

Special Specification 7272

Sanitary Sewer Pipe Bursting



1. DESCRIPTION

Replace sanitary sewer mains by Pipe Bursting method using hydraulically and pneumatically operated equipment to break and expanding the host pipe while simultaneously inserting liner pipe within the bore of the host pipe.

2. MATERIALS

2.1. **Testing.** Work must comply with the latest American Society for Testing and Materials (ASTM) Standard Specifications. The following references apply:

- D618 Standard Practice for Conditioning Plastics for Testing,
- D1248 Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable,
- D2122 Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings,
- D2412 Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading,
- D2657 Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings,
- D3212 Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals,
- D3350 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials, and
- F714 Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter.

2.2. **Liner Pipe.** Liner pipe must be high-density polyethylene pipe and meet the applicable requirements of ASTM F714, ASTM D1248, and ASTM D3350. Sizes of the insertions used must be as shown on the plans to renew the wastewater main to its original or greater than original flow capacity. Use pipes made of virgin material. No rework except that obtained from the manufacturer's own production of the same formulation must be used. Pipe must be homogenous throughout and free of visible cracks, holes, foreign material, blisters, or other deleterious faults. Material color should be white, gray, or light colored, and suitable for TV inspections.

Unless otherwise noted on the plans or specifications, the minimum wall thickness of the high-density polyethylene pipe must meet the requirements in accordance with Table 1.

Table 1
Polyethylene Pipe Wall thickness

Typical Application	Depth of Cover (ft.)	Separation Distance from Water Main (ft.)	SDR (DIPS ¹ HDPE)	Min Pressure (psi)
		< 9.0	11	160
	< 10.0	As required	11	160
Force Main	As required	As required	11	160

1. Ductile Iron Pipe Sizes (DIPS) must be used unless otherwise specified on the plans.

3. CONSTRUCTION

Perform work in a manner consistent with the Plans, Specifications, Addendums and Standards necessary to perform the work.

- 3.1. **Delivery, Storage, and Handling.** Transport, handle, and store pipe and fittings in conformance with manufacturer specifications. If new pipe and fittings become damaged before or during installation, it must be repaired in conformance with the manufacturer's specifications or replaced as required by the Engineer or his representative, at the expense of the Contractor, before proceeding further. Deliver, store, and handle other materials as required to prevent damage.
- 3.2. **Pre-Pipe-Bursting Television Inspection.** A pre-pipe-bursting television inspection of wastewater mains must be performed to locate or confirm the breaks, obstacles, sags, other point repair items, and service connections. The Engineer or his representative will review and approve the television inspection report and video before proceeding with any rehabilitation.
- 3.3. **Obstruction Removal.** Identify any point repairs required, such as dropped joints, intruding service connections, collapsed pipe, sags in main or any other obstructions before the pipe bursting process. Remove all obstructions to perform pipe bursting operation, as necessary.
- 3.4. **Sags and Grade Problems.** All sags and grade problems in existing sewer lines must be corrected. If the pre-construction television inspection reveals a sag in the sewer line, the proposed sewer pipe must be brought to an acceptable grade without a sag. A sag is defined as any sewer line segment more than 3 ft. in length which ponds water to a depth greater than 1 in. in the absence of sewer flow. The Contractor must:
- identify sags by television inspection in the absence of sewage flow. Flow must be blocked at an upstream manhole and diverted to another sewer line or downstream manhole below the segment of pipe to be inspected,
 - correct sags by open cut replacement or digging a sag elimination pit and bringing the bottom of the pipe trench to a uniform grade in line with the existing pipe invert. For pipe enlargement methods, all sags identified on the pre-construction video tapes must be corrected. With the approval of the Engineer, the Contractor may attempt to remove sags during the pipe bursting process. If the sags are not removed during this process, at direction of the Engineer, excavate and install additional bedding under the pipe or other methods. The pipe will then be backfilled to a point 1 ft. above the exposed pipe with cement stabilized, and
 - where sags are located under existing structures, the existing sewer line may be relocated using open cut or boring methods. The Engineer must specifically review potential relocations and evaluate the constructability, economics, and engineering feasibility before construction work.

The Contractor must notify the Engineer or his representative for approval to make an excavation after exhausting all other options to remove any obstruction or retrieve any pipe bursting tool or camera from the wastewater main.

- 3.5. **Diversion Pumping.** The Contractor, when and where required, must divert wastewater flows for the cleaning, pipe bursting, television inspection, point repairs, obstruction removals, or other related work in this project as required to complete the work. The Contractor is responsible for continuity of sanitary sewer service to each facility connected to the section of sewer during the execution of the work. If sewage backup occurs and enters buildings, cleanup, repair, property damage cost, and claims will be the responsibility of the Contractor.
- 3.6. **Insertion Pit and Access Pit.** Insertion or access pits must be efficiently located so the total number of pits are minimized, and footage of liner pipe installed in a single pull is maximized. Where possible, use existing manholes and excavations at point repair locations for insertion pits.

