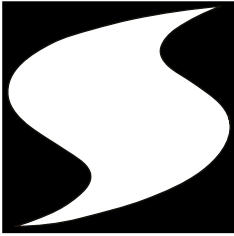


SMITH®



**CUSTOMER
DRIVEN
SINCE 1926**



ENVIRO-FLO® II TECHNICAL INSTALLATION GUIDE

Easy Installation with Smith's Enviro-Flo® II Modular Trench Drain System



Jay R. Smith Mfg. Co.® • 2781 Gunter Park Dr. E. • Montgomery, AL 36109 • 334-277-8520

www.jrsmith.com

A Superior Drainage System from Jay R. Smith Mfg. Co.[®]

Smith Enviro-Flo[®]II products are made from 100% polypropylene and provide economical and easy-to-install trench drainage systems which eliminate expensive and time consuming form work. By following the installation techniques outlined in this brochure you can achieve a fast, efficient installation.

Tools for Installation

The following tools may be required for your particular installation:

3 lb. hammer
Shovel

Screwdriver
Drill/Hole Saw
Wooden or Steel Stakes
Vibrator

Stringline/chalkline
4 Foot Level
Torpedo Level

Caulk gun
Caulk Sealant
Crescent Wrench
Pipe Wrench

Step 1: Excavation

An excavation must be provided that will ensure a minimum of 4 inches of bedding concrete on ALL sides of the Enviro-Flo[®]II Drain System. In every case, the excavation should be deep and wide enough to provide bedding concrete equal to slab thickness. (See Fig. 1). Slope the edges of the excavation to provide a smooth transition to the slab sub-grade. Slope the excavation to approximately follow the slope of the channels. Excavations should be made about the centerline of all proposed drainage runs. Prepare deeper and wider excavations for catch basins.

***Note:** This trench drainage system is designed for "on grade applications only," as there are no provisions for a flashing flange or flashing clamp

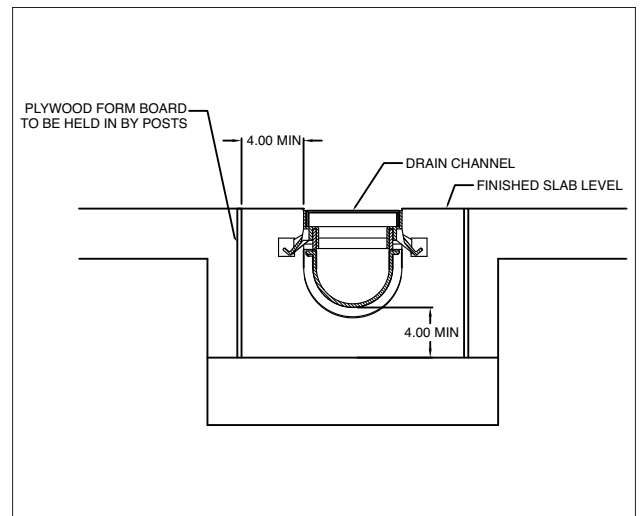


Fig. 1 Excavation for Channels

Step 2: System Layout

Each channel displays a number on the outside of the channel identifying its sequential location in the system. Arrows on both sides of the channel indicate flow direction. Arrows should always point to the catch basin or evacuation outlet. (See Fig. 2 if Smith shop drawings are provided, consult them for proper channel sequence). Channels should be laid out, in numerical order alongside the completed excavation. To assure proper alignment and grade elevation use a stringline.

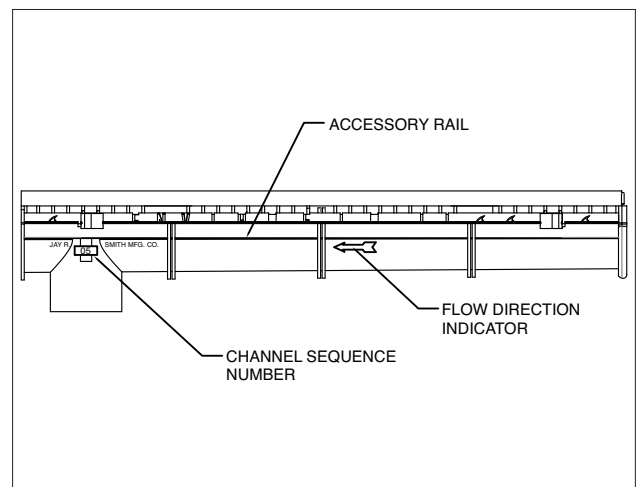


Fig. 2 Enviro-Flo[®]II Drain Channel section

Step 3: Piping Connections and Preformed Cutout Removal

Channel and catch basins are equipped with preformed outlet piping connections. These connections are prepared as follows:

1. Using a 4" Dia. or 6" Dia. hole saw, cut required diameter. See Fig. 3.
2. Remove the remaining fins using a rasp or file.
3. Attach drain pipe to catch basin with pipe coupling. See Fig. 4

NOTE:

Use 4" or 6" diameter hole saw to machine hole on side of catch basin.

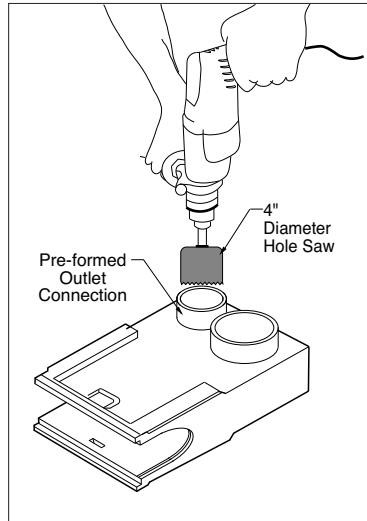


Fig. 3 Sawing hole in outlet connection.

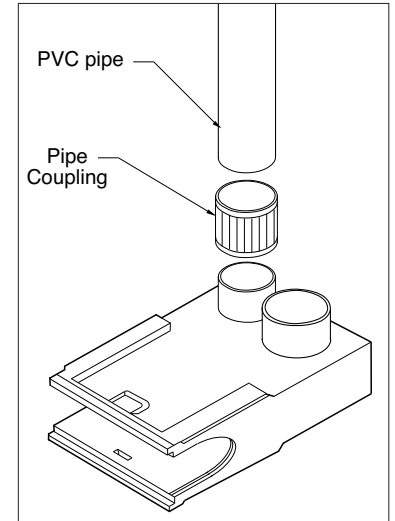
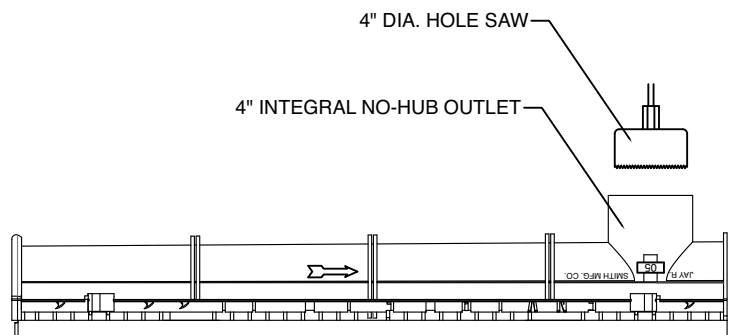


Fig. 4 Fitting PVC pipe to catch basin

Wear protective eyeglasses or goggles when sawing or filing Enviro-Flo®II channels and catch basins.

NOTE:

Use 4" diameter hole saw to machine hole inside vertical outlet on channel.



Step 4: Catch Basin Installation

Locate positions of catch basins and excavate. Remember, the depth of the bedding concrete must be a minimum of 4 inches or equal to slab depth.

