

VIKIMATIC MULTICELL CONDUIT SYSTEMS

These guidelines should help you install MultiCell Conduit in the simplest way possible and should be read in their entirety before attempting to install the system to have as smooth an installation as possible.

To be certain that the conduit has been properly placed, the conduit work should be inspected throughout the construction period by a trained inspector who is completely familiar with the job and construction specifications. The inspector should confirm the MultiCell run is in the correct location, proper conduit depth is maintained, the trench bottom is level, all joints are properly made, horizontal and vertical alignment is maintained and select backfill is used.

MultiCell Conduit is packaged from the factory in bundles. Each bundle contains sections of pipe that measure 20 feet. Each section of pipe is shipped with a protective wrap on both ends which prevents any foreign material from entering the MultiCell before being installed in the ground. MultiCell Steel Conduit is normally manufactured in 10 foot lengths.

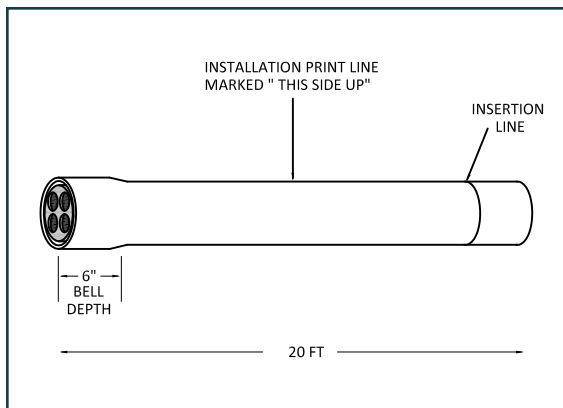


Figure 1. MultiCell Outline

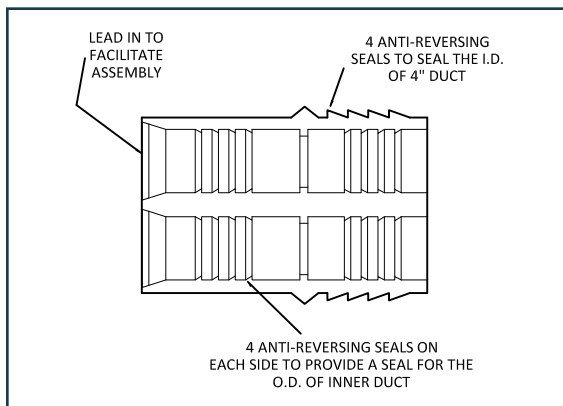


Figure 2. MultiCell Coupling Body

STANDARD PVC DUCT

The Standard 4-way or 3-way PVC MultiCell is available in several configurations. We can provide a MultiCell assembly with an outer shell of Type C duct, Schedule 40 UL conduit or Schedule 80 duct. These are intended mainly for direct burial installation. (See Figures 1 and 2) We can also provide a boreable 4-way or 3-way MultiCell with a locking Schedule 40 outer duct is also available.

FIBERGLASS DUCT

For aerial and underground installations.

This MultiCell system is also manufactured with a fiberglass outer duct. The outer duct is available with a .070 inch wall, .090 inch wall or .250 inch wall thickness in bullet resistant fiberglass. Fiberglass installed above ground is joined with a 2-part epoxy.

STEEL DUCT

For underground boring or underbridge applications.

Provides extra tough protection with either three or four inner ducts inside a 4" Schedule 40 galvanized steel outer duct. Expansion joints for underbridge applications are readily available. (See Figures 3 and 4)

Vikimatic MultiCell engineers will review any specifications for a custom MultiCell proposal. Give us a challenge!

