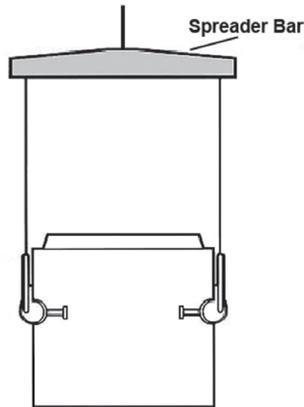


Recommended Installation Procedures Storm and Sanitary Sewer Manholes

Lifting Apparatus

Use approved lifting devices that will safely lift the weight of the unit with applicable OSHA safety factor requirements (Title 29 Part 1926). When lifting manhole bases and risers, make sure the chain or cable lengths are long enough to prevent contact with the tongue and groove area, and are kept at appropriate sling angles, not less than 60 degrees.

Where safe sling angles cannot be achieved, use appropriately rated spreader bars. The manhole lifting apparatus must meet or exceed safe working load capacity with respect to the lifting points. All lifting points should be used, and the product should be handled with equal “picking” force on all lifting points.



Recommended Manhole Bedding

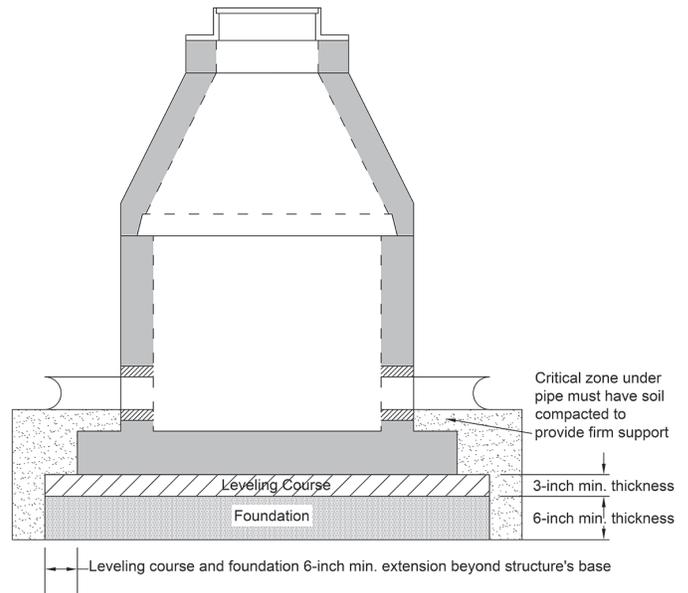
Manhole bedding consists of two separate soil layers: the foundation and the leveling course. The foundation may be firm insitu soil that must support the structure. The foundation also may be constructed of a soil mat of approved bedding material compacted to a minimum of 90% Proctor density. The foundation area shall be no less than the area of the manhole base. It is recommended the foundation area extend 6 inches beyond the manhole base in every direction to assure the added support.

The leveling course shall be 3 inches minimum of loosely placed granular material intended to slightly consolidate upon placement of the structure. This consolidation should provide uniform bearing to reduce the potential for point loads on the manhole base caused by uneven surfaces or hard spots in the soil foundation. Local ground conditions may require increased bedding thickness based on engineers' recommendations.

The zone under manhole-to-pipe connections must be treated with extra care to ensure firm, uniform support under the pipe sections at this critical interface. Inadequate pipe support could cause the pipes to shear, become misaligned or leak.

Handling Manhole Components

Manhole components should not be lifted using backhoes or front end loaders, unless they are of sufficient capacity to handle the product. Avoid transporting products across bumpy terrain at a



Use a minimum of 6" of approved bedding material compacted to 90% Proctor and 3" of leveling course in an area that is 6" beyond the outside radius of the manhole base.

speed that causes the product to bounce. Excessive travel bouncing of the product can cause damage. Also, avoid pushing or rolling a manhole product on the ground with on-site machinery.

Setting the Manhole Base and Risers

Set the manhole base on a graded bedding per job specifications making sure the connectors or pipe openings match design elevations. Level the top of the manhole base in both directions. Make sure each additional riser section is plumb before installing the next riser, cone or cap.

Pipe Connections

Should be based on manufacturer's recommendations. Check with the manufacturer if precast inverts are supplied.

Flexible Boot Connections – Clean the pipe surface and inside of boot. Insert the pipe flush with the inside of the manhole wall or as allowed by jurisdiction, keeping the pipe centered in the connector. Install all take up clamps(s) in groove(s), if provided, at the receiving end of connector. Tighten the clamp to the recommended torque, which will vary depending on size and manufacturer's specifications. Clamps should be tightened when the pipe is in straight alignment for proper seating of clamps. Any grouting that will inhibit the design/flexibility of the connector should be avoided.

