

A.) GENERAL**DESCRIPTION:**

This specification shall cover the rehabilitation of existing sanitary sewer laterals using the GRUNDOCRACK PIPE BURSTING SYSTEM. Sewer laterals are generally considered to be 10 feet to 200 feet in length and are normally 4" or 6" diameter pipe. Pipebursting is a system by which the pneumatic burster unit fractures and displaces the existing pipe while simultaneously installing a new Polyethylene Pipe of the same size or larger size pipe where the old pipe existed, then reconnect existing sewer service house connections, television inspection of the Polyethylene Pipe and complete the installation in accordance with the contract documents. Only Pneumatically operated equipment with either front or rear expanders for the proper connection to the Polyethylene Pipe will be allowed for use. The pneumatic tool must be used in conjunction with a winch that shall have twin capstan with twin hydraulic drive motors and twin gear boxes for independent operation that provides guiding force keeping the bursting tool centered in the host pipe. Other types of winches, that provide for constant tension, may be considered.

B.) QUALIFICATIONS:

- 1.) The contractor shall be certified by the particular Pipe Bursting System Manufacturer that such a company is a fully trained user of the pipe bursting system.
- 2.) Polyethylene pipe jointing shall be performed by personnel trained in the use of butt-fusion equipment and recommended methods for new pipe connections. Personnel directly involved with installing the new pipe shall receive training in the proper methods for handling and installing the polyethylene pipe. Training shall be performed by qualified representative.
- 3.) The contractor shall submit evidence acceptable to the City, such as a certified copy of a license or agreement that it has the authority from the patent holder and the licensed equipment manufacturer to perform pipe bursting work. The contractor agrees to defend, indemnify and hold harmless the City and the Engineer against all claims, suits, and actions or other damages as a result of negligence of any person or property arising out of patent infringement by the contractor or the contractor's employees, agents, the suppliers, or any tier of subcontractors involved in the work.

C.) SUBMITTALS:

Submit the following Contractor's Drawings:

- 1.) Shop drawings, catalog data, and manufacturer's technical data showing complete information on material composition, physical properties, and dimensions of new pipe and fittings. Include manufacturer's recommendations for handling, storage, and repair of pipe and fittings damaged.
- 2.) Method of construction and restoration of existing sewer service connections. This shall include:
 - a.) Detail drawings and written descriptions of the entire construction procedure to install pipe, bypass sewage flow and reconnection of sewer service connections.
- 3.) Certification of workmen training for installing pipe.
- 4.) Television inspection reports and videotapes made after new pipe installation.

D.) DELIVERY, STORAGE, AND HANDLING:

- 1.) Transport, handle, and store pipe and fittings as recommended by manufacturer.
- 2.) If new pipe and fittings become damaged before or during installation, it shall be repaired as recommended by the manufacturer or replaced as required by the Engineer at the Contractor's expense, before proceeding further.

- 3.) Deliver, store and handle other materials as required to prevent damage.

E.) METHODS FOR NEW PIPE INSTALLATION:

The method approved for rehabilitation of existing sewer laterals by pipe bursting and installation of new polyethylene pipe is TT Technologies, Inc. GRUNDOCRACK SYSTEMS, (800-533-2078) or approved equal. See accompanying list for your closest trained contractor that is licensed by Advantica Technologies (AKA British Gas).

PLEASE NOTE THAT using an unlicensed contractor who does not have a Advantica Technologies method license that causes them to pay royalties to Advantica Technologies can put you in violation of Advantica Technologies patents.

Using an unlicensed contractor could cause the owner who is releasing and getting the benefit of the work to legal exposure.

If we may be of any further assistance, please feel free to contact us, or Peter McCallum of Advantica, directly at 713-586-7000 or Mobil (403)238-6937.

F.) MATERIALS:

Polyethylene Plastic Pipe shall be high density polyethylene pipe and meet the applicable requirements of ASTM F714 Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter, ASTM D1248, ASTM D3350.

- 1.) Size of the pipe to be used shall be such to renew the sewer lateral to its original or greater than flow capacity.
- 2.) All pipe shall be made of virgin material. No rework except that obtained from the manufacturer's own production of the same formulation shall be used.
- 3.) The pipe shall be homogenous throughout and shall be free of visible cracks, holes, foreign material, blisters, or other deleterious faults.
- 4.) Dimension Ratios: The minimum wall thickness of the polyethylene pipe shall be as specified by the Engineer.
- 5.) Material color shall be white, black or whatever is specified with interior of pipe having a light reflective color to allow easier/better viewing for television inspection.
- 6.) Alternative pipe materials may be considered. The pipe bursting equipment manufacturer shall be consulted to determine feasibility of installing alternative pipe materials via the pipe bursting method.