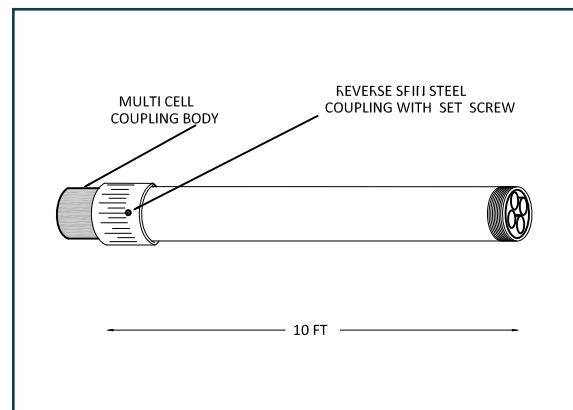


Figure 3. MultiCell Galvanized Steel

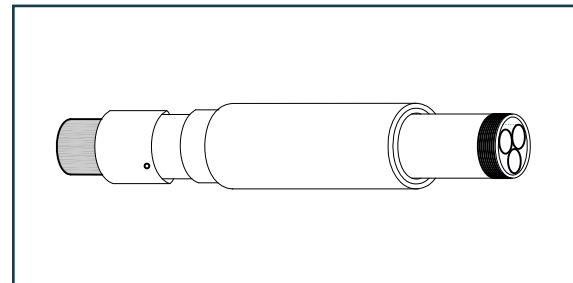
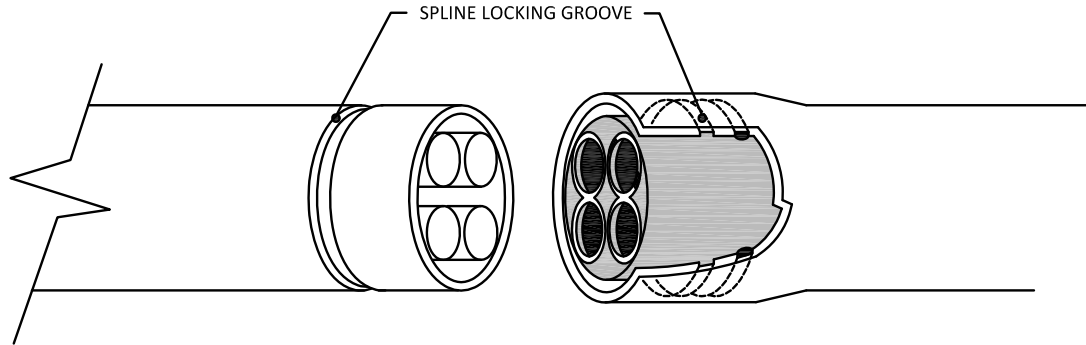


Figure 4. MultiCell Steel Expansion Joint

VIKIMATIC MULTICELL BOREABLE

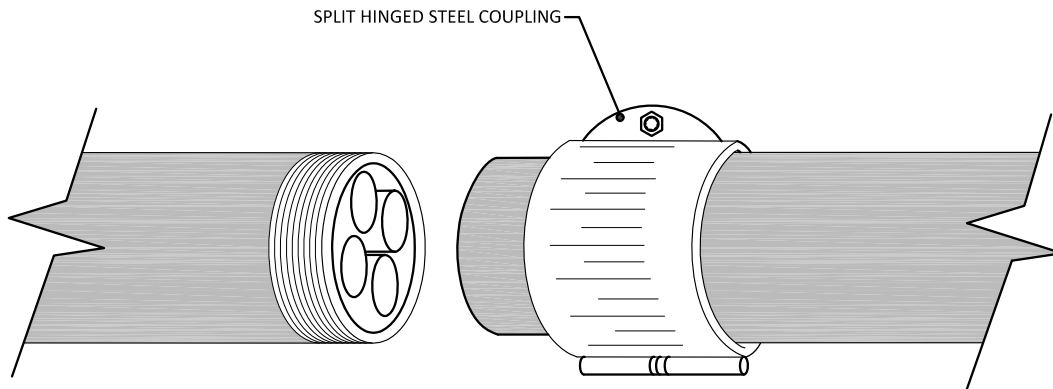


MULTICELL

Part Number	No. of Inner Ducts	Description	PSI Rating (each)	Max. Inner Dimension (in)	Min. Wall Thickness (in.)
MCB 43	3	MultiCell 43 Steel Conduit	200	1.507	.079
MCB 44	4	MultiCell 44 Steel Conduit	200	1.194	.063

