

1.0 GENERAL**1.1 DESCRIPTION**

This section addresses the procedures to be employed for pipe bursting existing water/sewer pipelines, as identified on the drawings, and replacing with new Restrained Joint PVC pipe.

1.2 QUALIFICATIONS

- 1.2.1 The contractor shall be trained by TT Technologies to operate GRUNDOBURST pipe bursting equipment and systems. The contractor shall provide certifications of training and proficiency in the use of the equipment. Only the contractor's employees trained by TT Technologies shall operate the GRUNDOBURST equipment.
- 1.2.2 The contractor shall be trained by the respective manufacturer of the pipe bursting equipment in the use of that machinery. The contractor shall provide certification from the manufacturer that the contractor has been trained and is proficient in the use of the equipment. Only the contractor's employees trained and certified by the manufacturer shall be allowed to operate the equipment during the project.
- 1.2.3 The contractor must have successfully completed 3,000 feet of pipe bursting which includes one successful static pipe bursting project. Contractor shall submit a list of these projects including the owner, engineer, addresses, phone numbers and dates that said projects were completed with their proposal.

1.3 METHODS

The method approved for rehabilitation of existing water mains and sanitary sewers by pipe bursting and installation of new Restrained Joint PVC pipe is TT Technologies, Inc. GRUNDOBURST system, (800) 533-2078 or approved equal. The contractor shall be licensed to use the required technology proposed for this work. Bids, submitted by untrained or inexperienced contractors, will be non-responsive and not allowed.

1.4 EQUIPMENT

- 1.4.1 Pipe bursting tool shall be static. 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 statically pulled which enables forward progress to be made. Simultaneously, the new Restrained Joint PVC pipe, directly attached to the expander, shall also move forward.
- 1.4.2 The static pulling frame shall be telescopic in design to allow the cutting head to release at the termination of the pull. This also provides minimal trench length by telescopic adjustment.
- 1.4.3 Quick lock bursting rods are required to guarantee snap lock connections. Quick Lock rods also stabilize cutting wheels at a 90° plane to invert pipe. Threaded bursting rods are not allowed. This insures the same cutting location eliminating threaded rod failures and turning of rods which effect cutting ability of blades.
- 1.4.4 The unit must maintain automatic thrust and pull back.
- 1.4.5 The static unit is capable of pipe bursting in two directions from the same excavation.

1.5 SUBMITTALS

- 1.5.1 Submit manufacturer's specific technical data with complete information on physical properties of pipe and pipe dimensions pertinent to this job. A certificate of "Compliance with Specification" or suitable alternative shall be furnished for all materials to be supplied.
- 1.5.2 Complete calculations including lists of parameters, all formulas and all other data showing the design of the new pipe.

- 1.5.3 Detail drawings and written descriptions of the entire construction procedure to install pipe, bypass sewage flow, pit sizes, pit construction and shoring, dewatering and sewer service reconnections.

1.6 PATENTS

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.

2.0 MATERIALS; Certa Lok REstrained Joint PVC Pipe

CertainTeed
C900/RJTM
Engineering Specifications
1.0 Scope

This specification covers restrained joint Polyvinyl Chloride (PVC) Pipe, 4" – 12", with cast-iron pipe (CI) outside diameters.

Pipe is intended for use in pressure-rated potable water delivery systems, as well as in sewer and fire protection piping systems.

2.0 Reference Documents American Society for Testing and Materials (ASTM)

ASTM D 1784 Standard Specification for Rigid PVC Compounds and Chlorinated PVC Compounds

ASTM D 2837 Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials

ASTM D 3139 Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals

ASTM F 477 Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

American Water Works Association (AWWA)

AWWA C900 Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. through 12 In. (100 mm through 300 mm), for Water Distribution

NSF International

NSF 61 Drinking Water System Components – Health Effects

2.1 Requirements

2.2 General

Products delivered under this specification shall be manufactured only from water distribution pipe and couplings conforming to AWWA C900. The restrained joint pipe system shall also meet all short and long term pressure test requirements of AWWA C900. Pipe, couplings, and locking splines shall be completely non-metallic to eliminate corrosion problems.

