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Legacy report on the BOCA® National Building Code/1999

DIVISION: 02—SITWORK

Section: 02620—Subdrainage

DIVISION: 03—CONCRETE

Section: 03130—Permanent Forms

REPORT HOLDER:

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EVALUATION SUBJECT:

FORM-A-DRAIN®

EVALUATION SCOPE:

Compliance with the following code:

BOCA® National Building Code/1999

- Section 1813.5.2 Foundation drains
- Section 106.4 Alternative materials and equipment
- Section 1909.1 Design of formwork

DESCRIPTION

GENERAL

The CertainTeed FORM-A-DRAIN® functions as both a permanent concrete form for concrete foundation footings and as a foundation drain.

The FORM-A-DRAIN system consists of 12-foot-long (3.66 m) extruded drainage channels, called "lineals", and connectors which are used to connect the lineals to each other and to the drainage pipe which discharges to an approved area in accordance with 'Conditions of Use' section of this report.

FORM-A-DRAIN lineals are manufactured from extruded polyvinyl chloride (PVC) compound. The components of the system are described in the 'Systems Components' section. Figure 1 of this report depicts a typical schematic of the FORM-A-DRAIN system. Figure 2 of this report depicts a section through a typical application of the 6 and 8 inch (150 and 200 mm) lineal.

The lineals are rectangular in shape and slotted on the exterior vertical face to allow the entrance of ground water into the lineals drainage channels. The lineals, in conjunction with the connectors, form a foundation drain system which allows the passage of water between lineal sections.

SYSTEM COMPONENTS

■ FORM-A-DRAIN Lineals and Fittings

The FORM-A-DRAIN lineals are 12-foot-long (3.66 m) available in heights of 4, 6 and 8 inches (100, 150 and 205 mm). The 4 inch (100 mm) lineals have a single chamber. The 6 and 8 inch (150 and 200 mm) lineals are manufactured as hollow tubes with solid intermediate webs, which stiffen the tubes and create upper and lower chambers of equal size. See Figure 3 of this report for an illustration of a lineal.

Water enters these chambers through slots in the exterior vertical face of the lineal, and passes through the system to outlet fittings which provide the connection of the FORM-A-DRAIN to an approved discharge area in accordance with the 'Conditions of Use' section of this report.

■ FORM-A-DRAIN Fittings

The FORM-A-DRAIN Fittings are used to connect the lineals to each other and to connect the foundation drain system created by FORM-A-DRAIN to an approved drainage disposal system. The fittings consist of straight couplings, 45° and 90° corners, vertical 90° "L" and "Tee" couplings and straight couplings with single and double outlet fittings. See Figure 3 of this report for illustrations of the various fitting types.

The straight couplings and the 45° and 90° corners are manufactured with an interior taper or friction fit so that the lineals are slip fit into the fittings, without the use of solvents or adhesives, to form the foundation drain system. The lineals and vertical "L" and "Tee" couplings are inserted into the tapered fittings to form a friction fit, designed to prevent the leakage of concrete into the piping.

■ FORM-A-DRAIN Accessories

The FORM-A-DRAIN Accessories are manufactured from formed sheet steel and consist of spacer straps and grade stakes. The grade stakes are used to hold the FORM-A-DRAIN in position during the concrete pour. The spacer straps are used to hold the inner and outer lineals in position until the grade stakes are installed.

The spacer straps are removed once the FORM-A-DRAIN is secured to the grade stakes and prior to the placement of concrete. See Figure 3 of this report for illustrations of the accessories.

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INSTALLATION

The FORM-A-DRAIN system shall be installed in accordance with the manufacturer's specifications stated in the 'Conditions of Use' section of this report, and which shall be available at the job site at all times.