VIKIMATIC MULTICELL PVC COATED

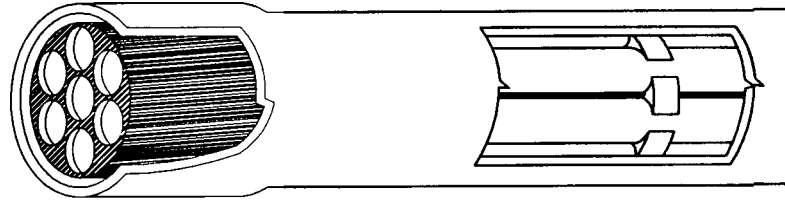
Part Number	No. of Inner Ducts	Description	PSI Rating (each)	Max. Inner Dimension (in)	Min. Wall Thickness (in.)
MCSC 43	3	MultiCell 43 Steel Conduit	200	1.507	.079
MCSC 44	4	MultiCell 44 Steel Conduit	200	1.194	.063



VIKIMATIC MultiCell

This MultiCell can be made with standard wall, heavy wall, and bullet-resistant fiberglass, as well as steel and PVC.

Elbows, Expansion Joints, and other miscellaneous fittings available upon request.



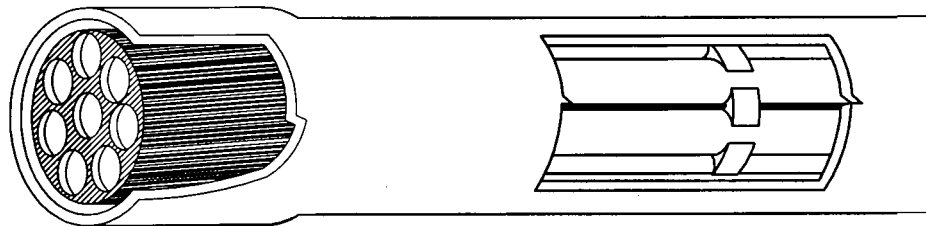
Part Number	No. of Inner Ducts	Description	Max. Inner Dimension (in.)	Min. Wall Thickness (in.)
MCF57	7	5" Fiberglass MultiCell 7-Way	1.312	.063

Note: Standard length of MultiCell is 20'. 10' is available; please call for details.

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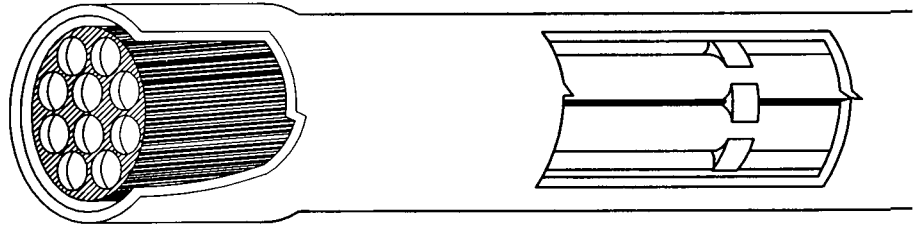
Part Number	No. of Inner Ducts	Description	Max. Inner Dimension (in.)	Min. Wall Thickness (in.)
MCF68	8	6" Fiberglass MultiCell 8-Way	1.507	.079

Note: Standard of MultiCell is 20'. 10' is available; please call for details.

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MULTICELL

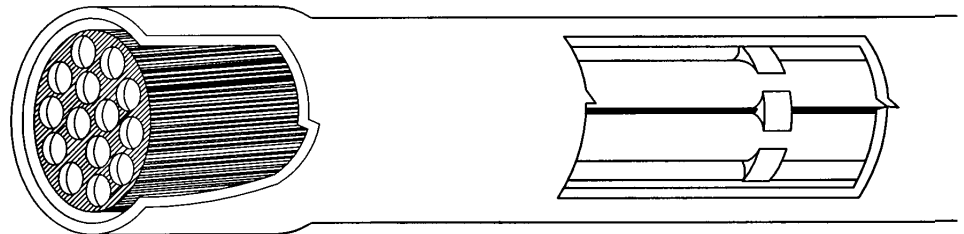
Part Number	No. of Inner Ducts	Description	Max. Inner Dimension (in.)	Min. Wall Thickness (in.)
MCF610	10	6" Fiberglass MultiCell 10-Way	1.194	.063

Note: Standard length of MultiCell is 20'. 10' is available; please call for details.