2.3 Materials

Pipe and couplings shall be made from unplasticized PVC compounds having a minimum cell classification of 12454, as defined in ASTM D 1784. The compound shall qualify for a Hydrostatic Design Basis (HDB) of 4000 psi for water at 73.4°F, in accordance with the requirements of ASTM D 2837.

2.4 Approvals

Restrained joint PVC pipe products shall have been tested and approved by Underwriters Laboratories for continuous use at rated pressures as follows:

Pipe Size	4"	6"	8"	10"	12"
DR18	UL Listed for Underground Restrained Joint Water Mains				
DR14	UL Listed for Underground Restrained Joint Water Mains			UL Listed for Conventional Underground Water Mains Installed with Thrust Blocks	

Note: All approvals shown are for a locking-joint system suitable for directional drilling.

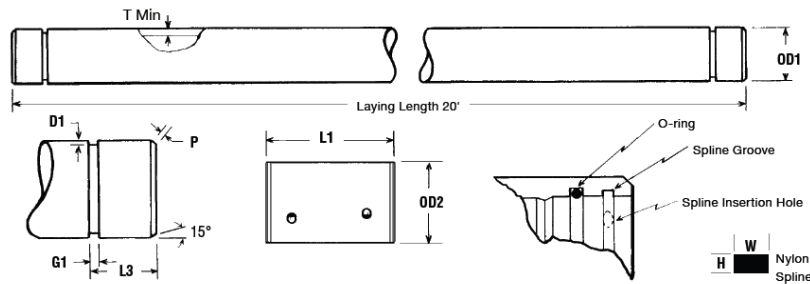
Joint Water

Mains

Copies of agency approval reports or product listings shall be provided to the Engineer. Products intended for contact with potable water shall be evaluated, tested, and certified for conformance with NSF 61 by an acceptable certifying organization.

2.5 Dimensions

Nominal outside diameters and wall thicknesses of restrained joint pipe shall conform to the requirements of AWWA C900. Restrained joint pipe shall be furnished in 4", 6", 8", 10" and 12" sizes, in Class 235 (DR18) and Class 305 (DR14). Pipe shall be furnished in standard lengths of 20 feet.



Dimensions of the pipe are shown as follows:

Pipe Dimensions

Sizes	OD1	T Min.		P	L3	G1	L1	OD2	D1		Approx. Weight with Coupling (lbs/ft)	
		DR18	DR14						Min.	Max.	DR18	DR14
4"	4.80	.267	.343	.313	3.000	.375	8.250	5.964	.125	.135	2.6	3.2
6"	6.90	.383	.493	.313	3.000	.375	8.250	8.366	.125	.135	5.4	6.7
8"	9.05	.503	.646	.656	3.163	.500	10.500	10.947	.130	.140	9.3	11.5
10"	11.10	.617	.793	.656	3.500	.500	11.125	13.361	.200	.215	14.2	17.8
12"	13.20	.733	.943	.656	3.500	.500	12.000	15.836	.200	.215	20.4	24.7

2.6 Joints

Pipe shall be joined using non-metallic couplings to form an integral system for maximum reliability and interchangeability. High-strength, flexible thermoplastic splines shall be inserted into mating, precision machined grooves in the pipe and coupling to provide full 360° restraint with evenly distributed loading. Couplings shall be designed for use at or above the pressure class of the pipe with which they are utilized, and shall incorporate twin elastomeric sealing gaskets meeting the requirements of ASTM F 477. Joints shall be designed to meet the zero leakage test requirements of ASTM D 3139.

2.7 Workmanship

Pipe and couplings shall be homogeneous throughout and free from voids, cracks, inclusions and other defects, and shall be as uniform as commercially practicable in color, density and other physical characteristics.

