

MULTI-GARD™ INSTALLATION PROCEDURES

The Multi-Gard PVC System is designed for easy assembly as follows:

1. Distribute Multi-Gard sections along the sides of the trench with male ends pointing towards starting vault entrance.
2. Remove protective cap and install Multi-Gard terminator on male end. Install first section into vault opening or enclosure making sure the print line is on the top stating "INSTALL PRINT LINE UP."
3. Each consecutive 20' section can now be placed by inserting the male end into the gasketed belled end 1/2" to the gasket depth. Make sure the print line is upright. (If not, rotate the outer duct until it is.) Now push the sections together with a firm push by hand until belled end seats against insertion line. (Apply standard grade cement (VC9962) to male end if system will be used for jetting).

Terminations

Standard Terminators (Type1) allow Multi-Gard to be terminated into a standard pre-cast termination for Type C or Type 40 PVC.

1. Remove watertight plugs in order to assure total insertion of the Multi-Gard innerducts.
2. Install terminators into male end of Multi-Gard to full depth.
3. Replace watertight plugs into the terminator and tighten.
4. Insert prepared male end into the pre-cast terminator with print line facing upward. Solvent cement into place.
5. Use shim enclosed for terminator requiring a connection of Type C (4.35 O.D.) into a Type 40 (4.50 O.D.) termination.

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Use a [Type 1 Standard Terminator](#) also at an entrance where a pre-cast terminator is not available or a knockout is used:

1. Insert the male end section of Multi-Gard 4 inches past the inside wall of the vault with print line facing upward.
2. Remove the protective cap from the male end of the Multi-Gard.
3. Remove the watertight plugs and insert the terminator to full depth.
4. Install bell fitting over the end of the Multi-Gard using solvent cement, and replace plugs.
5. Slide Multi-Gard section until bell fitting is flush with inside, and then seal entrance as required by job specifications.

Use a [Type 6 Enclosure Terminator](#) at entrances into metal or non-metallic enclosures above ground.

1. Remove watertight plugs in order to assure total insertion of the Multi-Gard innerducts.
2. Install terminators into male end of Multi-Gard to full depth.
3. Replace watertight plugs into the terminator and tighten.
4. Install threaded adapter over end of Multi-Gard using solvent cement. Insert adapter through enclosure hole and provide 4" locking ring.
5. Use shim enclosed for terminator requiring a connection of type C (4.35 O.D.) termination.

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The [Multi-Gard belled end](#) may also be used as a terminator at entrances without pre-cast terminators.

1. Insert the belled end flush with the inside wall of the vault with print line facing upward.
2. Insert water tight plugs into unused cells.
3. Insert flared bell fitting to full depth.
4. Seal entrance as required by job specifications.

Use split plugs for sealing Multi-Gard cells where cable has been installed.

The [pass-through terminator](#) is designed to allow for continuous ducts through the vault or hand hole for cable pulling.

1. Install terminator into vault following steps 1 through 5 for standard Type 1 terminator.
2. Cut innerduct of pass through kit 10" longer than the width of the manhole. Add spacers as needed.
3. Upon completion, remove the watertight plugs and install innerducts to traverse manhole/handhole by cutting to length inserting into one side of handhole and raising or bowing center of innerduct span to insert into the pass-through terminator on the opposite side.

Use the [jet terminator](#) for jetting operations.

1. Remove watertight plugs in order to assure to total insertion.
2. Apply standard grade solvent cement (VC9962) to male end of Multi-Gard. Install jet terminator to insertion line.

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3. Replace watertight plugs into terminator and tighten.
4. Apply standard grade solvent cement to terminator male end and insert into pre-cast bell end. (Install PVC bell fitting in kit if pre-cast bell end is not available).
5. Use shim enclosed for terminator requiring a connection of Type C (4.35" O.D.) into a Type 40 (4.50" O.D.) termination.
6. Measure between ends of terminators on opposite ends of vault, and cut innerduct to length.
7. Solvent cement each coupling into place or use mechanical coupling rated for use with high speed air blowing systems.