VIKIMATIC MULTICELL

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Elbows, Expansion Joints, and other miscellaneous fittings available upon request.



Part Number	No. of Inner Ducts	Description	Max. Inner Dimension (in.)	Min. Wall Thickness (in.)
MCF814	14	8" Fiberglass MultiCell 14-Way	1.507	.079

Note: Standard of MultiCell is 20'. 10' is available; please call for details.

VIKIMATIC MULTICELL INSTALLATION

SAFETY

Safety headgear, eye protection, and any safety wear normally required when laying plastic underground conduit should always be worn. Individual company guidelines for safety should also be followed.

HANDLING

When unloading MultiCell from the delivery vehicle, mechanical equipment should be used. If possible, distribute the MultiCell along the route of the trench site as it is unloaded. Where MultiCell cannot be distributed in this manner, the delivery and storage should be covered by local instructions.

MultiCell Conduit must be handled with reasonable care to avoid damage from impact or crushing. When moving or carrying MultiCell Conduit, be careful not to strike the ends against a hard surface.

TRENCHING

For economical operation particularly where paving is involved, the trench width should be no greater than is needed to provide adequate working space. This will reduce the amount of surface to be repaved. Generally, this dimension is controlled by types of excavating equipment used. As a minimum, the trench must be four inches wider than the width of the conduit structure where the backfill will be used and three inches wider where concrete encasement will be used. Individual job specifications will dictate trench width as well.

Grade and level the trench bed. Where necessary, provide sand and/or granular backfill as bedding material so the conduit will be evenly supported over the length of each section.

VIKIMATIC MULTICELL ASSEMBLY

STANDARD PVC DUCT

In The Trench

Every 20 foot section of MultiCell is manufactured with the outer duct's letter lines marked in direct relationship with the inner duct position. This is to assure a twist free inner duct installation. Simply install every section of pipe with the letter line facing upward in the trench. (See Figure 5)

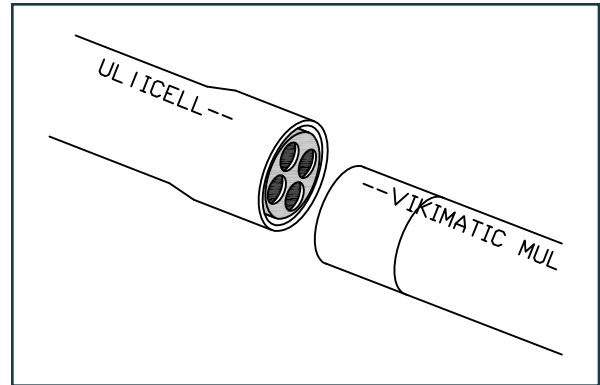


Figure 5. MultiCell's Letter Line Alignment System

***NOTE: To assure continuity of inner duct colors make sure all bell ends of each joint placed are facing in the same direction throughout your project.**

When connecting typical bell and spigot ends of MultiCell, make sure that the spigot end's key inner duct is aligned with the marked opening within the bell end when connecting the two ends.

At this time, the letter line of the pipe being added should be upward in the trench. If not, the added pipe's outer duct may be rotated to turn the line upward before completing the connection while the inner ducts are partially inserted into their respective sockets.

As one person keeps the two pipes in straight alignment with each other, a second person can insert the added section.

On Top Of The Trench

After preparing the trench as described earlier, the MultiCell can be assembled on top of the ground outside the trench. Once joined together, the MultiCell can then be laid gently into the trench. Backfill according to the job specifications.

FIBERGLASS DUCT

Fiberglass MultiCell assembles in the same manner as PVC with one additional step. In the installation on the fiberglass type, the use of fiberglass epoxy to cement the outer shell of each joint in place is necessary.

