

GAS CONSTRUCTION SPECIFICATIONS

1 MATERIALS TO BE FURNISHED

All materials shall meet the Company's specifications and shall be purchased from approved manufacturers. The following materials shall be furnished as part of the proposed improvement unless specified in the drawings or specifications:

- Polyethylene Pipe (PE)
- Coated Steel Pipe (XTC or FBE)
- Valves
- Valve Boxes and Conductor Pipe
- Fittings (Elbows, Tees, Reducers, etc.)
- Tracer Wire (PE Pipe)
- Metallic/Nonmetallic Warning Tape
- Pressure Test Supplies (Soap Solution, Gauges, etc.)
- Bare Steel Casings with Spacers, End Seals and Vents
- Cathodic Protection and Insulating Materials
- Miscellaneous Items (Nuts, Bolts, Gaskets, etc.)

2 DESCRIPTION OF PIPE

A. Coated Steel Pipe

All coated steel (XTC or FBE) gas pipe shall be API 5L Specification, plain end, beveled, bare inside, and extruded polyolefin or fusion bonded epoxy coated per the Company's material specifications and shall be purchased from approved manufacturers.

NOMINAL SIZE	O.D. INCHES	WALL THICKNESS INCHES	COATING THICKNESS MILS		LENGTH FEET	WEIGHT POUNDS PER FOOT
			FBE	XTC		
3/4"	1.050	0.113	14-16	25	20	1.13
1"	1.315	0.133	14-16	25	20	1.68
1-1/4"	1.660	0.140	14-16	25	20	2.27
1-1/2"	1.900	0.145	14-16	25	20	2.72
2"	2.375	0.154	14-16	30	20	3.65
4"	4.500	0.156	14-16	35	40	8.70
8"	8.625	0.188	14-16	40	40	17.40
12"	12.750	0.219	14-16	40	40	30.00



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B. Polyethylene Pipe

All Polyethylene (PE) gas pipe shall be manufactured according to ASTM D-2513 and shall be iron pipe sized, PE3408 high density pipe per the company's material specifications and shall be purchased from approved manufacturers.

NOMINAL SIZE	SDR	AVERAGE O.D. INCHES	MINIMUM WALL THICKNESS	COIL LENGTH FEET	WEIGHT POUNDS/ FEET
1/2"	7	0.625	0.090	1000	0.07
3/4"	11	1.050	0.095	500	0.12
1"	11	1.315	0.119	500	0.19
1-1/4"	11	1.660	0.151	500	0.31
2"	11	2.375	0.216	500	0.64
4"	11	4.500	0.409	40*	2.30
6"	11	6.625	0.602	40*	4.97

* These are straight lengths, coil pipe may be allowed on a case by case basis subject to approval by SPPCO.

C. Bare Steel Casing

All bare steel casing pipe shall be electric weld pipe, bare inside and outside.

O.D. INCHES	WALL THICKNESS INCHES	LENGTH FEET	WEIGHT POUNDS PER FOOT
4"	0.188	20	7.9
8"	0.188	20	14.3
12"	0.188	20	24.8
16"	0.250	20	47.0

If so desired, the Company may specify pipe lengths different than those shown above. Should this be the case, the lengths specified shall be indicated on the project construction drawings.



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3 PIPELINE CLEANING

All open ends of pipe lowered into a trench shall be properly closed to prevent entry of any foreign matter. At the end of each working day, the open ends of the pipeline shall be properly closed to prevent foreign matter from entering the pipe. Should foreign matter enter the pipeline due to lack of proper care by the Contractor, the Inspector shall require the Contractor to clean the line by swabbing or pigging at the Contractor's expense and to the satisfaction of the Inspector.

If required by the Inspector, the interior length of every pipe shall be swabbed before it is welded or fused to the adjoining length to ensure that it is free of dirt or obstructions of any kind.

4 COATED STEEL PIPE CONSTRUCTION

A. Pipeline Welding

The contractor shall weld all steel pipe together by means of electric arc techniques for nominal sizes 2" and larger and by means of oxygen-acetylene techniques for nominal sizes 1-1/4" and smaller. The Contractor shall also install all valves, fittings and appurtenances into the pipeline by approved methods.