Multi-Gard PVC Trenching

Installation allows Multi-Gard in the trench to be placed one section at a time or over the trencher for continuous feed. Open trenching with Type C Multi-Gard is recommended for direct burial or concrete encased applications.

Features:

- Install one section at a time.
- Multiple-cells are installed as soon as product is placed.
- Economical installation with installation speed as fast as the trencher can dig.
- Easy installation with standard equipment.
- Gasketed coupling body prevents conduit pulling apart during installation.

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- Industry standard outer duct in Type C is suitable for direct burial.
- Type 40 outer shell and Type 80 outershell are available where extra protection is necessary.
- Spacers inside outershell allow PVC innerduct internal movement allowing for more flexibility.

Procedures:

Paved Areas In paved areas, the surface should be carefully cut to prevent unnecessary excessive width at the top of the trench and help reduce the amount of surface to be repaved.

Trench Width For economical operation, particularly where paving is involved, the trench width should be no greater than is needed to provide adequate working space. Generally, this dimension is controlled by the types of excavating equipment used. As a minimum, the trench must be 5 inches wider than the width of the conduit structure where backfill will be used and 3 inches wider where concrete encasement will be used. Individual job specifications will dictate trench width.

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

Assembly On Top Of The Trench After preparing the trench, the Multi-Gard can be assembled on top of the ground outside of the trench. Once joined together, the Multi-Gard can then be laid gently into the trench. Backfill according to the job specifications.

Trench Feeding Multi-Gard Using Rollers This procedure involves assembling the Multi-Gard above the ground. After the first four or five lengths are assembled, place on top of the trenching machine. The remainder of the duct can

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be attached to the first section and assembled ahead of the trencher on the ground directly above the intended place for the trench. As the trencher advances forward, the Multi-Gard will lay itself into the trench behind. Once placed in the trench, backfill according to the job specification.

Multi-Gard PVC Boring

is easy with the following installation procedures. These recommended procedures have been tested by Carlton engineers for the easiest procedure with the maximum holding strength.

Features:

- Install one section at a time.
- Easy field application.
- Multi-Gard sections push together easily without tools.
- Each joint can be connected as the Multi-Gard is being pulled.
- Gasketed coupling body is water tight keeping out water and drilling fluids.
- Only tool required is a battery operated drill with 1/4" hex head bit.

Procedures for attaching to back reamer:

(After bore has been made according to the boring equipment manufacturer's recommendations.)

1. Place mesh pulling grip over capped plain end. The first section is now ready for pulling.

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2. Assemble next section of Multi-Gard by applying Carlton Quick-Set™ Cement to the outside of the plain end. Then, push the plain end into the belled end, checking for print line alignment.

3. Screw a #10 hex head self tapping screw (refer to chart for length) approximately 3" and 4" from the end of bell at approximately 90°. A total of 8 screws will give the joint tensile strength given in the table below. Repeat procedures 2 and 3 on each Multi-Gard PVC section.

Multi-Gard PVC Sections

Part No.	Description	Length	Screw Length	Joint Tensile lbs.	Outer Dim.	Pkg. Qty.	Wt. per 100 Ft.
MFSS4S-020	Type 40 4cell	20'	3/4"	5000	4.5	960'	338
MFSS3S-020	Type 40 3-cell	20'	3/4"	5000	4.50	960'	340
MDSS4S-020	Type 80 4-cell	20'	3/4"	5000	4.75	760'	450
MDSS3S-020	Type 80 3-cell	20'	3/4"	5000	4.75	760'	452

Bore Accessories

Part No.	Description	Pkg. Qty	Wt. Ea. (lbs.)
MAG4	4.25 - 4.487 Meshgrip (7,000 wk. load) 58"	1	2.7
VC9982	Carlton Quick-Set Solvent Cement Quart	12	2.4