Pour bedding concrete and position the catch basin on top as soon as the concrete will support it. Set catch basins to proper grade and alignment using a stringline which has already been set. See Fig. 5.

Next install the pipe connections. Then backfill with concrete around the sides of the catch basin up to the channel excavation level.

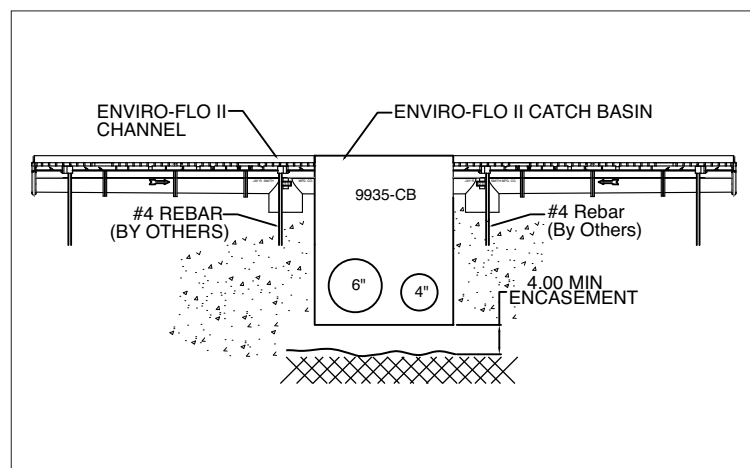


Fig. 5 Location of the Catch Basin

Step 5: Channel Installation

Channel installation should begin at the evacuation or discharge end of the run where the catch basin or outlet is located. (See Fig. 6). #4 rebar can be used for anchoring channels/catch basins.

Match the appropriate catch basin with the channel sections being connected to it (See Enviro-Flo®II Drain data sheets for layout detail).

Alternatively, one can set the channel into end of catch basin supporting it on the bottom with the **RanteArrow** (Fig. 7). Channels can also be suspended from 2" x 4" boards by temporarily installing longer bolts through the boards and into the locking bars (Fig. 8). The method you choose will depend on soil type, retrofit solutions and other various factors.

Install the other channels in numerical sequence, always making sure the arrows point downstream. The catch basin channels are installed from top, sliding each channel into the Enviro-Loc® groove in the preceding channel*.

*SPECIAL PRECAUTION

- * A. Due to the positive Enviro-Loc® joining method, channels must not be carelessly torqued or elevated from one another.
- B. Be careful when job conditions warrant the preassembly of several channels which will be lifted into final installation position. (When doing this, always span joints with polypropylene insert and secure with locking devices.)

Adjust channels for height and centerline alignment using one of the installation methods discussed.

Complete the run using appropriate closing end caps to seal the channel system.

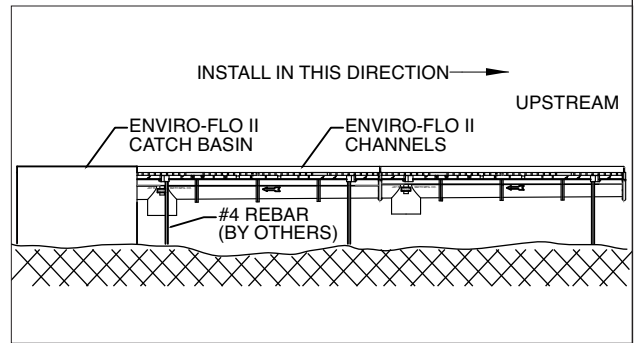


Fig. 6 Order of Channel Installation

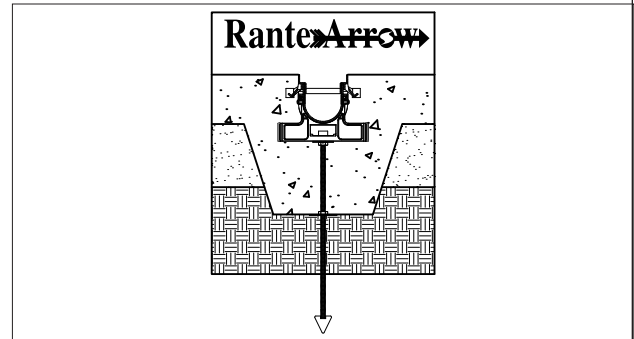


Fig. 7 Rante Arrow Installation

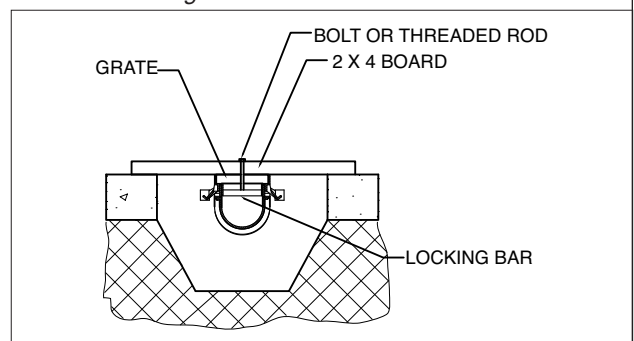


Fig. 8 Suspended Installation

Step 6: Recycled Polypropylene Insert and Rebar Installation

All Enviro-Flo®II channels and Catch Basins come with 3/4" polypropylene insert installed in the grate seat and must be in place prior to concrete pour. The insert also aids in maintaining alignment during pour.

Prior to concrete pour, the inserts must be placed in channels so they span the channel joints, as shown in Fig. 9.

After concrete has dried remove insert, install grates and lock in place.

The insert acts as a stabilizer while keeping channels free of debris during installation.

The channels and catch basins have integral rebar clips (4 per 1 meter channel) for easy installation using #4 rebar (by others).

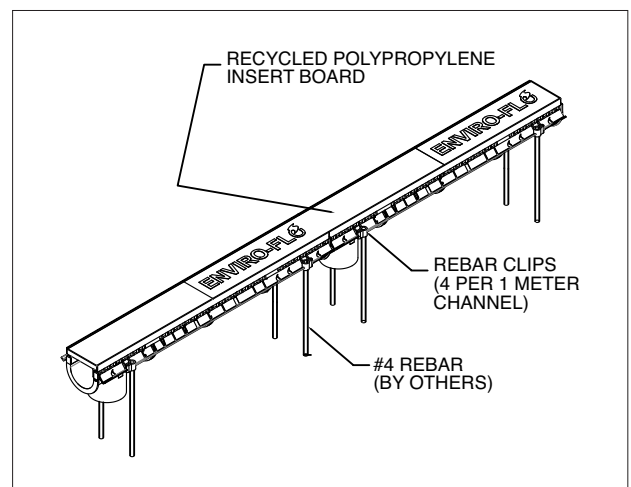


Fig. 9 Placement of Enviro-Flo®II Insert

Step 7: Concrete Anchoring & Final Concrete Pour

Bedding concrete must conform to minimum standards for thickness (4" minimum) and must be poured following the same procedure whether the finished surface will be asphalt or concrete. Pour concrete into the excavation equally on both sides of the channel to avoid disturbing channel alignment.

It is recommended the finished level of concrete be 1/8" above to level with the top edge of the channel. This helps protect the exposed edges. See Fig. 10.

A finished slope of 1/8" per foot for at least 2 feet is recommended. This will provide positive drainage flow into the channel drainage system.

