

# Spirolite

**BULLETIN No. 912 –  
MANHOLE & PUMP STATION  
INSTALLATION GUIDE  
ASTM F1759/ ASTM D2321**



**High Density Polyethylene Manholes & Pump Stations**





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*This bulletin is intended to be used as a guide to support the designer in the use of Spirolite pipe. It is not intended to be used in the place of a professional design engineer. The information contained herein cannot be guaranteed because the conditions of use are beyond our control. The user of this bulletin assumes all risk associated with its use.*

# SPIROLITE MANHOLE INSTALLATION GUIDELINES

## ! WARNING !

*ISCO recommends that all entries into Spirolite manholes, including those containing ladders, be made using a safety harness attached to a fall protection system. The standing surfaces and walls of the manhole may be slippery, particularly when wet. Use due caution when working inside the manhole. All OSHA, local, and other applicable confined space entry procedures must be followed including the implementation of a three-man crew and use of gas detection equipment to prove the atmosphere safe.*

### INTRODUCTION

The key to a successful installation is achieving stable and permanent support under and around the manhole. Uniform and proper placement of the foundation and backfill materials is necessary to obtain permanent support. All applicable safety procedures should be strictly followed during handling and installation of Spirolite manholes. All construction must be done in accordance with local, state, and OSHA regulations, including but not limited to:

- Trench excavation, including placement of bracing, sheathing and trench shields
- Entry and egress of trenches, pipes, and manholes
- Heavy equipment operation



**FIGURE 1A: PLACING MANHOLES**



**FIGURE 1B:  
MANHOLE TRENCH IN LANDFILL**

### HANDLING

Safe handling instructions are provided with each shipment of pipe and manholes. **Failure to follow these instructions may result in severe injury, death, or property damage.** Prior to off-loading and handling any ISCO structures, it is imperative that all personnel involved in their handling be acquainted with the Handling Instructions.

The delivery vehicle and lifting equipment must be parked on level ground with stabilizers fully extended and set. Parking brakes must be set and wheels chocked where applicable. The unloading equipment should be inspected for condition and lifting capacity before use. The structure should be lifted

with a crane or backhoe using slings of sufficient capacity to safely handle the load.

Structures shall be moved using the lifting lugs connected to the manhole wall. All lugs are equally spaced around the circumference. A web style strap, such as nylon, shall be connected to each lug on one end and held together with a hook on the other end (as illustrated in Fig. 1), taking care to distribute the load equally between all lugs. When standing the structure upright, do not lift by lifting lugs. Wrap straps around the structure and use the lugs as strap stops. Lift with the straps. Once the structure is vertically “righted”, then the lugs may be used for lifting.

**The following should be met:**

- Use only web style slings when lifting the structures. Do not use wire rope or other devices that may cut into the lifting lugs or provide insufficient force distribution.
- Do not sling by fewer lugs than those provided on the structure.
- Do not lift structure when containing fluid or any other materials.
- Do not stand on, under, or around structure while it is being lifted.

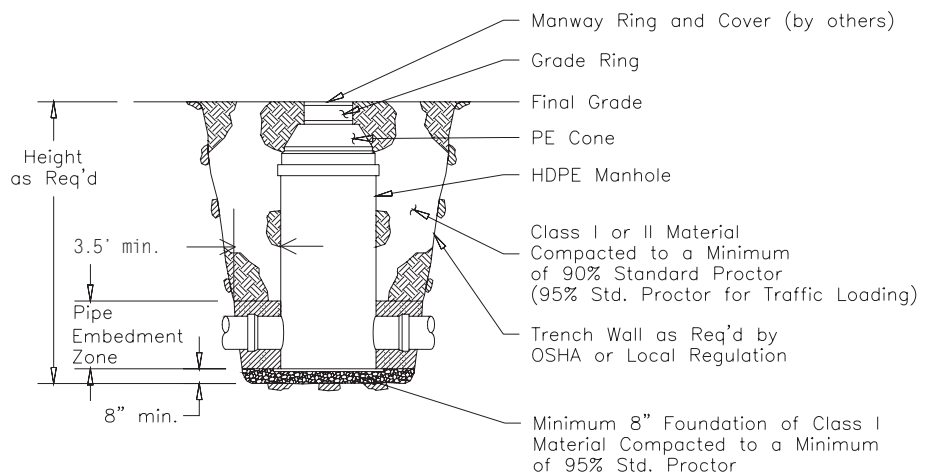
## MANHOLE INSTALLATION

### **! WARNING !**

*Consult the appropriate authorities on trench construction requirements.  
Take all safety precautions when working in or near a trench.*