F.1) TESTS:

Tests for compliance with this specification shall be made as specific herein and in accordance with the applicable ASTM Specification. A certificate with this specification shall be furnished, upon request, by the manufacturer for all material furnished under this specification. Polyethylene plastic pipe and fittings may be rejected to meet any requirements of this specification.

G.) EQUIPMENT:

The pipe bursting tool shall be designed and manufactured to force its way through existing pipe materials by fragmenting the pipe and compressing the old pipe sections into the surrounding soil as it progresses. The bursting unit shall be pneumatic and shall generate sufficient force to burst and compact the existing pipe line. See manufacturers specifications for what size tool should be used in what diameter of pipe, as well as parameters of what size tool for percentage of upsize allowed.

The pipe bursting tool shall be pulled through the sewer by a winch located at the upstream manhole. The bursting unit shall pull the polyethylene pipe with it as it moves forward. The bursting head shall incorporate a shield/expander to prevent collapse of the hole ahead of the PE pipe insertion. The pipe bursting unit shall be remotely controlled.

The pipe bursting tool shall be pneumatic. The bursting action of the tool shall increase the external dimensions sufficiently, causing breakage of the pipe at the same time expanding the surrounding ground. This action shall not only break the pipe but also create the void into which the burster can be winched and enables forward progress to be made. At the same time the polyethylene pipe, directly attached to the sleeve on the rear of the burster, shall also move forward.

The burster shall have its own forward momentum while being assisted by winching. A winch shall give the burster friction by which it can be move forward. To form a complete operating system, the burster must be matched to a constant tension winching system.

G.1) WINCH UNIT:

A winch shall be attached to the front of the bursting unit, connecting to or through the advanced guide head technology. The winch shall provide a constant tension to the burster in order that it may operate in an efficient manner. The winch shall have twin capstan with twin hydraulic drive motors and twin gear boxes for independent operation.

The winch shall be hydraulically operated providing a constant tension throughout the operation. The winch shall be of the constant tension type but shall be fitted with a direct reading load gauge to measure the winching load.

The winch must automatically maintain constant tension at a set tonnage reading. The constant tension winch shall supply sufficient cable in one continuous length so that the pull may be continuous between approved launch and receiving points.

The winch, cable and cable drum must be provided with safety cage and supports so that it may be operated safely without injury to persons or property. The contractor shall provide a system of guide pulleys and bracing at the exit pit to minimize cable contact with the existing line between launch and exit pits.

The supports to the trench shoring in the insertion pit shall remain completely separate from the winch boom support system and shall be so designed that neither the pipe nor the winch cable shall be in contact with them.

H.) SEWER SERVICE CONNECTIONS:

a.) All sewer service connections shall be identified and located prior to the pipe insertion. Upon commencement, pipe insertion shall be continuous and without interruption from starting pit to receiving pit. Upon completion of insertion of the new pipe, the contractor shall expedite the reconnection of the lateral service so as to minimize inconvenience to the customers.

b.) Sewer service connections shall be connected to the new pipe by various methods. The saddles should be made of a material compatible with that of the pipe. Fusion of saddle connection to the main is the only means of assuring complete leak free joint is obtained.

- 1.)** Electrofusion saddles as manufactured by Central Plastics, shall be installed in accordance with the manufactures recommended procedures.
- 2.)** Conventional Fusion saddles as manufactured by Central Plastics, Phillips Driscopipe, or Plexco shall be installed in accordance with the manufacturers recommended procedures.
- 3.)** Connection of the new service lateral to the mainline shall be accomplished by means of mechanical rubber sleeve couplings, as manufactured by Fernco, Mission or approved equal. Install using procedures and equipment as referenced in manufacturer's written installation instructions.

PREPARATION

I.) TELEVISION INSPECTION:

Television inspection of pipelines shall be performed by experienced personnel trained in locating breaks, obstacles and service connections by closed circuit color television. Television inspection shall include the following:

- 1.) Videotapes (post) to be submitted to the city before final invoice.
- 2.) Videotapes to remain property of the city; Contractor to retain second copy for his use.
- 3.) Should any portion of the inspection tapes be of inadequate quality or coverage, as determined by the City the Contractor will have the portion re-inspected and video taped at no additional expense to the City.