All welds shall meet each and every requirement set forth under these specifications and all welding rod used shall be approved by the Inspector.

Only welders certified per the Company's welding procedures shall perform any welding on the pipeline. Only proper welding equipment in good working order shall be used.

All welders shall have successfully completed a qualification test performed annually according to the Company's welding procedures for each specific welding procedure. Additionally, the welders shall have proof of qualifications and shall be required to present such proof when requested.

A welder may retain certification by having one or more welds tested and found acceptable every six (6) months. If a welder's certification expires, he must successfully complete a qualification test before being allowed to weld.

B. Testing of Welders

The Company reserves the right to test any welder the Contractor intends to use on a project before the welder is allowed to work on the project. If any weld fails to meet the Company specifications, the Company reserves the right to disqualify the welder from performing any welding on the project.



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The Contractor shall be responsible for all expenses incurred in the testing of welders and any expenses resulting from the failure of any welder to qualify.

C. Welding Procedures

If the ends of the pipe are bent or damaged, the damaged or bent section shall be removed prior to welding so that proper alignment can be obtained.

Prior to performing the weld, every length of pipe shall be aligned so that the longitudinal seam shall be located on the upper surface of the pipe within 45 degrees of the vertical. Successive lengths of pipe shall be rotated to avoid aligning longitudinal seams.

The Contractor shall use line-up clamps on pipe diameters three (3) inches and larger to ensure proper alignment of the lengths of pipe. Line-up clamps shall be left in place until the first pass or root bead is at least 50% completed in equally spaced segments.

When pipes or components of dissimilar material grades are to be joined by welding, they must be prepared according to a procedure specific for the joining of those two dissimilar grades.

Unless otherwise specified, change in pipe direction shall be made with an elbow. A miter shall only be used to deflect the pipe 1 degree or less. Miter joints shall be made by cutting equal amounts from both pipe ends. The mitered pipe ends must butt together properly. No more than two miter joints are allowed for each deflection. The miter joints shall not be closer than one pipe diameter from each other as measured from the crotch of each joint.

When welding pipe to slip-on flanges, the pipe must be fully penetrated into the slip-on flange with all edges of the pipe extending to the internal face of the flange.

Unless otherwise specified, the Contractor shall also field fabricate all pipeline fittings necessary for tie-ins to existing mains. All field-fabricated fittings shall be constructed to the satisfaction of the Inspector.

Unless appropriate protection is provided, the Contractor shall not perform any weld when the quality of the weld could be impaired by the prevailing weather conditions.

D. Testing of Welds

All welds will be inspected by means of visual, destructive or nondestructive methods, or any combination thereof as determined by the Company. SPPCo will require that a minimum of 25% of all welds on steel mains in excess of 1000 feet be radiographically (x-ray) tested. The Company reserves the right to order sections of the line, including a weld, to be cut out and tested at any time.



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The Contractor shall immediately remove the designated section and deliver it to the Inspector. If any test fails in the weld metal, the entire weld shall be considered as failing to meet the Company specification. The Contractor shall prepare all welds for test at his own expense and to the satisfaction of the Inspector. The Contractor shall, at his own expense, remove and/or replace any weld failing to meet the Company specifications. For each weld tested that meets the Company's specifications, the Company shall pay the Contractor a predetermined amount. The Company shall determine the type and number of weld tests to be performed.

E. Pipeline Strains

Wherever the Inspector has reason to believe there is a strain on a section of pipeline that has been installed in the trench, the Contractor shall sever the pipe. If the two ends of the pipe pull apart, the Contractor shall, at his own expense, reconnect the two ends with no strain upon the pipeline and wrap the new field joint to the satisfaction of the Inspector. If the ends of the pipe do not pull apart, the Company shall assume the expense of severing the pipe, rewelding the pipe together, and wrapping the field joint.

F. Repair of Steel Pipe

All imperfections or damages which may impair the serviceability of the pipe shall be repaired by the Contractor at his own expense in accordance with the method prescribed by the Inspector.


G. Protective Coating

The shop-applied protective coating of each and every length of steel pipe shall be tested by the Contractor with a high potential Holiday Detector.