The FORM-A-DRAIN system shall be laid out in accordance with the approved foundation drawings. The slotted vertical face of the lineals shall be installed facing away from the footing. The lineals shall be inserted firmly into the accessory couplings to obtain a snug fit. Where the ends of lineals are cut to fit the layout, they shall be cut square and all burrs removed. Drainage outlets shall be installed with the outlet located at the bottom of the lineals. A 4-inch-diameter (100 mm) rigid pipe or corrugated polyethylene pipe is used to connect the outlets to each other or to the drainage pipe which discharges to an approved area. The 2 inch (50 mm) cross-overs shown in Figure 3 of this report are used with the 4 inch (100 mm) lineals.

The complete FORM-A-DRAIN system shall be leveled and reinforced with stakes spaced at a maximum distance of 5 feet (1.5 m) on center, prior to the placing of concrete.

After the concrete is placed, the FORM-A-DRAIN is left in place, and the assembly is backfilled on both sides with a minimum 6 inch (152 mm) cover of gravel or crushed stone in accordance with Section 1813.5.2 of the BOCA® *National Building Code/1999*.

CONDITIONS OF USE

This report is limited to the applications and products as stated in this report. The ICC-ES Subcommittee on National Codes intends that the report be used by the code official to determine that the report subject complies with the code requirements specifically addressed, provided that this product is installed in accordance with the following conditions:

- Installations of FORM-A-DRAIN as a foundation drain shall be covered with gravel or crushed stone in accordance with Section 1813.5.2 of the BOCA® *National Building Code/1999*, except that the 2 inches (50 mm) of stone below the drain is not required.
- Installations of FORM-A-DRAIN shall not be directly connected to a public sewer, but shall discharge to a trapped area drain, sump, drywell, or an approved location above grade in accordance with Section 1813.5.3 of the BOCA® *National Building Code/1999*.
- FORM-A-DRAIN shall be handled, stored and installed in accordance with the manufacturer's written installation instructions, titled *Form-A-Drain Installation*, Code No. 40-95-04, dated 2002.
- Filter membranes used in conjunction with the system shall not be installed in direct contact with FORM-A-DRAIN.
- Roof storm drainage piping shall not be connected to the FORM-A-DRAIN system.
- The use of FORM-A-DRAIN as a permanent footing form shall be in accordance with Section 1810.3 of the BOCA® *National Building Code/1999* for the thickness of the footing using any combination of lineals.
- The use of FORM-A-DRAIN in combination with a cast against soil footing is outside the scope of this report.
- The evaluation of drainage disposal systems and filter membranes used in conjunction with FORM-A-DRAIN is outside the scope of this report.
- The FORM-A-DRAIN system shall be limited to installations where the ground water table investigation, as stated in Section 1813.2 of the BOCA® *National Building Code/1999* determines that hydrostatic pressure will not occur.

INFORMATION SUBMITTED

- JB Engineering and Code Consulting, P.C., Report Nos. 94C0301IT, dated March 20, 1994 and 95C0518IT, dated May 18, 1995, were submitted to establish the equivalent performance of FORM-A-DRAIN with 'drain tile or perforated pipe' materials typically used for subdrainage applications. Data included comparative testing of stiffness and impact resistance of FORM-A-DRAIN to ASTM F891-91, Type PS 25 PVC pipe, and flow characteristics of FORM-A-DRAIN to ASTM F405-89 corrugated polyethylene slotted pipe.

Engineering specification drawings, dated June 1995, and physical samples were submitted to establish the ability of FORM-A-DRAIN to comply with the requirements for concrete formwork. The data indicated that the product, when installed in accordance with the manufacturer's installation instructions, complies with the requirements for formwork to be sufficiently tight to prevent the leakage of concrete. Additionally, the pipe stiffness and impact resistance data indicated that FORM-A-DRAIN resists the lateral loads imposed by the concrete placement and backfilling operations.

ITEMS REQUIRING VERIFICATION

The following items are related to the installation of the report subject, but are not within the scope of the evaluation. These items are related to determination of code compliance for the structure on which the subject is used.