J.) CONSTRUCTION METHOD:

- 1.) The pipe bursting installation shall be one continuous operation. The pneumatic tool operation will be simultaneously complimented by operation of the winch. As the bursting tool moves through the existing sewer lateral the winch shall provide constant tension to the tool, keeping it in line with the pipe being replaced.
- 2.) Equipment used to perform the work shall be located away from buildings to minimize noise impact. Provide a silent engine compartment with the winch to reduce machine noise as required to meet local requirements.
- 3.) The method approved for rehabilitation of existing sanitary sewers by pipe bursting and installation of new polyethylene pipe is TT Technologies, Inc. GRUNDOCRACK system, (800) 533-2078) or approved equal. The contractor shall be licensed to use the required technology proposed for this work. Bids, submitted by unlicensed or inexperienced contractors, will be determined to be non-responsive and not allowed.
- 4.) Launching and Receiving pits shall be placed at each end of the sewer lateral service to be replaced. Other excavations may be necessary to accommodate changes of direction in the lateral service or to expose other utilities that may be in close proximity to the pipe bursting operation.
- 5.) After completion of pipe bursting installation all excavations shall be backfilled, compacted and all surfaces (hardscape and landscape) restored.
- 6.) Pit Placement Issues:
 - A.) Launching and Receiving pits shall be placed at each end of the sewer lateral service to be replaced. Other excavations may be necessary to accommodate changes of direction in the lateral service or to expose other utilities that may be in close proximity to the pipe bursting operation.
 - B.) Optional Tool Removal Back to Starting Pit via Reversible Feature Tool
Contractor shall use the GRUNDOCRACK PCG System when an exit pit is difficult due to underground utility placement or surrounding infrastructure. The PCG System uses a pneumatic tool with a special head expander. The head expander is larger in diameter than the new pipe thus providing adequate clearance space for the new pipe to be inserted into the ground. The PCG tool also uses a remote controlled reverse procedure to allow reversing the GRUNDOCRACK tool for removal back through the newly installed HDPE. In all cases, the tool must have the ability to operate in reverse to prevent damage to the HDPE during removal. This method requires the bursting tool to be smaller in diameter than the Inside Diameter of the new pipe. Example: 4" Pipe requires a max. diameter bursting tool of 3 3/4". The head expander is left in the receiving excavation mounted to the new pipe. After the reversing operation is completed, the head expander is then removed from the end of the new pipe and pipe burst is complete.
 - C.) After completion of pipe bursting installation all excavations shall be backfilled, compacted and all surfaces (hardscape and landscape) restored.

L.) FIELD TESTING:

- 1.) After the existing sewer is completely replaced, internally inspect with television camera and videotape as required. The finished tape shall be continuous over the entire length of the sewer and to be free from visual defects.
- 2.) Defects which may affect the integrity or strength of the pipe in the opinion of the Engineer shall be repaired or the pipe replaced at the Contractor's expense.

M.) PIPE JOINING:

- 1.) He polyethylene pipe shall be assembled and joined at the site using the butt-fusion method to provide a leak proof joint. Threaded or solvent-cement joints and connections are not permitted.

All equipment and procedures used shall be used in strict compliance with the manufacturer's recommendations. Fusing shall be accomplished by personnel certified as fusion technicians by a manufacturer of polyethylene pipe and/or fusing equipment.

- 2.) He butt-fused joint shall be true alignment and shall have uniform roll-back beads resulting from the use of proper temperature and pressure. The joint shall be allowed adequate cooling time before removal of pressure. The fused joint shall be watertight and shall have tensile strength equal to that of the pipe. All joints shall be subject to acceptance by the engineer and/or his representative prior to insertion.

All defective joints shall be cut out and replaced at no cost to the City. Any section of the pipe with a gash, blister, abrasion, nick, scar, or other deleterious fault greater in depth than ten percent (10%) of the wall thickness, shall not be used and must be removed from the site. However, a defective area of the pipe may be cut out and the joint fused in accordance with the procedures stated above. In addition, any section of the pipe having other defects such as concentrated ridges, discoloration, excessive spot roughness, pitting, variable wall thickness or any other defect of manufacturing or handling as determined by the Engineer and/or his representative shall be discarded and not used.