***NOTE: At no time should cement be applied to the bell end, internal coupling assembly, inner ducts, or the inside of the spigot end.**

Adapting Fiberglass To PVC

Fiberglass MultiCell is easily adaptable to PVC MultiCell by the use of a specially designed adaptor available through Vikimatic. A male end is required on both pipes to be joined. The internal coupling body that inserts inside of the fiberglass side is the same female type coupling that normally inserts into the fiberglass. The outer coupling contains a fiberglass section that slips over existing fiberglass duct and is cemented in place using fiberglass epoxy.

STEEL DUCT

Each 10' or 20' section of Steel MultiCell is shipped with a threaded steel couplet attached and an internal duct coupling body for use in connecting each length. Insert the coupling body protruding from one end of steel pipe into the male end of the connecting section. Push the two pieces of pipe as close to the center of the coupling body as possible and join the two pieces by using the threaded coupler. While keeping the two pieces of pipe from rotating, use a pipe wrench to tighten the threaded coupler.

Adapting Steel To PVC

Steel MultiCell is easily adaptable to PVC MultiCell by the use of specially designed adaptor available through Vikimatic. Installing it requires a male end on both pipes to be joined. The internal coupling of the adaptor is a female coupling body that inserts inside the steel conduit around the inner ducts. The outer coupling threads over the outside of the steel duct. The PVC MultiCell is then aligned with the female coupling body and inserted into the outer portion of the adaptor and cemented in place over the PVC conduit. (See Figure 6)

DIRECTION CHANGES

In order to make optimum use of the conduit system for subsequent cable placing operations, particular care should be taken concerning direction changes. The ideal duct structure is one that is essentially straight and allows drainage grading into manholes. Directional changes should be made as gradual as possible.

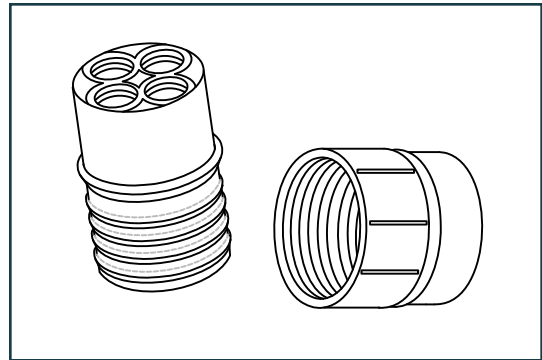


Figure 6. MultiCell/Steel to MultiCell/PVC Adaptor

Bores

When a bore has to be made, the recommended procedure is to install the boreable Multicell with a locking SCH40 outer duct.

In an instance where this is not possible and only a 4" existing pipe is present for a bore, the inner duct used inside of the MultiCell is available from Vikimatic in appropriate lengths for insertion through the existing bore pipe.

After installing the inner duct through the existing pipe, cut the inner duct flush to existing pipe end. Install compression duct organizers within each end of the bore to keep the ducts from moving. Any of the various threaded and/or adhesive adaptors may then be attached at the ends to allow for standard gasket MultiCell connection. MultiCell Steel may also be used in the bore. A simple Vikimatic MultiCell PVC to MultiCell Steel adaptor is used at each end.

Bends

Vikimatic provides bends of different degrees and radii for special construction; however, these should be used only where specified on the detailed plan. Standard bends include 11 ¼°, 22 ½°, 45°, and 90° in 36", 48", 72", and 108" radius are standard. Custom sizes, flex PVC, and flex steel bends are available by contacting Vikimatic.

FIELD CUTS

When it becomes necessary to join two sections of MultiCell that are being installed from opposite directions, the following procedure should be followed as dictated by job conditions.

Joining A Male And A Female End With A Joint Of A Pipe

When two sections are to be joined and less than a 20' section is needed, simply measure the length of the spigot end to be cut off as you would in a typical empty conduit installation.