- U Design and installation of the drainage disposal system and filter membrane comply with the applicable provisions of the 1998 *International Plumbing Code*®.
- U Placement of backfill materials complies with Section 1813.6 of the BOCA® *National Building Code/1999*. Any system components damaged during placement of backfill shall be removed and replaced with new components.

APPLICATION FOR PERMIT

To aid in the determination of code compliance with this report, the following represents the minimum level of information to accompany the application for permit:

- The language "See ICC-ES Legacy Report No. 95-37" or a copy of this report.
- Footing section indicating the size of footing, position of FORM-A-DRAIN, and the size of stone cover. When a filter membrane is required by the code official, based on soil conditions, the location of the filter membrane shall be indicated.
- Location and size of all crossover piping and drainage outlet piping.
- Maximum spacing for grade stakes.
- Project specifications stating material handling, storage, and installation requirements.

PRODUCT IDENTIFICATION

All CertainTeed FORM-A-DRAIN components manufactured in accordance with this report shall be marked at the plant with the following identification:

- "See ICC-ES Legacy Report No. 95-37."

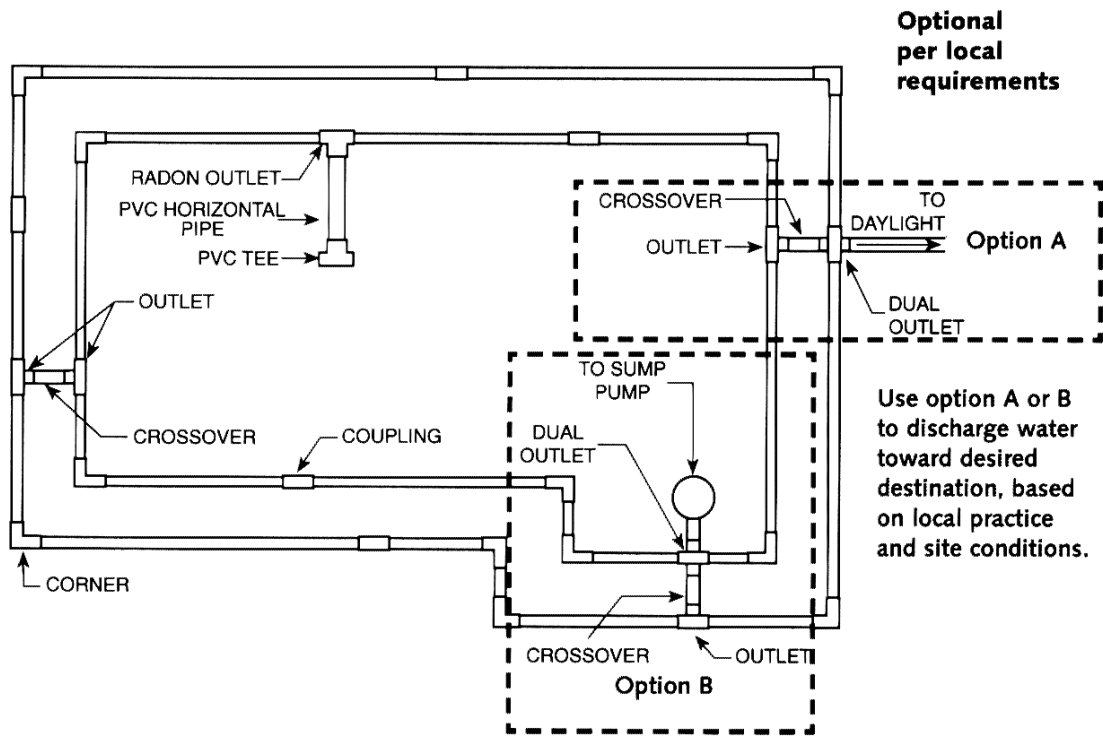