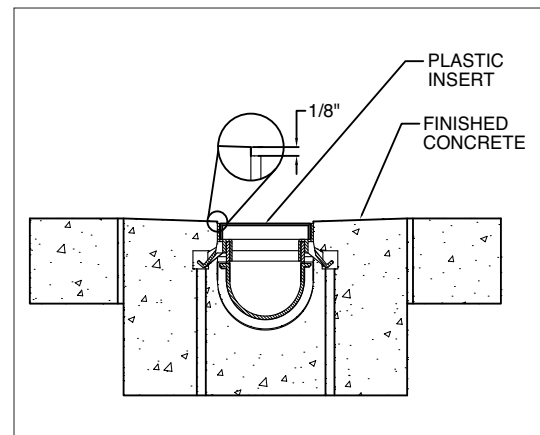


Fig. 10 Finished concrete level

Step 8: Cleanup and Final Grate Installation

Remove insert. Install and lock all grates into channels. Make sure all outlet pipes are clean. Install accessories such as strainers, trash buckets, etc. The drainage system is now ready for operation. See Fig.11.

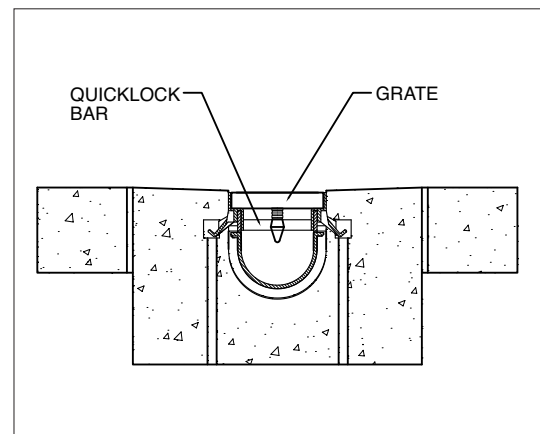


Fig. 11 Final grate installation

Rante-~~Arrow~~ for Enviro-Flo® II

Recommended Installation Procedures

Faster Installation * Monolithic-Pour * No flotation, no snaking * Secure anchor * No system failure

Suggested Tools and Material:

- ▼ 3 lb. hammer
- ▼ String line

- ▼ 4' level
- ▼ Crescent wrench

Procedures:

1. Begin installation at catch basin. Set catch basin to grade. If no catch basin is required, begin installation at the deepest (male) end of the discharge channel, set to grade, and work back toward shallow end.
2. Run a string line 6" to 12" off the outside edge of the trench drain. This running line will help maintain a straight trench during installation.
3. The first section (deepest) of the trench drain requires two (2) Rante-Arrow chairs, each located 12" in from end of the channel section. All other sections will take only one (1) Rante-Arrow chair located 12" from the shallow (female) end of the channel.



Placing Rante-Arrow - Step 4

4. The Rante-Arrow chair is made up of two (2) parts, a polypropylene seat clamp and a threaded rod with an arrow on one end and a solid oval bar on the opposite end.
5. Place the tip of the Rante-Arrow threaded rod in the ground parallel with the channel section and located 12" horizontally from the deep end of the channel. Drive top oval bar of the threaded rod in the

ground with a hammer, with the flat of the arrow parallel to the string line. From your leveling line drive the threaded rod about 1/2" below the depth of the channel. Repeat the procedure with a second Rante-Arrow for the other end of the channel.



Seating Rante-Arrow - Step 5

6. Turn the top piece (oval bar) one-quarter (1/4) turn and then assemble the polypropylene seat clamp by tightening the securing nut so the seat clamp is secure and now can hold the trench in the proper direction of the flow. This also rotates the arrow in the ground to keep the trench from floating.
7. Set the trench drain channel section into the seat clamp and snap the securing ears on to the accessory rail on the underside of the channel
8. Drive the next Rante-Arrow 39" from the previous Arrow into the subgrade as in step 5.

9. Set the next channel in place by engaging its discharge end into the female (shallow) end of the first channel and rest the intake end in the next Rante-Arrow chair. Use the 4' level while tightening the nut on the adjustment plate, bringing the channel up to grade.



Setting adjustment nut and plate - Step 7

10. Repeat steps five (5) through step eight (8) until all channels are in place.
11. We recommend spanning the channel joints with the polypropylene insert provided before pouring concrete. This will help keep the channel sections straight, avoid "snaking" and keep trash out of the channel until the job is complete.
12. The Rante-Arrow seat clamp allows the installer to shift the channel horizontally approximately 1" from side-to-side to meet various job conditions.

***For best results, the soil base must be dry, firm and or compacted.**

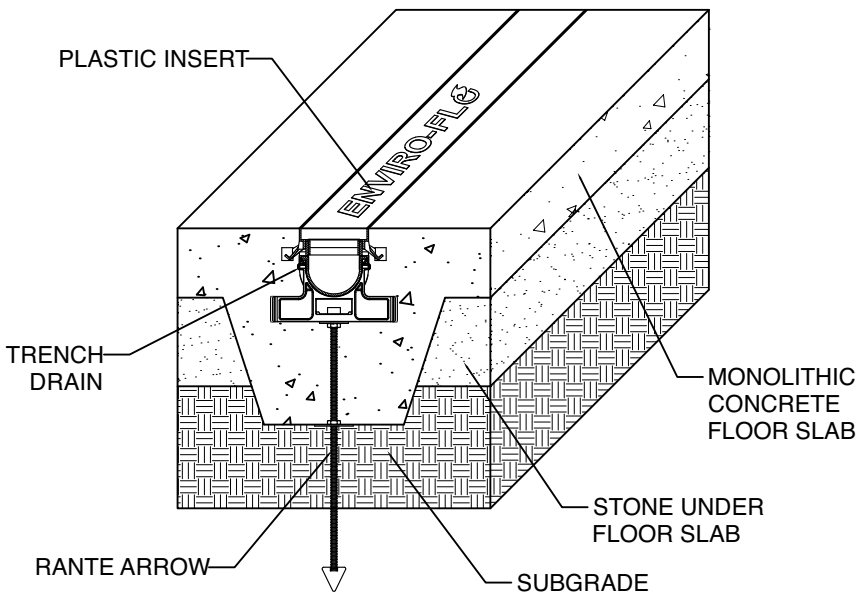
INSTALLATION SUPPORT



Fig. 12

Recommended Specification/Installation Diagram:

All presloped trench drain channels shall be installed utilizing Fig. 9849 Rante Arrow Chair Supports as manufactured by Jay R. Smith Mfg. Co. to ensure proper encasement during monolithic concrete pour. Trench Drain Systems and supports shall be installed in accordance with manufacturer's recommended procedures. See Fig. 12



Installation in Asphalt Surface

Smith Enviro-Flo®II drains may also be used to provide drainage in asphalt surfaces. Because asphalt is a flexible pavement, the channels must be encased in concrete.