All coatings, wrappings and patches applied by the Contractor shall also be subject to test with a high potential Holiday Detector as determined by the Inspector. Any defects discovered by this test shall be repaired by the Contractor at his own expense and to the satisfaction of the Inspector.

If the protective coating of any pipe is damaged, it shall be repaired by the Contractor at his own expense and to the satisfaction of the Inspector.

After the lengths of pipe have been welded together and the welds tested and accepted, the ends of the protective coating shall be trimmed and any damaged coating removed. The bare section of the pipe, including the weld, shall be cleaned of all rust, scale, dirt or other foreign material. An approved primer, mastic, and three layers of tape shall be applied to the satisfaction of the Inspector.

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The Company may require the use of thermofit shrinkable sleeves on field joints and coating repairs. The Contractor shall install the sleeve on the pipe prior to performing the joint weld. After proper completion of testing, center the sleeve over the weld and apply a soft flame, per the manufacturer's requirements, back and forth across the sleeve causing it to shrink over the weld. The Contractor shall install all sleeves to the satisfaction of the Inspector and shall remove and replace, at his own expense, all sleeves not properly installed.

H. Cathodic Protection Installations

All necessary cathodic protection equipment including but not limited to magnesium anodes, insulation fittings and test stations shall be installed by the Contractor in accordance with the standard cathodic protection installation details included as a part of these specifications or as shown on the drawings and to the satisfaction of the Inspector.

I. Tapping and Line Stopping

Any welding required for hot tapping or line stopping of steel pipe shall be performed by a certified welder using the Company's approved welding procedures.

Any personnel performing any work on any lines that carry or will carry gas must be qualified under the Company's Anti-Drug Policy for Contractors.

Hot tapping and line stopping equipment must be used in accordance with the manufacturer's guidelines and instruction booklets. Tapping and line stopping shall only be performed by qualified personnel using the proper equipment and procedures.

				
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5 POLYETHYLENE (PE) GAS PIPE CONSTRUCTION

A. Applications for PE Pipe

Polyethylene (PE) gas pipe may be used in gas distribution systems in the following applications:

- * Direct burial of mains and services.
- * Main or service replacements by insert or direct burial methods.

Polyethylene (PE) gas pipe shall not be used in the following applications:

- * Systems designed to operate in excess of 100 psig.
- * In above ground or exposed locations such as boxes, pits and vaults, unless it is for temporary emergency situations.
- * As above ground riser material to a meter set unless it is part of an approved manufactured riser.
- * In locations where the PE pipe would be subjected to temperatures in excess of 73 degrees F.

B. PE Pipeline Fusion

The Contractor shall join polyethylene pipe and all valves, fittings and other appurtenances by means of approved Company heat fusion joining procedures. In order to produce an acceptable butt fusion, lateral movement of the pipe is required. If lateral movement cannot be achieved, an electro fusion coupling must be used. Only approved types of compression and mechanical fittings shall be installed. Threaded, mitered or solvent-welded joints are not permitted.

All fusions shall meet each and every requirement set forth under these specifications and shall be to the satisfaction of the Inspector.

Only personnel certified per the Company's heat fusion procedures shall perform any heat fusions on the pipeline. Only proper fusion equipment in good working order shall be used.

All heat fusion personnel shall have successfully completed a qualification test performed annually according to the Company's plastic heat fusion procedures for each specific fusion procedure. The heat fusion personnel shall have proof of qualifications and shall be required to present proof when requested.



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The heat fusion personnel must have performed qualified fusions for the Company within the last year. If he/she has not, he/she must recertify for each specific heat fusion procedure that has lapsed before being permitted to heat fuse.

C. Testing of Heat Fusion Personnel

The Company reserves the right to test any heat fusion personnel the Contractor intends to use on a project before the heat fuser is allowed to work on the project. If any fusion fails to meet the Company specifications, the Company reserves the right to disqualify the heat fuser from performing any fusions on the project.

D. Heat Fusion Procedures

The most common reason for fusion failure is impurities in the fusion area, i.e., oil from human hands, dirt, water, PE material from the facing process. The Contractor shall ensure that the pipe and fittings are free from any impurities.