2.8 Quality Control

Every pipe and machined coupling shall pass the AWWA C900 hydrostatic proof test requirements of 2 times the pressure class for 5 seconds. Until such time as UL standards are harmonized with AWWA, UL requirements shall be used, which are 4 times the UL pressure class for 5 seconds (4*150=600psi, 4*200=800psi).

2.9 Marking

Pipe and couplings shall be legibly and permanently marked in ink with the following minimum information:

Pipe

Nominal size (for example, 4")

PVC

Dimension ratio (for example, DR18)

AWWA/UL pressure class (for example, PC 235)

AWWA C900-07 (or latest edition)

Manufacturer's name or trademark and production record code

Seal(mark) of the testing agency verifying the suitability of the pipe Material for potable water service

Seal (mark) of the certifying agencies that have tested and approved the pipe for use in fire protection systems

Couplings

Nominal size (for example, 4")

PVC

AWWA/UL pressure class (for example, PC 305)

AWWA C900-07 (or latest edition)

Manufacturer's name or trademark

Seal (mark) of the testing agency verifying the suitability of the pipe material for potable water service

Seal (mark) of the certifying agencies which have tested and approved the pipe for use in fire protection systems

3.0 Approved Manufacturers

C900/RJ™ PVC restrained joint pipe from CertainTeed Corporation, or approved equal

3.0.1. 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.

3.0.2. EXECUTION

3.0.3. SAFETY

The contractor shall carry out operations in strict accordance with all applicable OSHA Standards. Particular attention is drawn to those safety requirements involving work entry into confined spaces. It shall be the contractor's responsibility to familiarize and its employees with OSHA Standards and regulations pertaining to all aspects of the work.

3.1 INSERTION AND RECEIVING EXCAVATIONS

3.1.1 The location and number of insertion and receiving excavations shall be planned by the contractor and submitted in writing for approval by the Engineer 10 days (or as determined by the Engineer) prior to excavation.

- 3.1.2 Before excavation is begun, it will be the responsibility of the contractor to check with the various utility companies and determine the location of existing utilities in the vicinity of the work area. The contractor at no cost to the City, if required, will arrange temporary construction easement and/or right-of-way areas.
- 3.1.3 Damage to utilities and the resulting repair, temporary service cost, etc., shall be borne by the contractor. Access pits shall be backfilled in accordance with the appropriate specifications.
- 3.1.4 All excavations shall be properly sheeted/shored in accordance with relevant specifications for trench safety systems. Any damage resulting from improperly shored excavations shall be corrected to the satisfaction of the Engineer with no compensation due to the contractor.
- 3.1.5 All open excavations shall be kept secure at all times by the use of barricades with appropriate lights and signs, construction tape, covering with steel plates, etc., or as directed by the Engineer.
- 3.1.6 One or more receiving pits shall be excavated at the end(s) of the water main or sewer pipe to be replaced or at appropriate points within the length of the existing pipe. Pit shall be centered over the existing pipe.
- 3.1.7 The number of pits for machine and pipe insertion shall be the minimum necessary to most efficiently accomplish the work. The contractor shall give consideration to the use of excavations required for other purposes such as for Water Service reconnection, valve and fire hydrant replacements, or sanitary sewer service reconnections and manhole replacement.
- 3.1.8 Where Valve excavations or manhole excavations are used as machine or new pipe insertion pits, the contractor shall identify such manholes and replace them at no additional cost to the City if damaged. Any manhole modification or replacement required shall be considered incidental to the installation of the new pipe.
- 3.1.9 The cost of water main bypassing or diversion pumping around a manhole or insertion pit, if required, from a manhole upstream to a manhole downstream, shall be incidental to the installation of the new pipe.

4.0 MEASUREMENT AND PAYMENT

- 4.0.1 Payment for the work in this section will lump sum or as stipulated in the contract documents. The price for replacing the water main or sewer pipes by pipe bursting shall be full compensation for all materials, labor, equipment, cost of insertions and retrieval pits, machine pits, pavement removal and replacement, testing, and incidentals required to complete the replacement process.