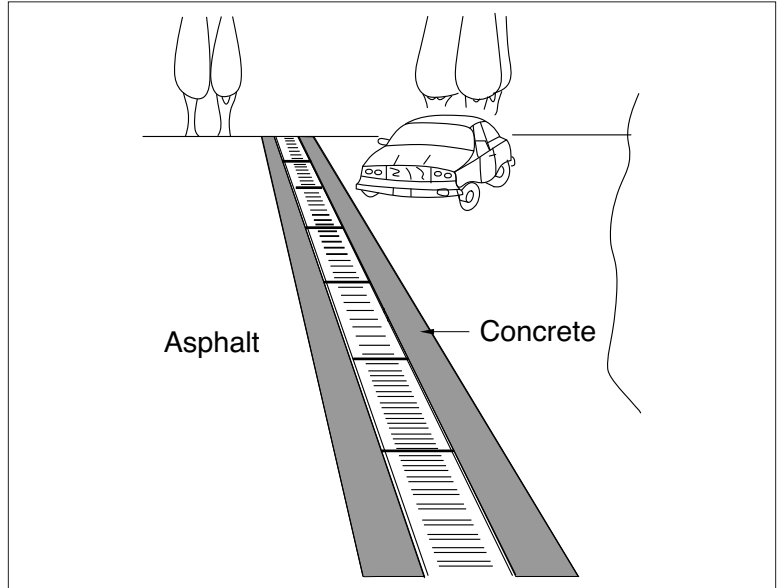
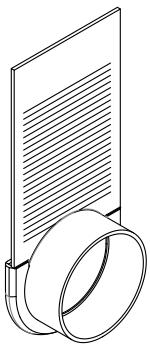
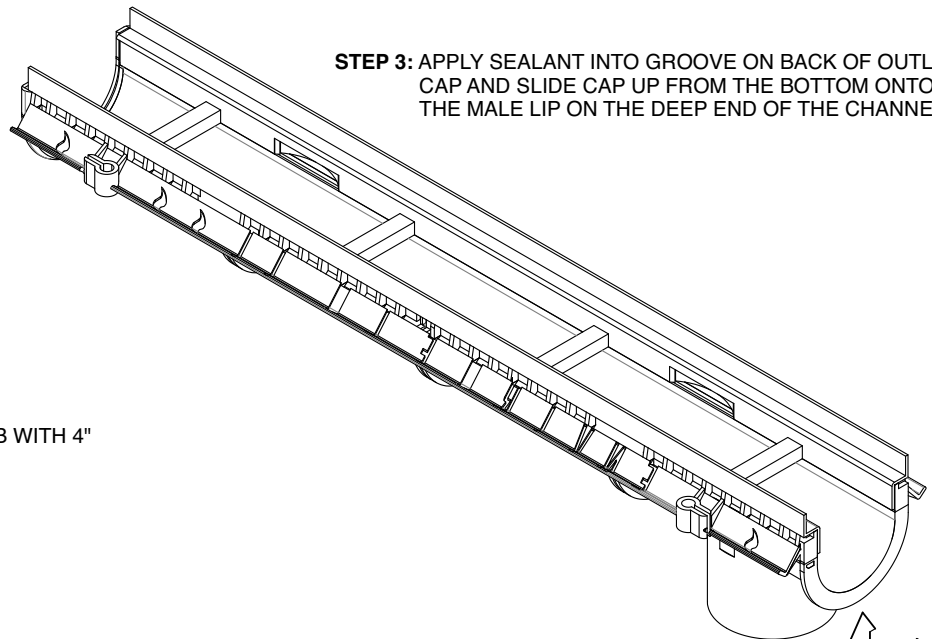
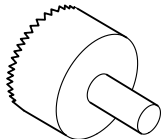


Fig. 13 Enviro-Flo®II Drain installed in asphalt surface

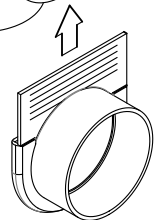
ENVIRO-FLO®II 4" HORIZONTAL OUTLET CAP ASSEMBLY INSTRUCTIONS



STEP 1: DRILL OUT CENTER OF 4" HUB WITH 4" HOLE SAW



STEP 3: APPLY SEALANT INTO GROOVE ON BACK OF OUTLET CAP AND SLIDE CAP UP FROM THE BOTTOM ONTO THE MALE LIP ON THE DEEP END OF THE CHANNEL.



STEP 2: CUT OFF TOP OF END CAP AT LINE WITH NUMBER DESIGNATING THE CHANNEL IT WILL BE ATTACHED TO. EVERY 4TH CHANNEL IS MARKED WITH A NUMBER.

NOTE: THE 4" HORIZONTAL OUTLET CAP SHOULD NOT BE USED ON A CHANNEL SHALLOWER THAN #10 TO ALLOW SUFFICIENT CONCRETE TO COVER THE PIPING.

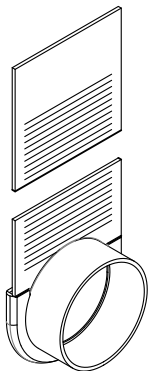


Fig. 14

JOINT SEALANTS

When required, openings, fittings and joints may be filled with one of several different materials. Please contact your Smith representative for specific recommendations. When a flexible filler is required, silicone caulk is recommended.

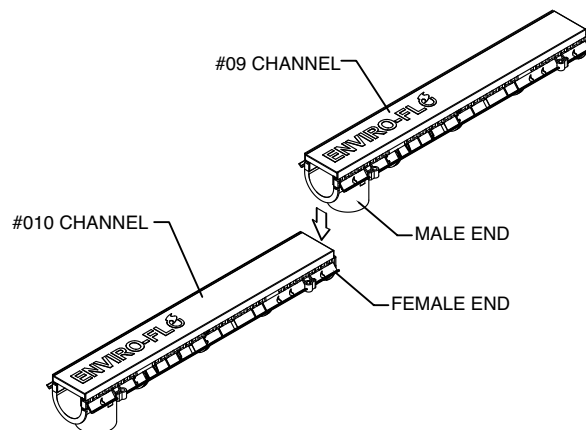
NORMAL SURFACE WATER RUNOFF APPLICATIONS:

<u>Manufacturer</u>	<u>Grade</u>	<u>Product Identification</u>
Bostik	Construction Adhesive	Chem-Caulk 900

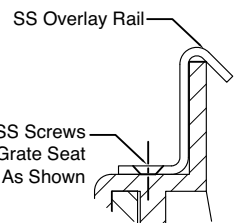
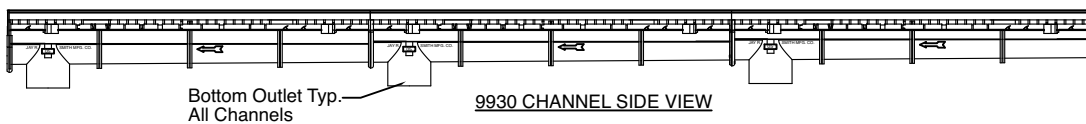
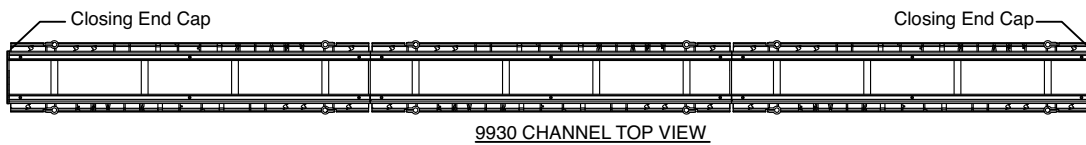
- STEP 1: Make sure male and female ends that are to be joined together are clean of all oil, dust or dirt.
- STEP 2: Apply a 1/4" dia. bead of sealant to inside surface of the female end of the channel.
- STEP 3: Then insert male end of connecting channel or closing end cap into female end with the sealant applied to it and press fit together.
- STEP 4: Wipe away any excess sealant from the interior surface of the channel.

HEAT WELDING

- STEP 1: Using hand held heat source, soften Enviro-Flo® material inside channel around joint.
- STEP 2: Using rounded metal object, smooth out and butter joint together. This should be done after concrete pour.