The Contractor shall also:

- * Properly align and/or face the pipe ends and fittings with the proper equipment before performing the heat fusion process.
- * Establish the proper melt bead for the fusion application.
- * Allow adequate cooling time after the fusion before handling the pipe.

Failure to follow the Company's approved plastic heat fusion procedures to the satisfaction of the Inspector will result in rejection of the fusion.

Unless appropriate protection is provided, the Contractor shall not perform any heat fusions when the quality of the fusions could be impaired by the prevailing weather conditions.

E. Testing of Heat Fusions

Heat fusion procedures and joints will be visually inspected as determined by the Company. The Contractor shall cut out any rejected fusions and perform the work again at his own expense and to the satisfaction of the Inspector.

Although other methods of evaluating heat fusion joints exist, i.e., tensile, destructive, and ultrasonic, these methods will not be recognized by the Company as tests for determining the acceptability or unacceptability of fusion joints.



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F. PE Pipeline Strains

All heat fusion joints shall be installed in straight alignment and carefully backfilled to prevent differential settlement.

The pipe must be installed so it will be free of tensile loading. PE pipe will expand as the temperature increases. The Contractor shall take special precautions, especially on warm days, to eliminate tensile loading in the pipe after it cools. Cut the pipe long so that it will be under compression when the final tie-in is made. Where clearance from other facilities is not a problem, "snake" the pipe in the trench to provide excess length. For casing inserts or where clearance from other facilities must be provided, cool the pipe to ground temperature before making the final tie-in.

The pipe must be fully supported along its entire length. The Contractor shall backfill the trench after the pipe has cooled to ground temperature in order to minimize tensile stress due to thermal contraction.

The pipe shall be installed in the trench so that there are no bends with a radius of less than twenty (20) times the pipe diameter. There shall be no fusion joints within three (3) feet of any bend.

NOMINAL PIPE SIZE	1/2"	3/4"	1"	1-1/4"	2"	4"	6"
MINIMUM BEND RADIUS	10"	15"	20"	25"	40"	80"	120"

G. Repair of PE Pipe

All imperfections or damages which may impair the serviceability of the pipe shall be repaired by the Contractor at his own expense in accordance with the method prescribed by the Inspector.

Temporary repairs can be made using a full encirclement stainless steel clamp for puncture or longitudinal-type damage. Compression couplings with insert stiffeners can be used for temporary repairs to completely severed pipe. Permanent repairs are the Contractor's responsibility and shall be made as soon as practical and to the satisfaction of the Company.

Pipe with punctures or gouges which are greater than 10% of the pipe wall thickness, or pipe with any other extensive damage shall be removed and replaced by the Contractor at his own expense.



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If, in any situation, it appears that there was pulling or movement of the pipe or that damage could have occurred at any other locations along the pipe, the suspected area shall be bar hole leak tested with a combustible gas indicator. The Contractor shall, at his own expense, expose the pipe at any suspected damage area.

H. Storage and Handling of PE Pipe

The pipe shall be stored so as to prevent the possibility of the material being damaged by crushing, gouging, piercing or other mechanical damage or being exposed to excessive heat, harmful chemicals or fire. The pipe must be stacked per the manufacturer's guidelines. If the pipe is to be stored for any length of time, it should be placed under cover for protection from the sun.

The pipe shall be handled so as to eliminate the possibility of damage during loading and unloading operations. During transport, the pipe must be supported and secured so as to minimize movement. During unloading, the Contractor shall lift the pipe from the truck to the ground. Do not drop or throw the pipe.

During stringing of the pipe along the trench, the pipe must not be rolled or pulled over sharp objects or rough surfaces.

After each handling operation, the Contractor shall carefully inspect the pipe for kinks, cuts, gouges, punctures or any other imperfections. Any defective or damaged pipe shall be rejected or repaired by the Contractor at his own expense and to the satisfaction of the Inspector.

I. Locating "Tracer" Wire

The Contractor shall install insulated locating wire with the pipe. The wire shall be #14 Copper Clad Stainless steel core with 30 mils HDPE insulation. The wire shall be taped to the pipe at intervals not exceeding twenty feet and at pipeline directional changes such as bends, 45's, and 90's.

