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# ICC-ES Report

# ESR-3964

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Issued 01/2017  
This report is subject to renewal 01/2018.

**DIVISION: 33 00 00—UTILITIES**  
**SECTION: 33 46 00—SUBDRAINAGE**

**REPORT HOLDER:**

**ROYAL BUILDING PRODUCTS (USA) INC.**

**2810 POST OAK BOULEVARD, SUITE 600**  
**HOUSTON, TEXAS 77056**

**EVALUATION SUBJECT:**

**FORM-A-DRAIN®—FOUNDATION FOOTING FORM AND DRAINAGE SYSTEM**



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# ICC-ES Evaluation Report

**ESR-3964**

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**DIVISION: 33 00 00—UTILITIES**  
**Section: 33 46 00—Subdrainage**

## REPORT HOLDER:

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## EVALUATION SUBJECT:

**FORM-A-DRAIN® – FOUNDATION FOOTING FORM AND DRAINAGE SYSTEM**

### 1.0 EVALUATION SCOPE

#### Compliance with the following codes:

- 2015 *International Building Code*® (IBC)
- 2015 *International Residential Code*® (IRC)

#### Property evaluated:

Foundation Drainage

### 2.0 USES

The Form-A-Drain® system is used to provide foundation drainage in accordance with IBC Section 1805.4 and IRC Section R405.

### 3.0 DESCRIPTION

#### 3.1 General:

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 the IBC or IRC as applicable.

Form-A-Drain® lineals are manufactured from extruded polyvinyl chloride (PVC) compound. The components of the system are described in Sections 3.2 and 3.3. 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) lineals.

#### 3.2 Form-A-Drain® Lineals

The Form-A-Drain® lineals are 12 feet long (3.66 m), available in heights of 4, 6, 8, and 10 inches (100, 150, 205, and 254 mm). The 4-inch (100 mm) lineals have a single

chamber. The 6-, 8-, and 10-inch (150, 205, and 254 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 IBC or IRC as applicable.

#### 3.3 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 to prevent the leakage of concrete into the piping.

#### 4.0 DESIGN AND INSTALLATION

The Form-A-Drain® system must be installed in accordance with the manufacturer’s published installation instructions and this report. A copy of the manufacturer’s published installation instructions must be available at the job site at all times during installation.

See Table 1 for infiltration rates of water into the Form-A-Drain® lineals.

The Form-A-Drain® lineal, gravel or crushed stone, and approved filter membrane material must be placed in accordance with IBC Section 1805.4 or IRC Section R405.1, as applicable. Discharge of the Form-A-Drain® system must be in accordance with IBC Section 1805.4.3 or IRC Section R405.1, as applicable.

#### 5.0 CONDITIONS OF USE

The Form-A-Drain® Foundation Footing Form and Drainage System described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

**5.1** Installation must comply with this report, the manufacturer’s published installation instructions and

the applicable code. In the event of a conflict between the manufacturer’s published installation instructions and this report, this report governs.

**5.2** Whenever crossovers are provided through foundations, plans and calculations must be submitted to the code official at the time of permit application, demonstrating the structural integrity of the foundation has been maintained. The calculations and drawings must be prepared and sealed by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

**6.0 EVIDENCE SUBMITTED**

**6.1** Manufacturer’s published descriptive literature and installation instructions.

**6.2** Engineering calculations addressing water infiltration into the Form-A-Drain® system.

**6.3** Quality documentation in accordance with ICC-ES Acceptance Criteria for Quality Documentation (AC10).

**7.0 IDENTIFICATION**

Form-A-Drain® system components must be labeled with the manufacturer’s name and this evaluation report number (ESR-3964).

**TABLE 1—DRAIN INFILTRATION RATES**

<b>WATER INFILTRATION RATE PER FOOT OF LINEAL<sup>1</sup> (gal/min)</b>					
<b>Feet of Head</b>					
<b>0.5</b>	<b>1.0</b>	<b>1.5</b>	<b>2.0</b>	<b>2.5</b>	<b>3.0</b>
17.5	24.7	30.3	34.9	39.1	42.8

For **SI**: 1 inch = 25.4 mm, 1 gallon/minute = 0.0631 liter/second

<sup>1</sup>The slot pattern (number of slots, size of slots, and shape of slots) is the same on all sizes; therefore, the infiltration rate is the same for all sizes of the drain.