INSTALLATION INSTRUCTIONS ENVIRO-FLO® II STAINLESS STEEL RAIL

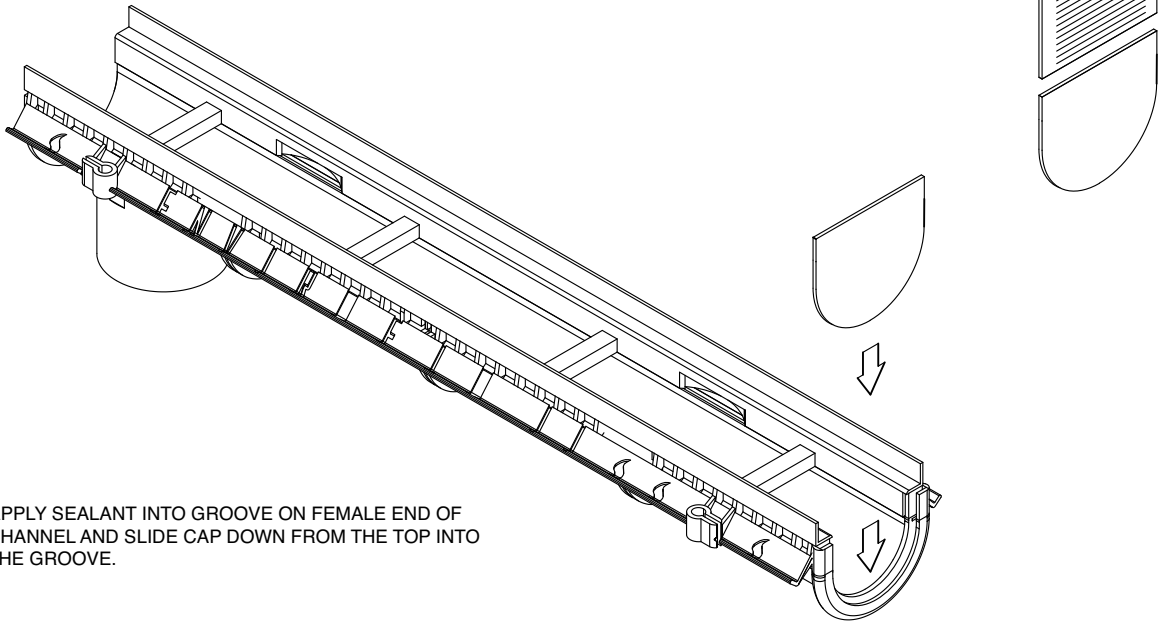


“IMPORTANT INSTALLATION STEPS”

1. Assemble channels in required configuration prior to attaching stainless steel rail.
2. Remove insert from channel.
3. Attach stainless steel rail to assembled channel sections, make sure stainless steel rail is flush against the top of the Enviro-Flo® II channel before securing with screws.
4. Some trimming may be required to shorten the stainless steel rail length on the last rail installed. Also the grate may require trimming.
5. Use the same method on the end caps.
6. Replace insert into the channel assemblies.
7. Stainless steel rails must be attached to channel before pouring concrete around the channel assemblies.

ENVIRO-FLO®II SHALLOW END CAP ASSEMBLY INSTRUCTIONS

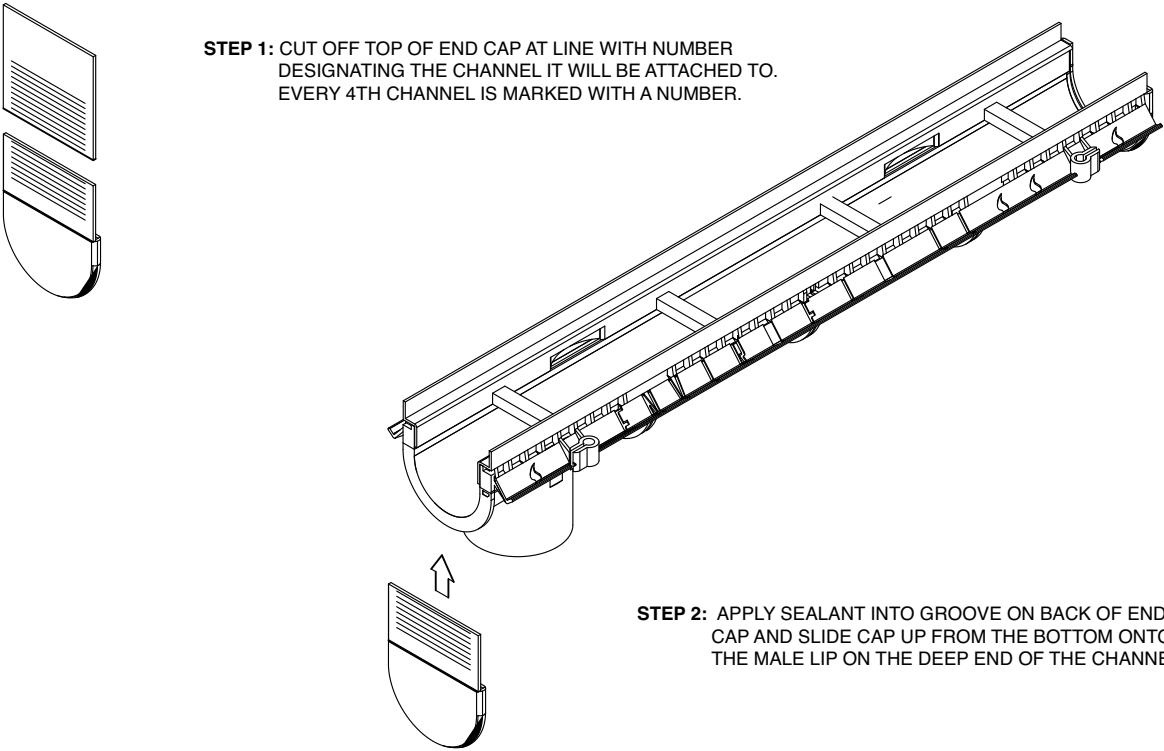
STEP 1: CUT OFF TOP OF SHALLOW END CAP AT LINE WITH NUMBER DESIGNATING THE CHANNEL IT WILL BE ATTACHED TO.



STEP 2: APPLY SEALANT INTO GROOVE ON FEMALE END OF CHANNEL AND SLIDE CAP DOWN FROM THE TOP INTO THE GROOVE.

ENVIRO-FLO®II DEEP END CAP ASSEMBLY INSTRUCTIONS

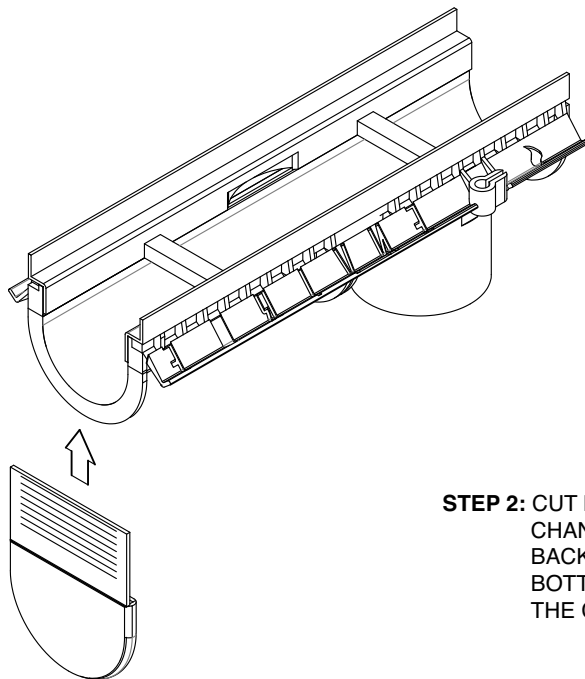
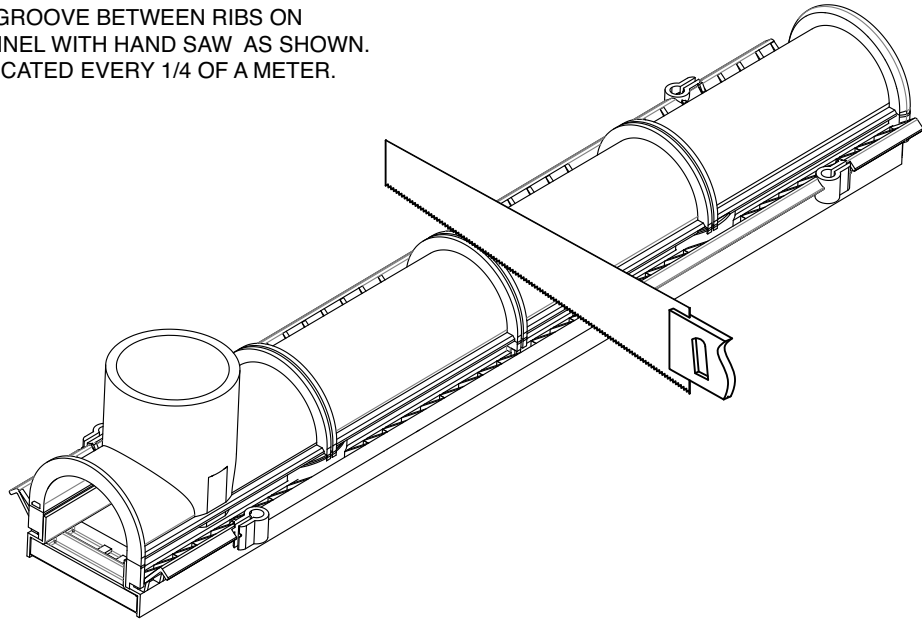
STEP 1: CUT OFF TOP OF END CAP AT LINE WITH NUMBER DESIGNATING THE CHANNEL IT WILL BE ATTACHED TO. EVERY 4TH CHANNEL IS MARKED WITH A NUMBER.