FIGURE 1*

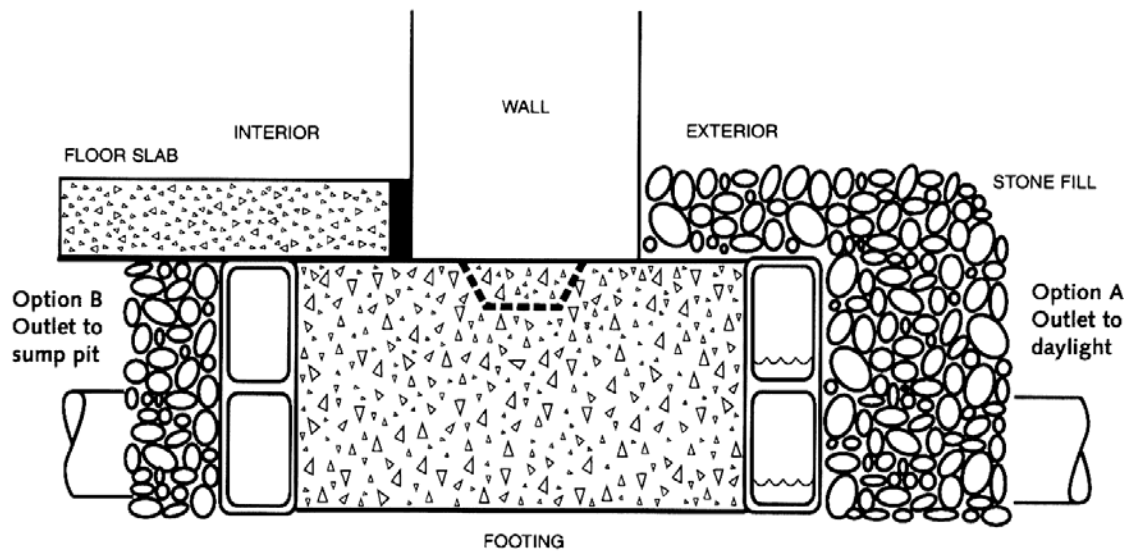
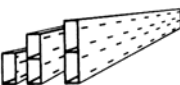



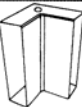

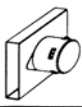


FIGURE 2*

FORM-A-DRAIN[®]		
System Components		
LINEALS	Size	Part #
	4" X 12'	LN124
	6" X 12'	LN126
	8" X 12'	LN128
FILTER FABRIC	Size	Part #
	4" X 12'	LF124
	6" X 12'	LF126
	8" X 12'	LF128
FITTINGS	Size	Part #
Coupling 	4"	XCPL4
	6"	XCPL6
	8"	XCPL8
Coupling With Hole 	6"	COUP6
	8"	COUP8
90° 	4"	CN904 (no hole)
	6"	CN906
	8"	CN908
45° 	4"	CN454
	6"	CN456
	8"	CN458
Outlet 	4" X 4"	OUT44
	6" X 4"	OUT46
	8" X 4"	OUT48

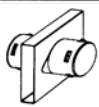
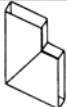
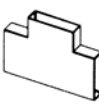


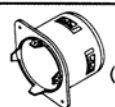
FORM-A-DRAIN[®]		
System Components		
Double Outlet Fitting 	6"	DOF46
	8"	DOF48
Vertical 90° "L" 	4"	VL904
	6"	VL906
	8"	VL908
Vertical "T" 	4"	VTEE4
	6"	VTEE6
	8"	VTEE8
ACCESSORIES	Size	Part #
Grade Stake 	18"	GS018
	30"	GS030
Spacer Strap 	4" X 16"	SS416
	4" X 20"	SS420
	4" X 24"	SS424
Outlet Adapter 		AD004
(for field fabrication of outlet fittings- use 3-1/2" hole saw)		

FIGURE 3*

*THESE DRAWINGS ARE FOR ILLUSTRATION PURPOSES ONLY. THEY ARE NOT INTENDED FOR USE AS CONSTRUCTION DOCUMENTS FOR THE PURPOSE OF DESIGN, FABRICATION OR ERECTION.