One simple flush cut should then be made straight through both the outer and inner ducts to create a new spigot end. If the inner ducts need supporting after the cut, install a spacer taken from the drop-off to help realignment. Remove any burrs from the cut area.

Insert the new spigot end into the bell, as you would a normal 20' length. Separate the remaining two pieces and insert the existing spigot end into the added piece's bell end to complete the connection.

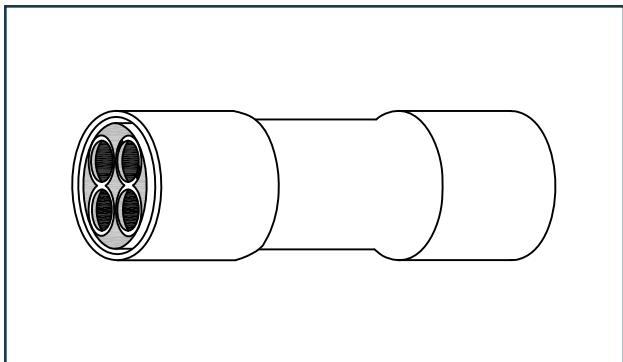


Figure 7. Bell x Bell Standard Coupling

Joining A Male To A Male End

A "bell x bell" coupling is available when joining two sections of conduit without bells. (See Figure 7)

Expansion Slip Coupling

Sometimes a "bell x bell" coupling will not work because you cannot flex either end of a conduit run to insert into a bell. A "bell x bell" Expansion Slip Coupling is available with 8" of travel. This allows the coupling to expand to join two sections of conduit where a standard "bell x bell" coupling cannot be used. (See Figure 8)

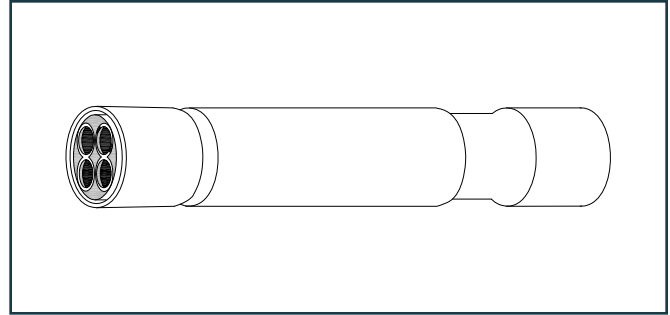


Figure 8. Bell x Bell Expansion Slip Coupling

DUCT PROOFING

A compressor having a volume rating of 200 C.F.M. at a pressure of 100 PSI is recommended for this procedure. Remove all inner duct plugs in case there was an error made in inner duct rotation at one of the joints during installation. Any water, rocks, or other debris must be blown clear from the system before attempting to place rope or cable.

Do not attempt to blow rope or lines lighter than 3/16" into MultiCell. The probability of bunching or bird nesting of lighter lines causing blockages could lead to expensive dig ups. Successful line blowing of 1/4" rope has been made over distances of several thousand feet.

The use of specially designed gun and missiles is imperative for successful line placement within the MultiCell system. Other missiles may not fit the inner duct's inside diameter as well. This would cause either air leakage past the missile or excess friction while attempting to blow the rope.

Full air compressor volume should be applied during the entire run to make full use of the forward momentum of both the rope and air. The spinning reel of rope should be allowed to almost freewheel while applying only slight resistance to prevent backlashes as the missile gets further into a log run that could still contain some water, it may drastically slow down from the accumulation of water ahead of the missile. If the line slows and stops before the end, maintain consistent full air volume while pulling back on the line and let it snap loose until it begins to move again.

TERMINATOR KITS

The MultiCell terminator kits are about the most important elements of the system. The easy to install gasket terminator kits are used in lieu of messy foams and expandable duct organizers. (See Figure 9)

CABLE PULLING

Cable placing operations in MultiCell are accomplished in the same way as cable placement in conduit with reeled inner duct. Commercially available cable lubricants should be utilized as recommended by the manufacturer.

10' REPAIR KIT

To repair a section of 4-way or 3-way MultiCell System, Vikimatic supplies a 10' Repair Kit. Simply cut away exactly 10' of existing conduit system. Use extreme care when cutting and slitting duct with cables.