STEP 2: APPLY SEALANT INTO GROOVE ON BACK OF END CAP AND SLIDE CAP UP FROM THE BOTTOM ONTO THE MALE LIP ON THE DEEP END OF THE CHANNEL.

ENVIRO-FLO® II SHORTEN CHANNEL INSTRUCTIONS

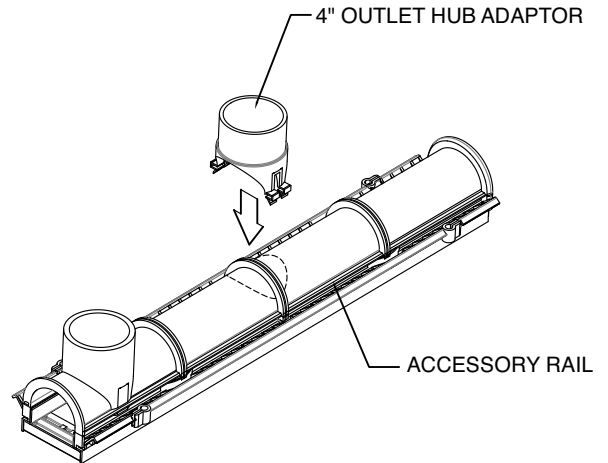
STEP 1: CUT CHANNEL IN GROOVE BETWEEN RIBS ON BOTTOM OF CHANNEL WITH HAND SAW AS SHOWN. GROOVES ARE LOCATED EVERY 1/4 OF A METEER.



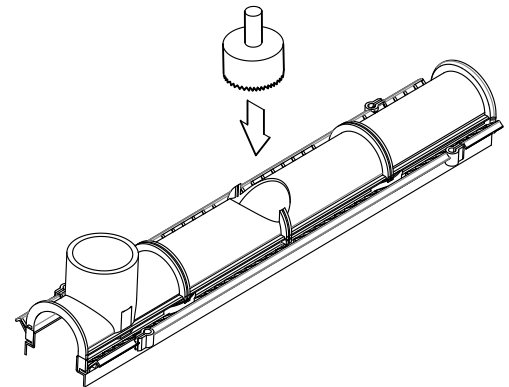
STEP 2: CUT DEEP END CAP TO HEIGHT REQUIRED FOR CHANNEL AND APPLY SEALANT INTO GROOVE ON BACK SIDE OF CAP AND SLIDE CAP UP FROM THE BOTTOM ONTO THE MALE LIP ON THE CUT END OF THE CHANNEL.

ENVIRO-FLO® II OUTLET ADAPTOR ASSEMBLY INSTRUCTIONS

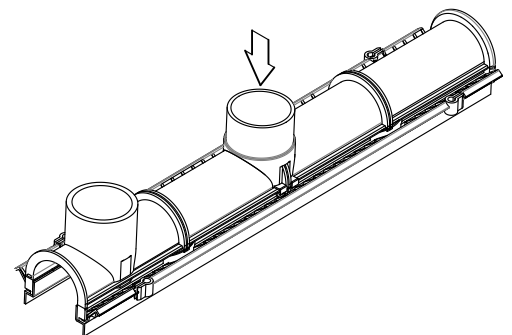
STEP 1: SNAP THE OUTLET ADAPTOR ONTO THE CHANNEL. THE CLIPS ON THE ADAPTOR WILL SNAP OVER THE ACCESSORY RAIL. THE ADAPTOR MAY BE PLACED ANYWHERE ALONG THE CHANNEL BETWEEN THE RIBS OR MAY BE PLACED STRADDLING THE RIBS. MARK THE INSIDE DIAMETER OF THE OUTLET ONTO THE CHANNEL WITH MARKER.



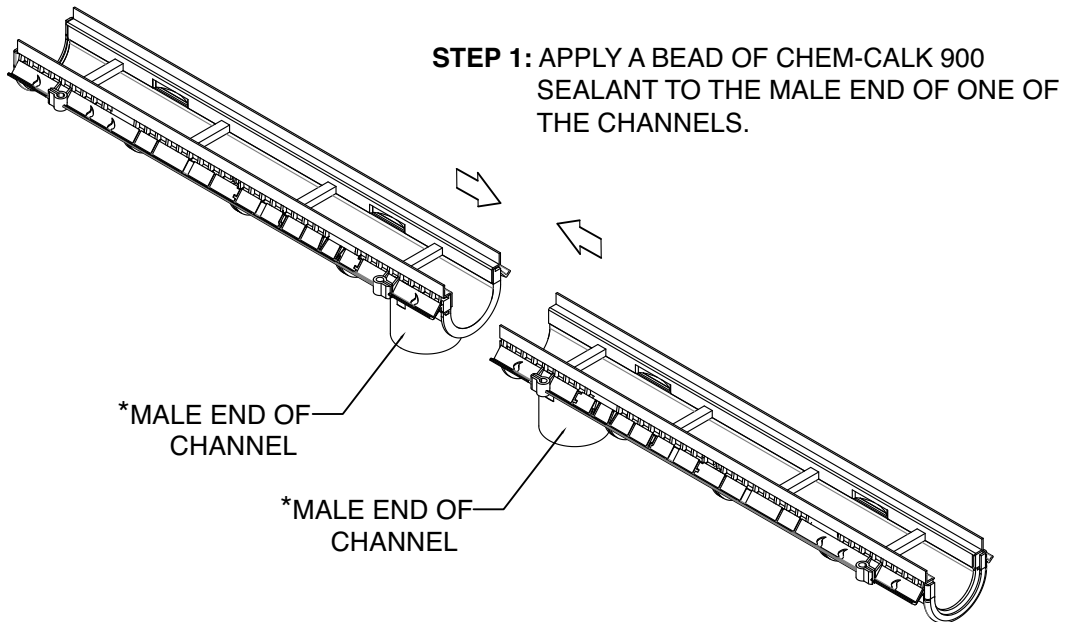
STEP 2: REMOVE THE OUTLET ADAPTOR FROM THE CHANNEL. DRILL A HOLE IN THE CHANNEL WITH A 4" HOLE SAW. MAKE SURE THE HOLE IS CENTERED ON THE CHANNEL FROM SIDE TO SIDE.