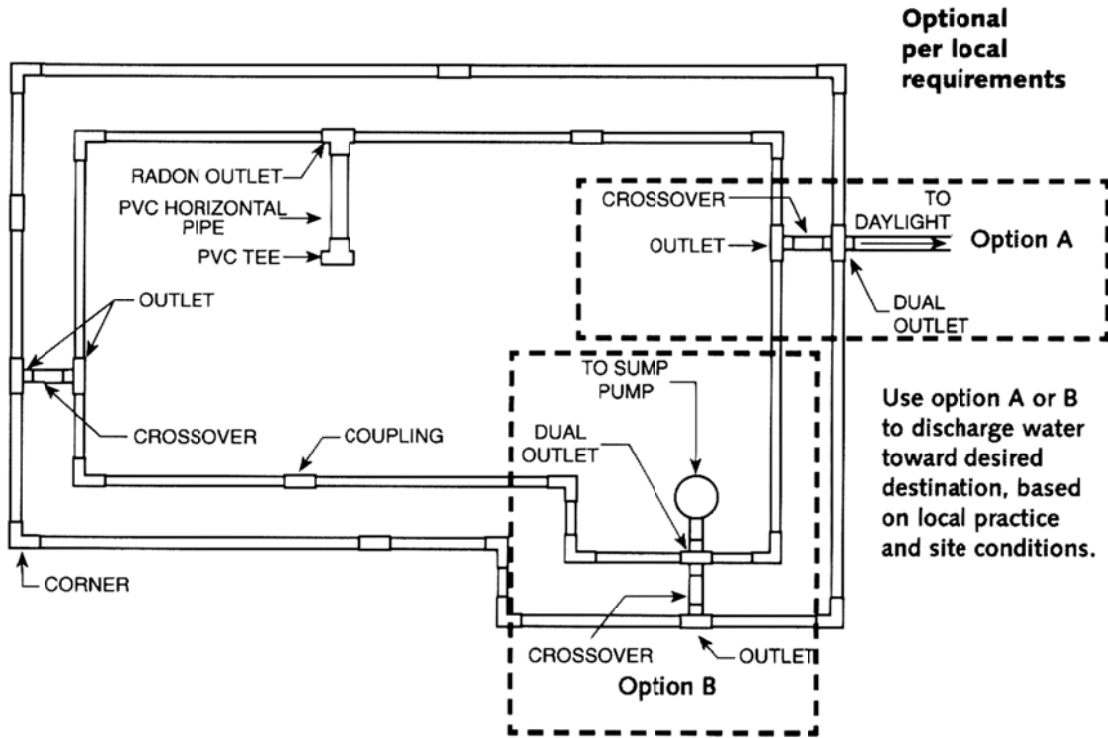


FIGURE 1—SYSTEM SCHEMATIC

NOTE: For illustrative purposes only

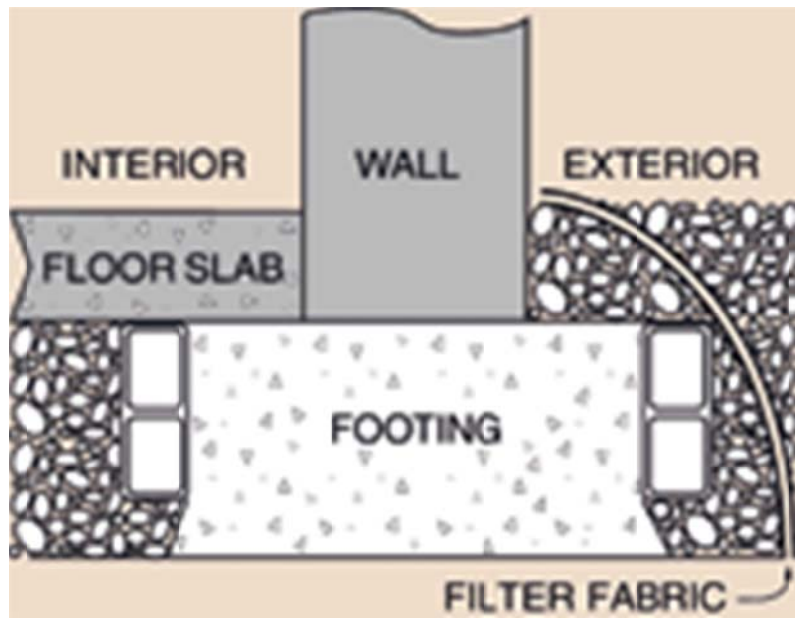


FIGURE 2—INSTALLATION CROSS SECTION

Note: For illustrative purposes only










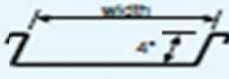


<b>SYSTEM COMPONENTS</b>		<b>AVAILABLE SIZES</b>	<b>PART #</b>
<b>LINEALS</b>			
	4" x 12'	LN124	
	6" x 12'	LN126	
	8" x 12'	LN128	
	10" x 12'	LN1210	
<b>FITTINGS</b>			
<b>Coupling (extruded)</b> 	4"	XCPL4	
	6"	XCPL6	
	8"	XCPL8	
	10"	XCPL10	
<b>Coupling with Hole (molded)</b> 	6"	COUP6	
	8"	COUP8	
	10"	COUP10	
<b>90° Corner (molded)</b> 	4"	CN904	
	6"	CN906	
	8"	CN908	
	10"	CN9010	
<b>45° Corner</b> 	4"	CN454	
	6"	CN456	
	8"	CN458	
	10"	CN4510	
<b>4" Outlet</b> 	4"	OUT44	
	6"	OUT46	
	8"	OUT48	
	10"	OUT410	
<b>4" Double Outlet</b> 	6"	DOF46	
	8"	DOF48	
	10"	DOF410	
<b>Vertical 90° L</b> 	4"	VL904	
	6"	VL906	
	8"	VL908	
	10"	VL9010	
<b>ACCESSORIES</b>			
<b>Grade Stake</b> 	18"	GS018	
	30"	GS030	
<b>Spacer Strap</b> For 4", 6", 8" 	4" d x 16" w	SS416	
	4" d x 20" w	SS420	
	4" d x 24" w	SS424	
<b>Spacer Strap</b> For 10" 	8" d x 20" w	SS820	
	8" d x 24" w	SS824	
<b>Snap-in Adapter</b> 	4" fits all	AD004	

FIGURE 3—SYSTEM COMPONENTS