Slip the Slit/Keyed Coupling over the existing MultiCell conduit. Make sure the keyed end is facing the section being repaired. Repeat this process on the other end of existing conduit.

Next, insert the Slit Coupling Body inside the existing MultiCell conduit, fitting the cable into the slit duct passage. Repeat this process on the other end of the existing conduit.

Carefully insert the cable into the Slit Corrugated Inner duct. Push the inner duct into the Coupling Body. Install remaining smooth wall ducts into the other Coupling Body openings.

Install the provided spacers to evenly support the inner ducts.

Lay one piece of the split PVC Snap Cover under the installed inner ducts. Install the other piece on the top of the inner ducts, align the two sides and snap into place.

Solvent cement the Slit/Keyed Coupling Covers in place over the split PVC to complete the procedure. Backfill according to the job specifications.

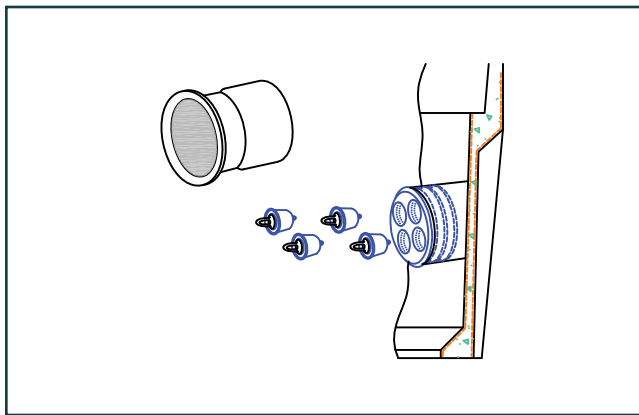


Figure 9. MultiCell Terminator Kit

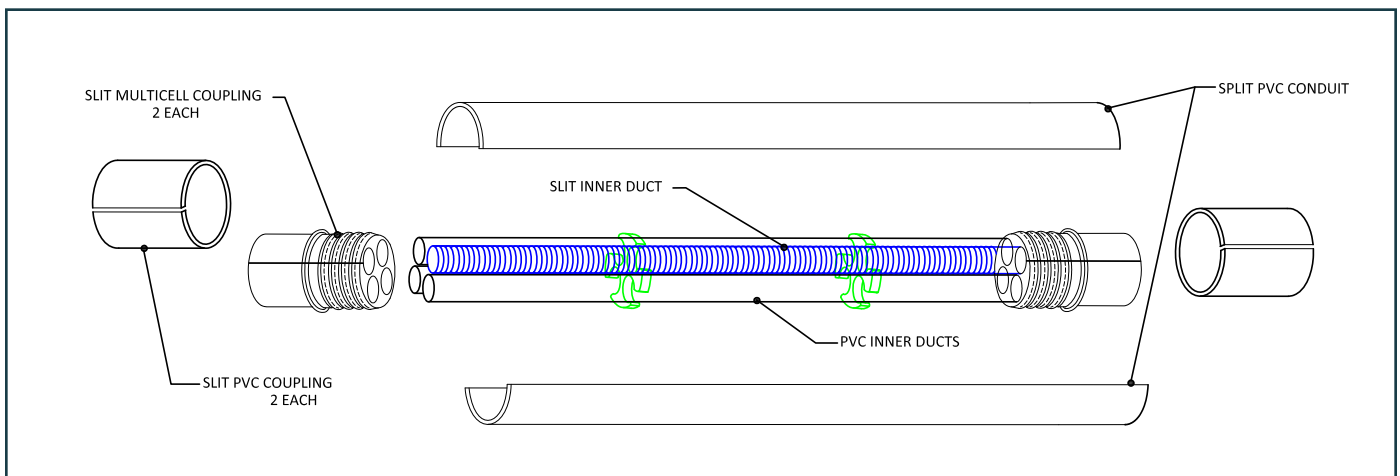


Figure 10. MultiCell 10' Repair Kit