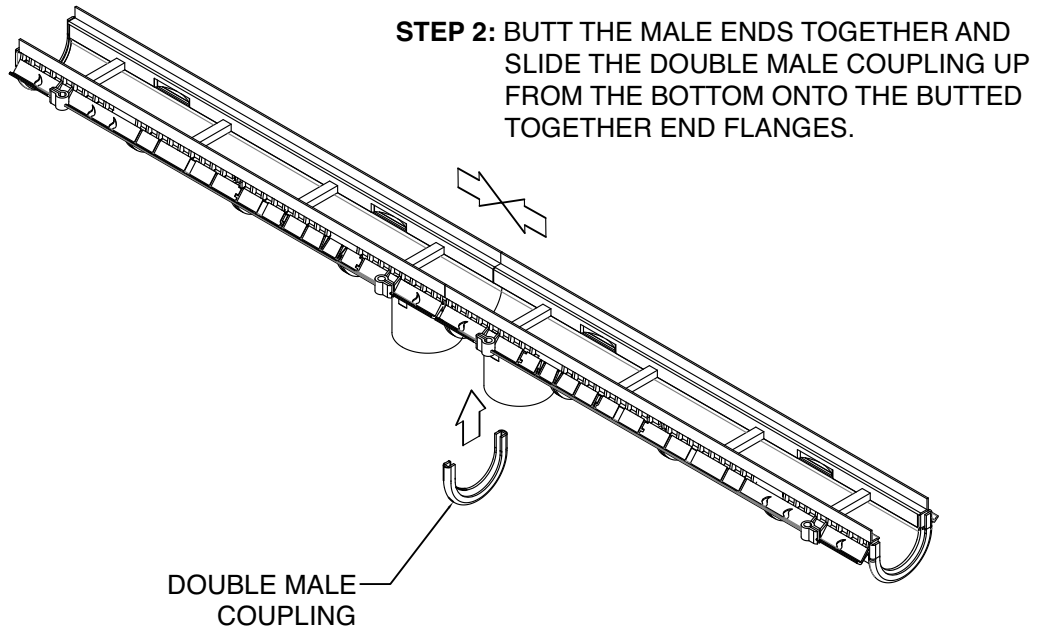
STEP 3: PLACE A BEAD OF CHEM-CALK 900 SEALANT ON THE BOTTOM OF THE OUTLET ADAPTOR. SNAP THE OUTLET ADAPTOR ONTO THE ACCESSORY RAIL, MAKING SURE IT IS CENTERED ON THE HOLE. SEAL ANY GAPS AROUND THE PERIMETER OF THE ADAPTOR WITH CHEM-CALK 900 SEALANT. ALLOW TO DRY.



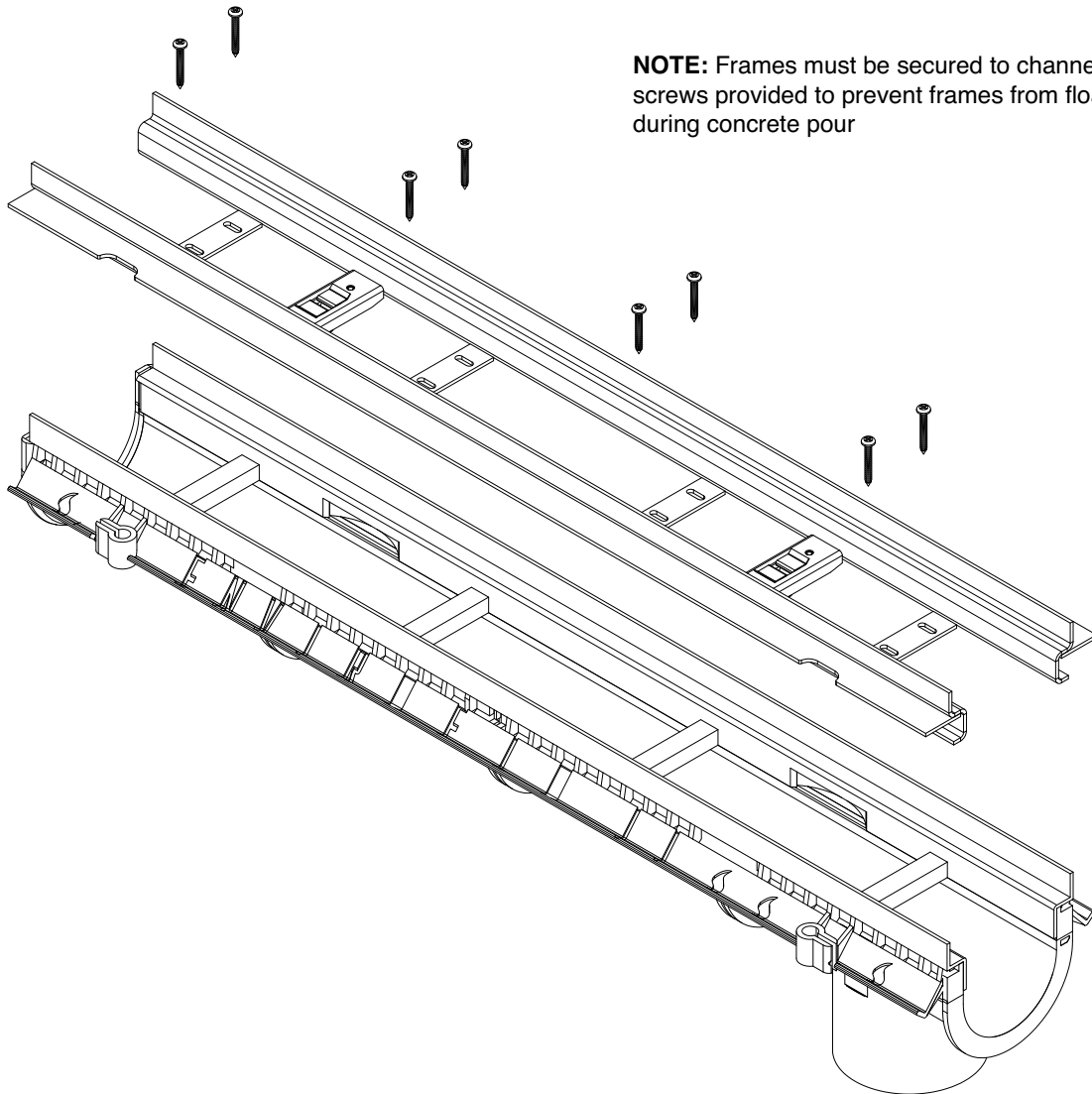
ENVIRO-FLO® II OUTLET DOUBLE MALE ASSEMBLY INSTRUCTIONS



*Channel Sections must be the same number, ie. #10



NEW STYLE 9931-M FRAMES ASSEMBLY



1. Remove plastic filler board from grate seat of channel.
2. Place frame into grate seat of channel. Frames and end frames are available in 1 meter and 1/2 meter lengths.
3. Align ends of frame flush with ends of channel. Crossbars with holes should sit directly above crossbars on channels.
4. Secure frame to channel using 8 screws provided through holes in frame into channel crossbars.
5. End frames fit into channels at each end of run. Assembly is the same as regular frames.
6. Install filler board into frame to keep concrete from entering channel during concrete pour.
7. After concrete cures, remove filler boards and snap grates into Quickloc locking bars welded into frame.

Installation Tips

IMPORTANT – Read all installation notes pertaining to your particular type installation before starting the project.

