
	PLASTIC MAIN AND SERVICE INSTALLATION		A-90
	Asset Type: Gas Transmission and Distribution Issued by: M. G. Rossi	 <div style="border: 1px solid red; padding: 2px; display: inline-block;">Original Signed By</div>	Function: Construction Date: 03-20-09
Rev. #05: This document replaces Revision #04. For a description of the changes, see Page 12.			

This document also appears in the following manual:

- [Gas Applicant Design Manual](#)

Purpose and Scope

This numbered document provides the requirements for constructing a plastic gas distribution system. Additional requirements are found in the documents listed in the “References” section below.

Acronyms

- CPA: cathodic protection area
- CTS: copper tubing size
- EFV: excess flow valve
- EMS: electronic marking system
- FPT: female pipe thread
- HVMS: high-volume multi-saddle
- HVTT: high-volume tapping tee
- IPS: iron pipe size
- MPT: male pipe thread
- MVTT: medium-volume tapping tee
- PE: polyethylene
- PUE: Public Utility Easement

References

Document

Code Numbers for Steel Pipe	A-15
Plastic Gas Lines on Bridge Structures	A-33.1
Service Connections to Cast Iron Main	A-44
Copper Pipeline Defects	A-67
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Locating Wire Installation for Direct Burial Plastic Mains and Services	A-90.2
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Repair Clamps	B-53.1
Plastic System Socket and Butt Fusion Fittings	B-90
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Electrofusion Fittings and Tapping Tees	B-90.3
Mechanical Transition Fittings for Plastic Systems	B-91
Plastic System Mechanical Fittings	B-91.1
Oxyacetylene Weld Procedure	D-20

References, continued

Document

Qualifications for Joining Plastic Pipe	D-34
Field Wrapping With Cold-Applied Tape	E-25
Meter Valves	F-80
Plastic System Valves	F-90
Plastic Valve Box for 3/4" – 4" Valves	K-40
Approved Specialty Locating Instruments	M-62
Corrosion Control of Gas Facilities	O-16
Design and Construction of Gas Distribution Facilities	Utility Standard S0470
Joint Trench	Utility Standard S5453
Squeezing Polyethylene Pipe	Utility Work Procedure WP4170-02

General Information

1. Locating wire shall be installed on all direct-buried and inserted plastic pipe. For locating wire, anode, and bonding requirements, see Numbered Documents [A-90.2](#), [A-90.3](#), and [O-16](#).
2. [Utility Standard S0470](#) requires that a corrosion mechanic or gas operating supervisor evaluate the cathodic protection impacts and needs associated with a project during the design stage of the project.
3. Connections to plastic gas distribution facilities shall only be made by individuals qualified under [Numbered Document D-34](#). Only those products listed in PG&E's *Gas Standards and Specifications* and Gas Information Bulletins are allowed in construction.
4. Where existing plastic gas facilities are found to not have a locating wire, or where the locating wire is bare, an appropriate EMS device shall be placed in the excavation if other EMS devices do not adequately define this facility. In the course of excavation work by PG&E or others, use this as an opportunity to install EMS devices. EMS devices shall be installed in incidental excavations at angle points, laterals, main dead ends, and at approximately 50' intervals over the main, where existing plastic gas facilities are found to not have a locating wire or where the locating wire is bare. These marker units shall be documented with dimensions and appropriately mapped on gas distribution plat maps.
5. Plastic main dead ends and main and/or service stubs shall have an appropriate EMS marker installed to indicate the end of the facility. EMS devices shall be mapped on the gas distribution plat maps and service orders with appropriate dimensions referenced.
6. Protective sleeves are not required on saddle fittings with outlets that are 1-1/4" and larger. If a sleeve comes packaged with a fitting, the sleeve must be used.

Typical Direct-Burial Plastic Main and Service Installation

Notes Apply to Figure 1 on Page 3

7. Weld vertical or horizontal steel legs to the steel pipe to prevent the valve body from rotating. See the [Gas Standards and Specifications, Section F](#), for information on steel valves.
8. Squeeze off the pipe to extend or repair it. See [Utility Work Procedure WP4170-02](#) for squeeze-off procedures and [Numbered Document B-53.1](#) for a description of PG&E-approved clamps.
9. Make changes in the pipe's direction at street intersections with elbows or tee fittings only. Roping may be used for directional changes at other locations. Where it is necessary to rope plastic pipe, all bends must have a radius greater than 20 times the pipe diameter and joints are not permitted within 3' of any bend.
10. For future lateral lines, install a minimum 3' stub with an EMS or other suitable device to facilitate locating.
11. Install EFVs according to the criteria listed in [Numbered Document A-93.3](#).
12. Ensure that all plastic lines are slack before completing final tie-ins to allow for thermal expansion and contraction. Refer to [Numbered Document A-93](#) and [Numbered Document A-93.1](#) for construction guidelines.
13. For 2" and larger valves, install a 4' section of straight pipe on either side of the valve. Where a valve branches off a main, install a straight section of pipe between the tee and the valve. The length between the tee and the valve should be long enough so that the pipe can be squeezed. See [Numbered Document A-93](#) for information on straight plastic pipe, or [Numbered Document B-90.1](#) for information on branching nipples.

14. To deactivate a plastic service, cut the service as close as possible to the tee. Install a mechanical or fusion cap. See [Numbered Document A-93.2](#) for more information.

