of the following methods:

- A crack smaller than slot width — do not attempt to repair, this is insignificant.
- A crack that might restrict drainage flow or allow stone and dirt to enter — remove small broken piece and cover open area with duct tape prior to backfill.
- A crack with large opening — cut out the damaged section and replace using a small piece of lineal, which is staked in line using a matching length of lineal. This will not affect the integrity of the drainage system. Cover broken area by using a coupling with one side cut out.

7. The FAD system must be installed level.

8. The FAD system must be backfilled with the appropriate gravel or stone in compliance with code requirements.

9. As with any foundation drainage system, roof runoff downspouts or rain gutters must not be connected into the system. If required, window wells may be drained into gravel or stone adjacent to FAD, or can be hard-connected to FAD via use of a downspout adapter.

10. Local codes may call for a filter fabric/geotextile screen to be used in conjunction with the foundation drainage system.