ISCO recommendations for the installation of manholes satisfy the design assumptions given in Section 4.2 of ASTM F 1759. ISCO recommends that the manholes be placed on a stable base and embedded with a compacted coarse-grained embedment material that extends radially at least 3.5 ft from the perimeter of the manhole or to undisturbed situ soil (whichever is greater) and for the full height of the manhole. Direct installation in new or active sanitary landfills or other fills subject to large settlements require special considerations outside the scope of these recommendations. Figure 2 shows ISCO's recommendations.

**FIGURE 2: TYPICAL INSTALLATION RECOMMENDATIONS FOR SPIROLITE MANHOLES DEWATERING**



The manhole trench must be dry during installation. Dewater by installing deep wells, sumps, well points, or other methods appropriate for the particular site. Maintain dewatering until completion of backfilling to prevent flotation during construction.

## FOUNDATION

The manhole should be installed on a stable foundation. All large rocks and clumps should be removed from the trench bottom. The foundation should consist of a minimum of 8" of Class I material (as defined by ASTM D 2321) compacted to a minimum of 95% Standard Proctor (as defined by ASTM D 698). Placement on a concrete slab foundation is also acceptable. In unstable insitu soils, a sub-foundation may be required to obtain a stable trench bottom. The sub-foundation can be constructed by removing weak organic or otherwise unstable soils and replacing them with stable, compacted materials.

## BACKFILL AND COMPACTION

ISCO recommends the use of Class I or II material as defined by ASTM D2321 for embedment of the manhole. Place lifts not exceeding 8" and mechanically compact to the density specified by the Engineer or 90% Standard Proctor (95% under streets), which ever is higher. Compacted backfill must extend to the trench wall or undisturbed soil. This distance from the manhole (outside surface of the riser) to the trench wall must be at least 3.5 feet. See Figure 2.

When lateral pipe connections enter the manhole, the embedment requirements for the pipe located within the backfill zone of the manhole must meet or exceed both the minimum requirements for the manhole, as well as, the minimum requirements for the pipe.

## CONCRETE ANTI-FLOTATION COLLARS

When a concrete collar and anchor connection ring is used to resist flotation, compacted foundation material should extend above the anchor connection ring to the bottom of the concrete collar as shown in Figures 3 & 4.

## FLOWABLE FILLS

When placed correctly, flowable backfill material, including materials such as concrete, cementitious grout or controlled density fill (CDF), can provide reliable manhole support. Precautions must be taken to avoid buckling and/or floating the manhole during placement of flowable fill. These precautions may include filling the manhole with water, placing flowable fill in lifts, and strutting the inside of the manhole. The Owner or Owner's Engineer should review and approve the installation procedure for each flowable backfill application. ISCO disclaims any and all liability for manholes that are damaged during the placement of flowable backfill.