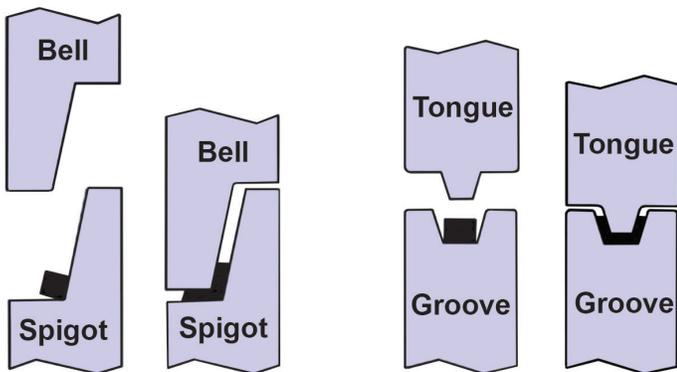
Compression Type Connector – Cut a ¾ inch bevel on the end of the pipe to be inserted into manhole. Clean the pipe and connector surfaces and the inside area of the connector. Lubricate the surface of the connector and exterior area of the pipe being inserted with the approved lubricant. Center the beveled end of pipe into the connector. Keeping the pipe level, push the pipe into the connector until the pipe is flush with the inside of manhole wall or as required per local specifications.

Mortar Joint – Set the pipe into the opening to meet elevations. Using approved non-shrink grout, fill the voids around the pipe completely. Follow grout material instructions and allow proper curing time before backfilling.

Pipe Stubs

Any pipe stubs installed in the manhole must be restrained from movement to prevent blowout, resulting from groundwater or any testing.

Joint Installation



Preformed Flexible Sealant – Use only the manufacturer’s recommended sizes for specific manhole diameters and annular joint spaces. Clean and inspect bell and spigot or tongue and groove surfaces. Surfaces should be free from all dust and debris. If moisture is present or the temperature is below 40°F (5°C), the use of a primer recommended by the sealant manufacturer is suggested. On the spigot up manhole joints, place the sealant material next to the vertical surface of the spigot. Wrap the material completely around the unit without stretching the sealant and overlap the ends. It is very important to knead the ends together to form a unified splice. Make sure all the protective paper is removed. Lower the bell end of the next unit carefully into the final position without damage to the joint, making sure the steps are in alignment (if applicable). If the manhole is constructed with the bell end up, place the sealant material next to the vertical portion of the bell and follow the instructions above.

Confined O-Ring – Clean and inspect joint surfaces.

Surfaces should be free from all dirt and debris. Lubricate the joint surface liberally. Lubricate the O-Ring gasket thoroughly before placing it into the confined groove space provided. Run a smooth round object between the gasket and spigot around the entire circumference several times to equalize the gasket diameter. Lower the lubricated end of the next unit, making sure steps are aligned into the final position. Keep units plumb while setting to prevent the gasket from rolling out of the confined groove, which could result in breaking the bell.

Profile and Prelubricated Gaskets – Clean and inspect joint surfaces. Surfaces should be free from all dirt and debris. Apply the profile or prelubricated gasket onto the offset spigot without lubricant. The gasket must be placed against the spigot shoulder with the nose of the gasket facing the end of the spigot. Run a smooth round object between the gasket and spigot around the entire circumference several times to equalize the gasket diameter. For the profile gasket, lubricate the gasket and the bell surface of the receiving section liberally. Prelubricated gaskets do not require any additional lubrication on the gasket itself or bell. The installer should verify the internal lubricant is dispersed uniformly within the gasket’s attached rubber tube.

Lower the end of the next unit, making sure steps are aligned into the final position. Align the spigot with the bell around the complete periphery, then allow the manhole section to settle under its own weight. Keep units plumb while setting to prevent the gasket from disjoining, which could result in breaking the bell or compromise performance.

Lift Hole Sealing

If required by an authority with jurisdiction, lifting holes should be sealed by inserting a resilient plug or approved non-shrink cementitious grout material into the hole. When using embedded anchors, voids may be filled with non-shrink grout.

Backfill Procedure

Backfill around the manhole equally to prevent tipping. Compact the fill in the same way as the standard trench procedure. Backfill material should be clean and free of large rocks. The size of the vibration equipment should be suited for site conditions to avoid damage to the manhole.

Testing Procedures

vacuum tests should be performed before backfilling in accordance with ASTM C1244. There is no applicable standard for vacuum testing after backfilling, and this may require special consideration to vacuum pressure to account for soil and hydrostatic loads.

Refer to the NPCA Manhole Vacuum Testing Brochure (precast.org/vacuum) for vacuum, hydrostatic and pressure testing where required.

Storage

If manhole products need to be stored on-site, make sure they are placed on level ground and not in mud or water to prevent damage. Dunnage can be used in these situations to avoid problems. Please consult with the manufacturer when storing manhole products for long periods.

Disclaimer

These procedures do not claim or imply that all safety-related issues, if any, associated with their use have been addressed. The manufacture of precast concrete products may involve the use of hazardous materials, operations and equipment. It is the user's responsibility to determine appropriate safety, health and environmental practices, and applicable regulatory requirements associated with the use of this manual and the manufacture of precast concrete products.

The use of these procedures does not guarantee the proper function or performance of any product manufactured in accordance with the requirements contained in the manual. Routine conformance to the requirements of this manual should result in products of an acceptable quality, according to current industry standards.