To facilitate long insertion runs, intermediate insertion pits may be allowed at the most advantageous location to provide for replacement pipe to be installed in both directions. When insertion pits are required in the lanes of traffic, the operation will be limited to one lane of traffic or one-half of the roadway, whichever is less. These pits must be only as large as required to accommodate the equipment. All pit dimensions and locations must be approved by the Engineer or his representative in writing, before beginning work. Manholes may be placed at insertion pit location as directed.

If the pipe bursting process requires the excavation of an insertion pit, the pipe through the pit must be bedded in the required bedding material in accordance with Item 400, "Excavation and Backfill for Structures."

- 3.7. **Pipe Bursting and Liner Insertion.** Equipment used to perform the work must be located away from buildings to minimize noise impact. Provide silencers or other devices to reduce machine noise as required.

Install all pulleys, rollers, bumpers, alignment control devices and other equipment required to protect existing manholes, and to protect the pipe from damage during installation. Lubrication may be used as recommended by the manufacturer. Under no circumstances will the pipe be stressed beyond its elastic limit.

The installed pipe must be allowed the manufacturer's recommended amount of time, but not less than 4 hr., for cooling and relaxation due to tensile stressing before any reconnection of service lines, sealing of the annulus or backfilling of the insertion pit. Enough excess length of new pipe, but not less than 4 in., will be allowed to protrude into the manhole to provide for this occurrence.

Following the relaxation period, the annular space may be sealed. Sealing must be made with materials approved by the Engineer or his representative and must extend a minimum of 8 in. into the manhole wall in such a manner as to form a smooth, uniform, watertight joint.

The new wastewater pipe must be placed without damaging the pipe joints or completed pipe sections and any pipe which has been damaged during installation will be replaced at the expense of the Contractor.

- 3.8. **Tie-Ins and Connections.** Trenching may be used to join sections at tie-ins of pipes installed by the directional boring method. The contractor must:

- pull an additional pipe length, enough for joining to the next segment, into the entrance pit. This length of the pipe must not be damaged or interfere with the subsequent drilling of the next leg. The Contractor must leave a minimum of 3 ft. of pipe above the ground on both sides of the bore hole, and
- for polyethylene pipe, tie-ins and connections must only be made after a suitable time period to allow the pipe to recover. Recovery period must be equal to at least twice the pull-back time.

- 3.9. **Drilling fluids.** Collection and Disposal Practices. Excess drilling mud slurry must be contained in a lined pit or container pound at exit and entry points until recycled or removed from the site. Entrance and exit pits must be large enough to contain the expected return of drilling mud and spoils. Precautions must be taken to keep drilling fluids out of the streets, manholes, sanitary and storm sewers, and other drainage systems including streams and rivers. The Contractor must make all diligent efforts to minimize the amount of drilling fluids and cuttings spilled during the drilling operation and must provide complete clean-up of all drilling mud overflows or spills.

- 3.10. **Acceptance.** The Contractor must provide a set of as-built drawings including both alignment and profile from actual field reading. Raw data must be submitted upon Engineer's request. Pipe must be installed within the pre-specified alignment and grade tolerances as shown on the drawings or project specifications. All surfaces affected by the work must be restored to their pre-construction condition including backfilling, replacement of topsoil, seeding and fertilizer. The contractor must:

- not obstruct driveways or streets unless approved by the Engineer. All lane closures must be in conformance with Department Specifications and the TMUTCD, and
- drill pipe at a depth and grade shown on the drawings.

4. MEASUREMENT

This Item will be measured as the distance in feet along the ground of the centerline of the proposed pipeline and not actual drilled distance from entrance pit to exit pit. Trenches for joining sections at tie-ins of pipes are subsidiary to the installation.

This is a plans quantity measurement Item and the quantity to be paid for will be that quantity shown in the proposal and on the Estimate and Quantity sheet of the Contract plans, except modified by Item 9.2. "Plans Quantity Measurement." If no adjustment of quantities is required, additional measurements or calculations will not be required.

5. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Horizontal Directional Drilling" of the type and size of pipe specified. This price will be full compensation for drilling, drill mud, pipe, exterior coating (if required), butt-fusion welding, hot gluing, flushing, pressure testing, water, all engineering services, plant, labor, material, and services for preparation of the site including removal of vegetation, location of all existing utilities along the proposed path, excavation of entry, exit, and slurry containment pits, full location map, surface restoration to existing conditions, replacement or reinstatement of existing utilities, backfill, compaction, and for all other materials, equipment, labor, tools and incidentals necessary to complete the work.