All wire splices shall be made using a split bolt connector wrapped with aquaseal and electrical tape.

The Contractor shall install a three(3) pound anode at the end of each below ground wire for cathodic protection of the locating wire.

J. Transition Joints

Steel to Polyethylene transitions must be made by using transition fittings approved by the Company. The Contractor shall not shorten the fitting and shall adequately support the PE pipe adjacent to the transition. If the transition fitting is a butt weld type, the Contractor shall wrap the fitting with a wet cloth from the midpoint of the steel section. The cloth shall be kept wet during the welding process and shall be left on the fitting until the steel pipe is cool to the touch. No welding or heating shall be done on the body of the transition.



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Fusions joining different pipe densities or manufacturers shall be performed utilizing an electrofusion method.

K. Shielding PE Pipe From Heat

The Contractor shall protect PE pipe from all forms and sources of heat, such as welding, by covering it with wet rags. When any welding is done in the vicinity of PE pipe, sparks must be directed away from the PE pipe and must be prevented from entering the pipe.

L. Removal of Static Electricity

Due to the nonconductive nature of PE pipe, significant static electrical charges may build up on the pipe during handling and installation. The Contractor shall remove all static electrical charges by grounding the PE pipe whenever it is squeezed off and during hot tapping, purging or emergency repair operations.

Dampen the entire working area. Use a water and liquid dishwashing detergent solution to wet the rags. Wrap the exposed pipe with wet rags. Keep the rags and working area wet during the entire operation.

Any metal tools used for cutting, tapping, or squeezing off the pipe shall be grounded using appropriate and approved methods. Squeeze-off tools shall be kept in tight contact with the wet rags.

Persons entering the work area shall ground themselves before touching the pipe by contacting the wet earth. Once a tool and worker are grounded, removal of the worker's hands from the tool may allow build up of static charges. The worker must re-ground himself before touching the tool.

M. Hot Tapping and Squeeze-Offs

Any heat fusion required for hot tapping PE pipe shall be performed by certified heat fusion personnel using the Company's approved heat fusion procedures.

Any personnel performing any work on any lines that carry or will carry gas must be qualified under the Company's Anti-Drug Policy for Contractors.

Hot tapping and squeeze-off equipment must be used in accordance with the manufacturer's guidelines and instruction booklets. Hot tapping and squeeze-offs shall only be performed by qualified personnel using the proper equipment and procedures. The Contractor shall furnish the hot tapping and squeeze-off equipment and shall ensure that such equipment is in good working order.



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After a squeeze-off tool is removed, the location shall be marked by means of yellow colored tape or with a repair fitting to ensure that a future squeeze-off is not repeated within 18" of the same location.

6 BARE STEEL CASING CONSTRUCTION

All necessary casings, casing appurtenances and venting equipment shall be installed in accordance with the drawings and specifications and to the satisfaction of the Inspector.

Casing pipe containing polyethylene gas mains or services shall not be squeezed or deformed except in an emergency.

7 PIPELINE TESTING

A. General Requirements

The testing procedures in this specification are for pipelines that will be operated at or below 90 psig and below 30% of the specified minimum yield strength of the pipeline (30% SMYS).

For pipelines operated above 90 psig or above 30% SMYS, a written plan developed by the Company describing the testing procedures will be followed.

Unless otherwise specified, no person may operate a new segment of pipeline or return to service a segment of pipeline that has been relocated or replaced until:

- * It has been tested in accordance with this specification to substantiate the proposed maximum allowable operating pressure.
- * All leaks have been located and eliminated.
- * All testing has been completed, and the results accepted by the Inspector.

The test medium must be air or inert gas as determined by the Company that is:

- * Compatible with the material of which the pipeline is constructed.
- * Free of all sedimentary materials.
- * Nonflammable.



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B. Environmental Protection and Safety Requirements

In conducting tests under this specification, the Contractor shall ensure that every reasonable precaution is taken to protect its' employees and the general public during the testing. The Contractor shall take all practicable steps to keep persons not working on the testing operation outside of the testing area until the pressure is reduced to or below the proposed maximum allowable operating pressure.

The Contractor shall ensure that the test medium is disposed of in a manner that will minimize damage to the environment.