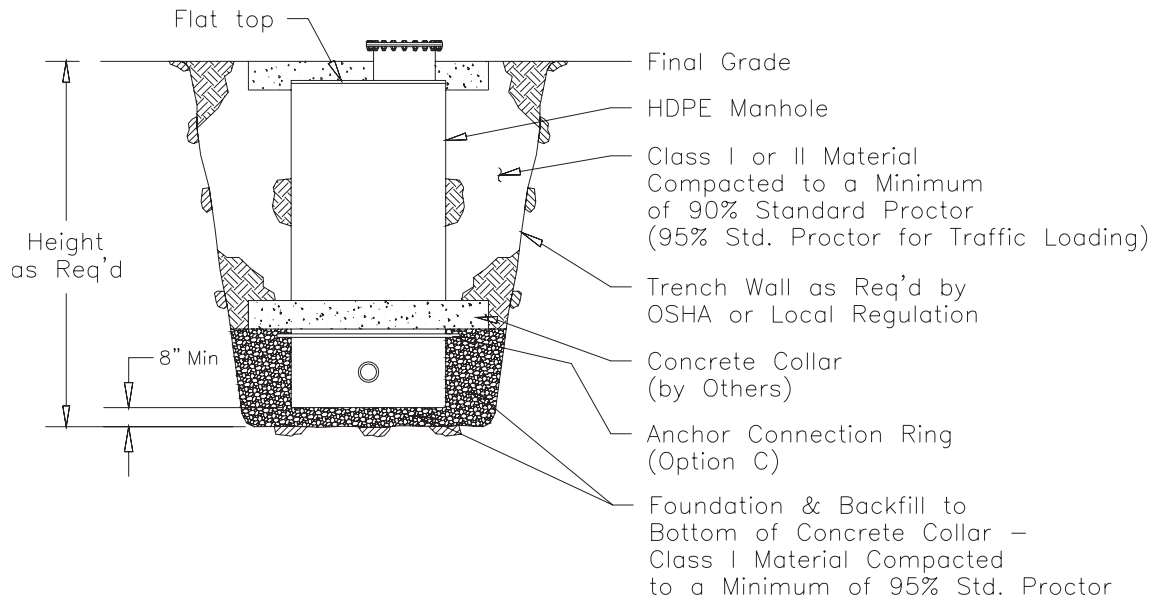


**FIGURE 3A: PLACE MANHOLE ON STABLE FOUNDATION**



**FIGURE 3B: MEASURING EMBEDMENT DENSITY**

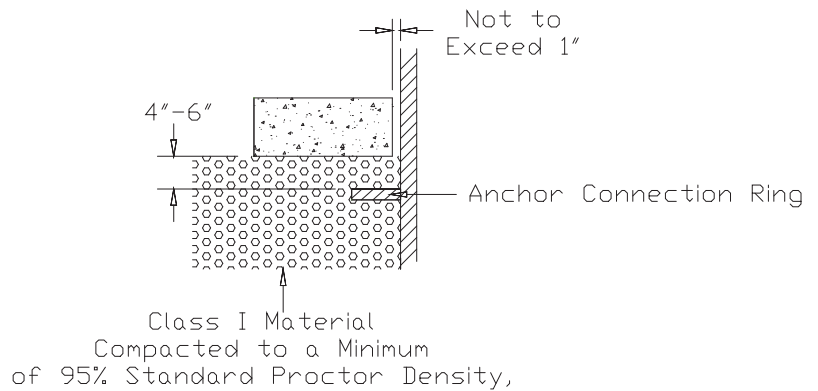
**FIGURE 4:  
SPIROLITE  
MANHOLE  
INSTALLATION  
WITH ANTI-  
FLOTATION COLLAR**



**FINISHING MANHOLE TO GRADE**

Manholes with cone tops can, in most cases, be field adjusted to accommodate the final grade. The riser may be cut to remove excess riser height, provided it is not obstructed by a ladder or other appurtenance and is cut even and square. The cone top may then be placed on the riser. A concrete grade ring or course of bricks may be placed on the cone's shoulder to support the cast iron ring and to make any final grade adjustments. See Appendix C, "Spirolite Manhole Cone Installation."

**FIGURE 5: DETAIL OF CONCRETE ANTI-FLOTATION COLLAR INSTALLATION**



***Manholes with flat tops are manufactured to the appropriate height specified by the Owner or Owner's Engineer to accommodate the final field grade required. The height of such manholes cannot be easily field adjusted. Before ordering the manhole, the Owner should verify the correct height.***

**VEHICULAR LOADS REQUIRE REINFORCED CONCRETE MANHOLE CAPS**

Wheel loads from cars, trucks and other vehicles can produce significant force on buried manholes and therefore must be considered in design. The most common loading used for design is the H-20 highway loading. The American Association of State Highway and Transportation Officials (AASHTO) publishes wheel loads for the standard H-20 highway loading.