An excavation must be provided that will ensure a minimum of 4 inches of concrete encasement surrounding Drain Channel System. NOTE – In all cases the thickness of the bedding concrete (under channel) must be equal to that of the surrounding slab.

Smith Enviro-Flo®II Drain Systems installed in asphalt or macadam require the same bedding concrete specifications as described above.

Lay out Smith Enviro-Flo®II Drain Channels (in order of installation) alongside the excavated trench prior to installation. Set catch basins to make all pipe connections prior to channel installation.

Begin installation run at outlet or evacuation point of each channel and work backwards. Make sure arrows on each side of the channel point toward outlet or evacuation point. Prior to pouring concrete, place inserts across channel interlocking joints. This helps to maintain channel alignment, keeps channel walls from compressing and prevents concrete from spilling into the channel.

NOTE: For drain channels laid in concrete floors, expansion joints must be provided parallel to each side of the drain run, and a minimum of 4" away from the channel. SMITH also recommends placing crack control joints at right angles to the channels. Line up these joints with the joint lines of the channels. (Fig. 15)

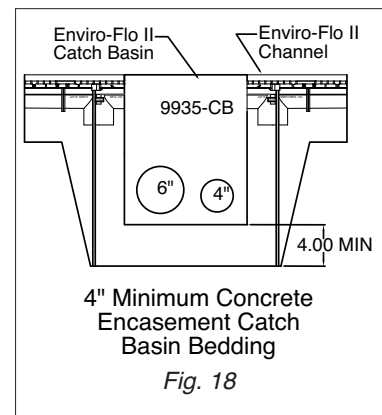
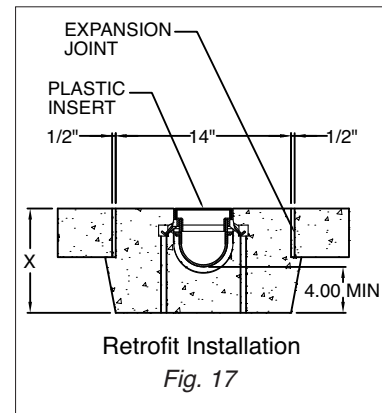
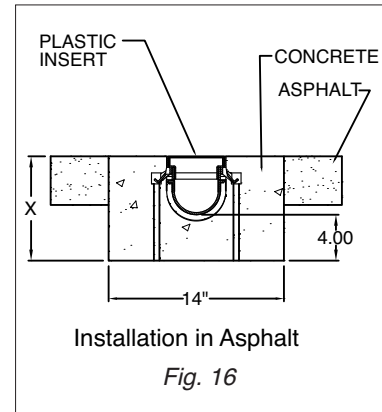
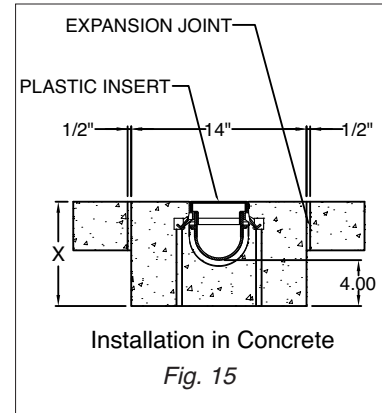
WARNING!!!

When cutting sections of Smith Enviro-Flo®II, wear protective eyeglasses.

Protective eyewear should always be worn when cutting, drilling or sawing.

Observe all safety precautions when operating electrical or hand tools.

***Note:** This trench drainage system is designed for "on grade applications only," as there are no provisions for a flashing flange or flashing clamp



Figs. 15-18 Installation procedures into different materials (x = variable dimension).

Retrofit Installations

Smith Enviro-Flo®II drains are an ideal system for providing drainage in existing hard surfaces. This may be accomplished by saw cutting the existing surface with 2 cuts at a minimum of 18 inches apart. The concrete is then removed and an excavation is made to accommodate the channels. Install the channels as previously described in step #5 on page 4 and pour concrete around channels. Inserts that are provided need to be installed in channel grate seat prior to concrete pour. The 2 x 4 hangers need to be anchored to the slab or form boards whichever method is used. This will help prevent floating by the channel system.

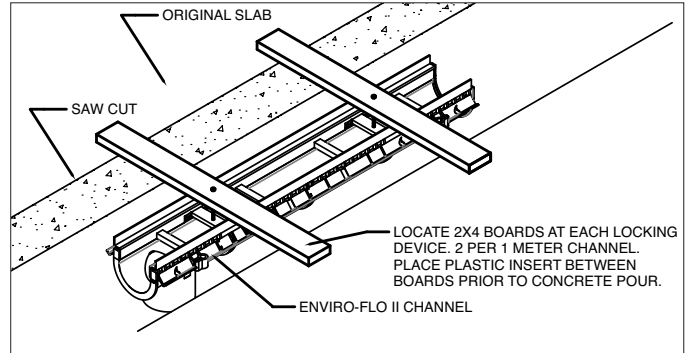


Fig. 19 Retrofit installation of a Smith Enviro-Flo®II Drain System.

Expansion Joints

When a system is being installed across an expansion/contraction joint in a floor slab, the following procedure should be used. The channel should be marked where it crosses the expansion/contraction joint. Cut the channel into two sections at this point. Next, separate the two channel pieces by the width of the expansion/contraction joint itself. Then, fill this space with a silicone or other suitable flexible material.

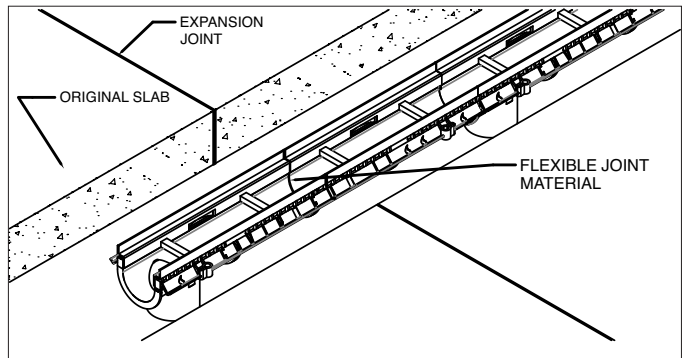


Fig. 20 Channel installed across an expansion/contraction joint

Cutting Enviro-Flo®II Channels and Forming Miter Joints

Mitered joints are made by sawing the channel to desired angle. Use suitable sealant at joint and butt together. Secure mitered joint with self tapping screws (min. 1 1/2") prior to concrete pour. Should channels be used in corrosive environment, heat welding is recommended.

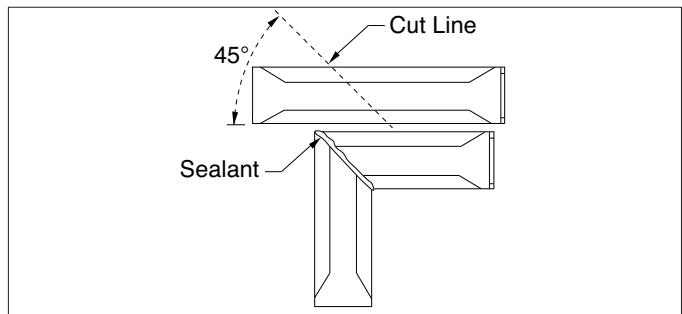


Fig. 24 Mitering Enviro-Flo®II Channels

WARNING!!!

When cutting Smith Enviro-Flo®II channels protective eyeglasses are recommended.

CALL FOR INSTALLATION ASSISTANCE

Jay R. Smith Manufacturing Company is a world leader in the development and production of drainage products, including trench drain systems for a variety of drainage applications. Our service representatives and distributors are willing to work with you to plan your drainage needs and support you with installation assistance.



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