C. Special Requirements

The Company reserves the right to require special leak testing procedures as it deems necessary, i.e., extended test durations or different test pressures. The Contractor shall conduct such special test procedures as requested.

Polyethylene pipe material must not exceed 100 degree F during the leak testing operation.

Each joint needed to tie in a tested segment of pipeline to the existing gas distribution system is excluded from the test requirements in this specification. The Contractor shall soap test and pressure test each tie in joint at the operating pressure.

If feasible, each service line connection to the main must be tested per the requirements in this specification. If not feasible, the Contractor shall soap test and pressure test each service line connection at the operating pressure.

Prior to reinstatement, each disconnected service line must be leak tested per the requirements in this specification from the point of disconnect to the service line valve. Testing need not be performed on any part of the service line which maintained operating pressure during the work.

If a reinstated service line is located in one of the Company's 40 psig pressure zones, the Contractor shall leak test the line at 60 psig instead of 135 psig.



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D. Test Requirements

Unless otherwise specified, the Contractor shall leak test each segment of pipeline at 135 psig. Minimum test durations, based upon size and length of pipe, are provided in the following table:

	MINIMUM TEST DURATION		
	10 MINUTE	2 HOURS	24 HOURS
1/2 " PIPE	ALL LENGTHS	NA	NA
3/4 " PIPE	ALL LENGTHS	NA	NA
1 " PIPE	ALL LENGTHS	NA	NA
1 1/4 " PIPE	ALL LENGTHS	NA	NA
2 " PIPE	0-240'	240-720'	OVER 720'
4 " PIPE	0-60'	60-180'	OVER 180'
6 " PIPE	0-30'	30-90'	OVER 90'
8 " PIPE	NA	0-60'	OVER 60'
12 " PIPE	NA	0-30'	OVER 30'

When pressure testing 2", 4", or 6" PE pipe; total volume less than 5 cubic feet can be tested for a minimum of 10 minutes, total volume between 5 and 15 cubic feet must be tested for a minimum of 2 hours, and total volume over 15 cubic feet will require a minimum 24 hour test.

Under some circumstances, the duration of the test can be reduced or increased at the discretion of SPPCO personnel, additional non-destructive testing (x-ray) may be required.



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E. Contractor Requirements

The Contractor shall provide all necessary labor, material and equipment for making the pressure test including proper compression equipment to produce a gauge pressure of 135 psig. As each section is completed and the ends of the pipe properly closed, the test medium shall be forced into the pipeline until a gauge pressure of 135 psig is achieved.

The Contractor shall locate and repair all leaks discovered in the pipeline during testing. Any welds or fusions displaying leaks shall be considered as failing to meet the Company specifications, and the Contractor shall, at his own expense, remove the defective work and perform a new weld or fusion to the satisfaction of the Inspector.

Whenever it is necessary to cut out a weld or fusion and the two ends of pipe cannot be brought together conveniently or without damage to the pipe, the Contractor shall, at his own expense, install a short piece of pre tested pipe per these specifications and to the satisfaction of the Inspector.

F. Company's Responsibilities

The Company will provide, install and remove the pressure recording device to document the leak test. The Company will make and retain for the useful life of the pipeline all required information of each leak test performed.



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8 PURGING STEEL AND PE PIPE

Air trapped and traveling in a gas distribution system can create a combustible mixture. Combined with static electricity an extremely hazardous situation can develop. Although the Contractor shall provide all appropriated purging equipment such as risers, purge stacks, and grounding tools, the purging itself must be performed by a Sierra Pacific Inspector. Under no circumstances will any Contractor personnel be allowed to operate valves, pressurize lines with gas, or purge lines without prior written approval from a Sierra Pacific representative.

When purging, the Sierra Inspector shall stack the riser to vent above the worker's heads. Ground the purging stack above and below the gas cock insulator by means of a #12 or heavier gauge wire. Do not purge into a bell hole, and do not allow gas to draft into buildings or other areas where it may become confined and create a combustible mixture.

If the improvement is to be supplied gas from more than one source, only one tie-in shall be made until all air has been purged from the entire improvement.