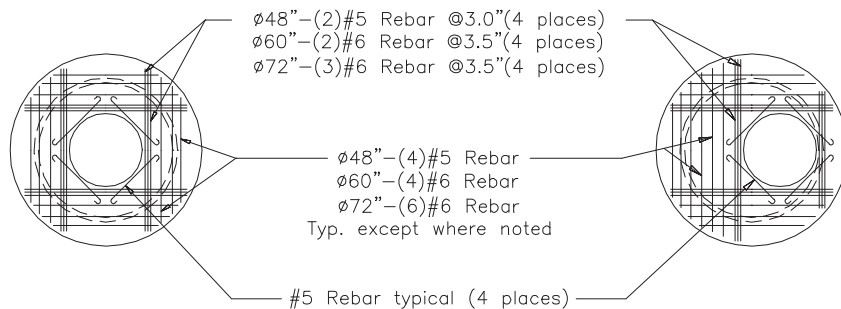
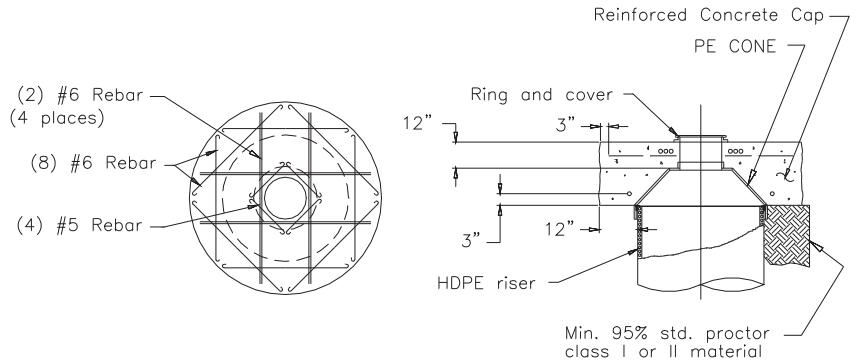
# ! WARNING !

When Spirolite manholes are installed in streets, under pavement, or where there is vehicular traffic, a concrete cap must be placed over the manhole to provide independent support for the vehicular load. Failure to do so may result in property damage, injury or death.

HDPE manholes will normally not be adequate to resist vehicular loads without use of a rigid cap or slab. The cap or slab is typically made from reinforced concrete and transmits the majority of the vehicular load into the soil instead of the manhole riser. Ultimately the responsibility for the design of the rigid cap rests with the Owner's Engineer. For convenience, typical concrete cap designs are shown in Figures 6, 7, and 8 for manholes with cone tops and for flat top manholes. If the Owner's Engineer chooses to incorporate these details into contract specifications, he/she must review and approve them for structural competence.

The concrete used to form caps typically has a minimum of 3000 psi compressive stress and may be pre-cast or poured-in-place. When pouring caps in place over a flat manhole top, the Engineer should determine, based on the stiffness of the top, whether or not a form is required to carry the static head of the wet concrete to prevent excessive top deflection of the manhole. Figure 6 shows a typical concrete cap for a manhole with a cone top. Figure 7 shows concentric and eccentric manhole caps for 48", 60" and 72" diameter manholes. A side view of this cap along with installation details is shown in Figure 8.

**FIGURE 6:  
POURED IN PLACE CONCRETE  
CAPS FOR 48" AND 60" PE  
CONE TOPS**



**FIGURE 7:  
CONCENTRIC AND ECCENTRIC  
MANHOLE CAPS FOR HDPE FLAT  
TOP RISER (PLAN VIEW)**

**FIGURE 8:  
TYPICAL INSTALLATION DETAIL OF  
A CONCRETE CAP FOR 48", 60"  
OR 72" FLAT TOP RISER**