9 BORING / SLEEVING

A. GENERAL INFORMATION

Description: These standards provide general requirements and guidelines for service replacement insertion and new construction boring and sleeving installations within SPPCO's service territory.

Jurisdiction: All applicable city, county, state and federal specifications must be met in addition to the requirements of this standard. In the case of conflict, the more rigid specification or standard shall apply.

B. GUIDELINES

Application:

Bore installations where native material does not meet the requirements of sand specification for gas pipe per Section 3, Staking and Trenching, ***SUB01X***.

To protect gas carrier pipe when minimum separation from other facilities can not be maintained.



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To facilitate installation of new or replacement gas facilities, such as street, driveway and sidewalk crossings.

Boring shall not be used in a multiple utility installation.

Note: Steel pipe must not be inserted into polyethylene sleeving.

Boring Methods:

Directional bores shall be guided by using locating equipment that display the angle and depth of the drill head.

Nondirectional bores shall be guided by aiming, alignment and leveling.

All receiving pits, regardless of method, shall not be backfilled until they have been approved by the SPPCO gas inspector. Any bores rejected by the inspector shall not be utilized and must be supported and/or sealed by appropriate methods to prevent settlement.

Inspection holes may be required by the inspector at his/her discretion to determine actual bore path.

Asphalt heave caused by bore tool shall be removed and excavated to a minimum depth of 18" below finish grade and compacted. Backfill of the affected area must be completed with base material meeting the requirements of Section 3, Staking and Trenching, ***SUB01X***.

Existing Utilities: Prior to and for the duration of any boring operation, all existing underground utilities and/or structures shall be located and exposed to prevent accidental contact and to ensure minimum separation per Section 3, Staking and Trenching, ***TE0003*** are maintained.

Bore Locations: Bore locations shall be that of trench locations. These locations are typically shown relative to street centerlines, right of way lines, or property lines in new and existing developments. It is the responsibility of the contractor or the customer to verify that these reference lines are established and are accurate. Where such reference lines are unavailable, alignment shall be established by SPPCO.



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Bore Depth: Depths shall meet the minimum requirements per Section 3, Staking and Trenching, *TE0003*. For bores that fall on a side slope, the depth shall be measured from the low side. Maximum depth for service on private property shall not exceed 36" unless the location of existing utilities or underground structures would require it.

Sleeve Material: Sleeve pipe for new installations of gas facilities shall be yellow medium density polyethylene SDR 11. At no time shall sleeve pipe be utilized as the gas carrying pipe.

Dewatering: Where ground water is encountered during pit and bell hole excavation, it shall be the responsibility of the contractor or customer to adequately dewater the trench to prevent the entrance of water into the sleeve or carrier pipe and provide for safe and convenient installation of both the sleeve and carrier pipe.

Installations:

Prior to pulling in the carrier pipe, the sleeve ends must be reamed to remove burrs and the pipe must be free of dirt, rocks, water, or any other debris that may cause damage to the outside wall of the carrier pipe.

Carrier pipe must be hand guided into the sleeve pipe to prevent pipe wall damage or undue stress on the carrier pipe.

Carrier pipe ends must be sealed to prevent debris remaining in the sleeve from entering the carrier pipe.

Care must be taken when using coiled sleeve and carrier pipe to prevent undue stress on the carrier pipe. Coiled sleeve pipe must not exit the bore with the natural coil bend in the opposite direction of the carrier pipe. Bore entrance/exit pits must be extended along the length of the bore to the point where undue stress is eliminated.

All sleeve ends shall be sealed with tape similar to 3M #50 (tape used in wrapping steel pipe in SPPCO's system). Taped ends shall not be taped so as to create a gas tight seal.

When sleeving terminates at or near a building, the upstream end of the sleeve nearest the downstream side of the curb valve must be sealed with a cold shrink seal. Cold shrink seal shall then be taped in each end.



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Tracer Wire: All polyethylene gas carrying pipe must be locatable by the use of tracer wire.

Tracer wire shall be #14 Copper Clad stainless steel as specified in Section 5 of these Gas Construction Specifications.

Tracer wire shall be installed inside the sleeve and pulled in with the carrier pipe.

Backfill:

All trenches, bore and receiving pits, service tie-ins and riser bell holes shall be backfilled in accordance with Section 3, Staking and Trenching, **SUB01X**. Sections of carrier pipe not contained inside the sleeve such as service taps and inspection points shall be supported by compacted sand up to the horizontal axis of the pipe prior to the first lift of backfill material. The pipe shall be supported to prevent vertical movement of the pipe.

Sleeve pipe may be backfilled with electric/water sand per Section 3, Staking and Trenching, **SUB01X**. However, this sand must not extend beyond the sleeve and overrun onto the carrier.

Documentation: All sections and type of sleeve pipe must be documented on the appropriate gas main and /or service cards. Sleeves shall be measured for their entire length and the ends shall be measured from the nearest fitting (service tee, curb valves, risers, etc.) and documented on the notes section of the card.

Sleeve Removal: To prevent damage to the carrier pipe and tracer wire, mechanical or electric cutters must have stops that will not allow 100% cutting of sleeve pipe wall. Once the sleeve is removed, the carrier and tracer wire must be inspected to ensure that no damage has occurred. Any damaged sections must be repaired or replaced.



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10 GUIDELINES FOR BRANCHING OFF EXISTING GAS SERVICES

Provided below are conditions that must be met and guidelines that must be followed when considering the possibility of branching off of an existing gas service line:

1. Sierra's Utility Designer shall verify that the capacity of the existing service line will adequately handle the existing load plus the projected new load combined.
2. Sierra's Utility Designer shall verify that all necessary easement concerns have been addressed.
3. Each design must be verified and approved by Sierra's Design & Construction Facilitator before committing to customer.
4. When branching off of an existing steel gas service the following Compatible Unit Numbers or Drawing Numbers should be utilized:

BRANCHING OFF EXISTING STEEL GAS SERVICES			
EXISTING STEEL SVC SIZE	NEW PE BRANCH SIZE	DRAWING NUMBER	COMMENTS
3/4" OR LARGER	3/4" PE	<i>STI19G</i>	REMOVE CV & BOX FROM COMPATIBLE UNIT *
1" OR LARGER	1" PE	<i>STI20G</i>	REMOVE CV & BOX FROM COMPATIBLE UNIT *
1 1/4" OR LARGER	1 1/4" PE	<i>STI21G</i>	REMOVE CV & BOX FROM COMPATIBLE UNIT *
2" OR LARGER	2" PE	<i>STI24G</i>	NO CHANGE REQUIRED

* Disruption of service should be considered before removing curb valve and box.

5. When branching off of an existing PE gas service the following Compatible Unit Numbers or Drawing Numbers should be utilized:

BRANCHING OFF EXISTING PE GAS SERVICES			
EXISTING PE SVC SIZE	NEW PE BRANCH SIZE	DRAWING NUMBER	COMMENTS
3/4" OR LARGER	3/4" PE	<i>ST105G</i>	CHANGE TAPPING TEE TO STD TEE, REMOVE CV & BOX *
1" OR LARGER	1" PE	<i>ST106G</i>	CHANGE TAPPING TEE TO STD TEE , REMOVE CV & BOX
1 1/4" OR LARGER	1 1/4" PE	<i>ST107G</i>	CHANGE TEE , REMOVE CV & BOX *
2" OR LARGER	2" PE	<i>ST111G</i>	NO CHANGE REQUIRED

* Disruption of service should be considered before removing curb valve and box.

6. After construction, Sierra's Inspector shall prepare the following documentation:

- A.) A new service card for the new service must be made.
- B.) A new revised service card for the existing service must be made. (Staple the old existing service card to the back of the new revised service card.)
- C.) The above mentioned cards shall be turned in to Gas Distribution Mapping.

7. Gas Distribution Mapping shall perform the following tasks:

- A.) Log each of these cases where existing services are branched.
- B.) Change the Gas Main and Service Inventory as necessary.



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11 GAS MAIN OFFSET REQUIREMENTS

Whenever a gas main must be installed under a conflicting utility, storm drain, sewer conduit, reinforced concrete box, or ditch, and the necessary depth from top of pipe to finish grade exceeds five feet, Sierra may require that 45 or 90 degree offsets be installed on each side of the conflicting area.



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