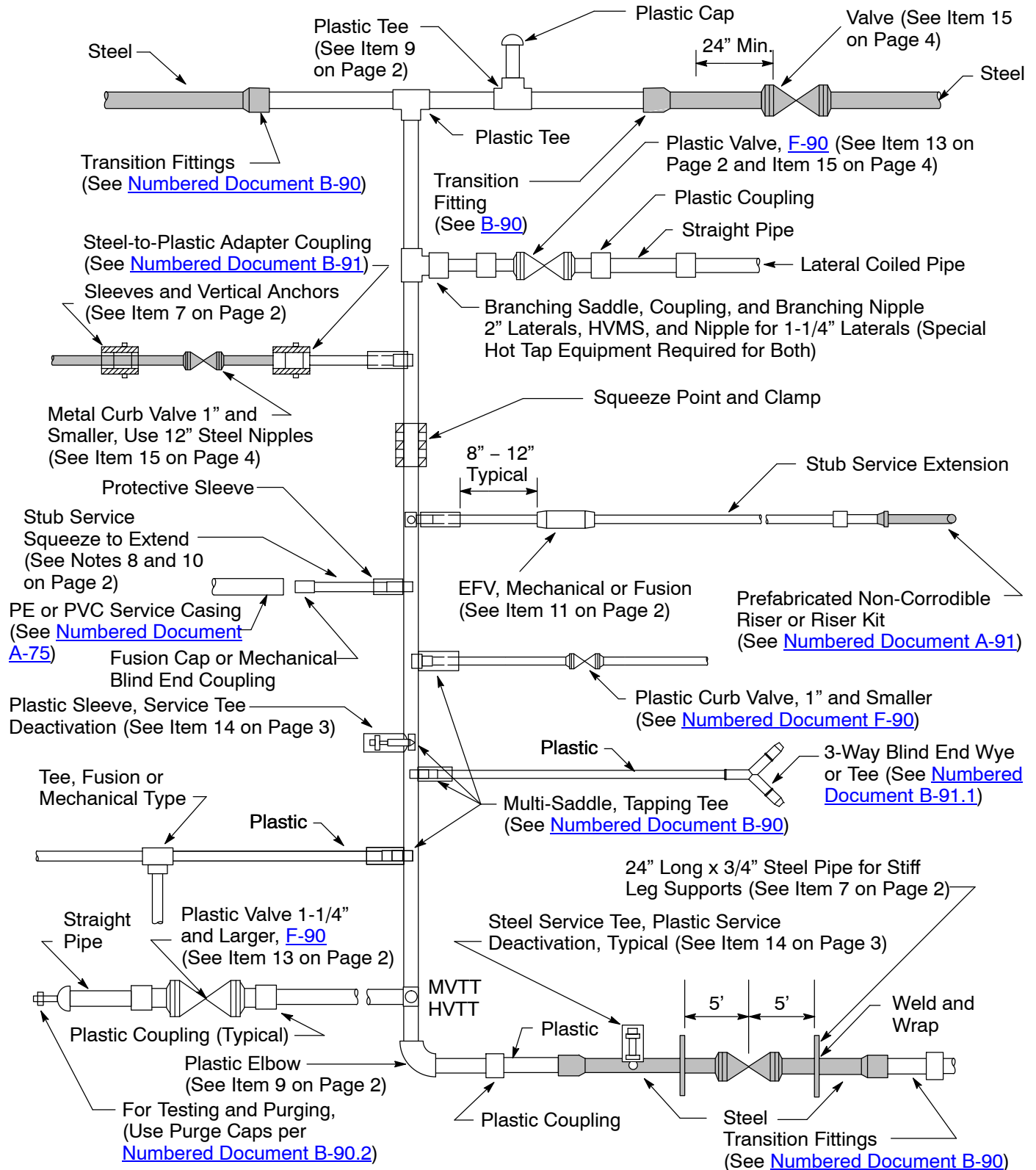


Figure 1
Typical Direct-Burial Plastic Main and Service Installation

15. Use plastic valves wherever it is feasible and safe to use them. Use steel valves for:

- A. Areas where repeated, heavy traffic loading is expected to impact the valve.
- B. Maintaining cathodic protection continuity.
- C. Fire/emergency valves upstream and downstream of regulator stations.

Notes Apply to Figure 2 on Page 4

16. Gas service should normally be installed in a straight line at a right angle to the main, traversing from the main to the meter. Offsets, diagonal runs, and bends should be avoided wherever possible. Service should not be installed under driveways or customer-paved areas wherever possible.

17. When an applicant changes the service-point location (lot flops), take the following action:

A. Short-side service stubs:

Cut off the service stub at the main per [Numbered Document A-93.2](#). Install a new service in accordance with Note 16 above.

B. Long-side service stubs:

- If the street is not yet paved, cut off the service stub at the main per [Numbered Document A-93.2](#). Install a new service in accordance with Note 16 above.
- If the street is paved and the walls of the new building are still opened, use the existing service-point location and have the applicant re-plumb the houseline to the original service-point location.
- If the street is paved and the walls of the new building are closed, a service may be permitted to run parallel to the street, in the PUE or on the applicant's private property, and then make a right angle to continue in a straight line to the new meter location. All offsets should be noted on the plat map and the gas service record.

Follow the EFV requirements in Table 4 of [Numbered Document A-93.3](#).

18. Figure 2 represents a typical lateral connection. See Numbered Documents [B-90.1](#) and [B-90.3](#) for saddle fittings.

19. A lateral connection to Aldyl-A requires mechanical or electrofusion fittings. Standard heat fusion is not allowed.

20. Use 1/4" CTS PE tubing for inserting into existing 1/2" CTS copper, plastic, or steel services only, where system pressures and loads allow. Contact gas planning personnel to verify that 1/4" CTS PE tubing is appropriate. Do not directly bury 1/4" CTS PE tubing. Use only approved connectors in [Numbered Document B-91.1](#) to connect 1/4" CTS PE tubing.

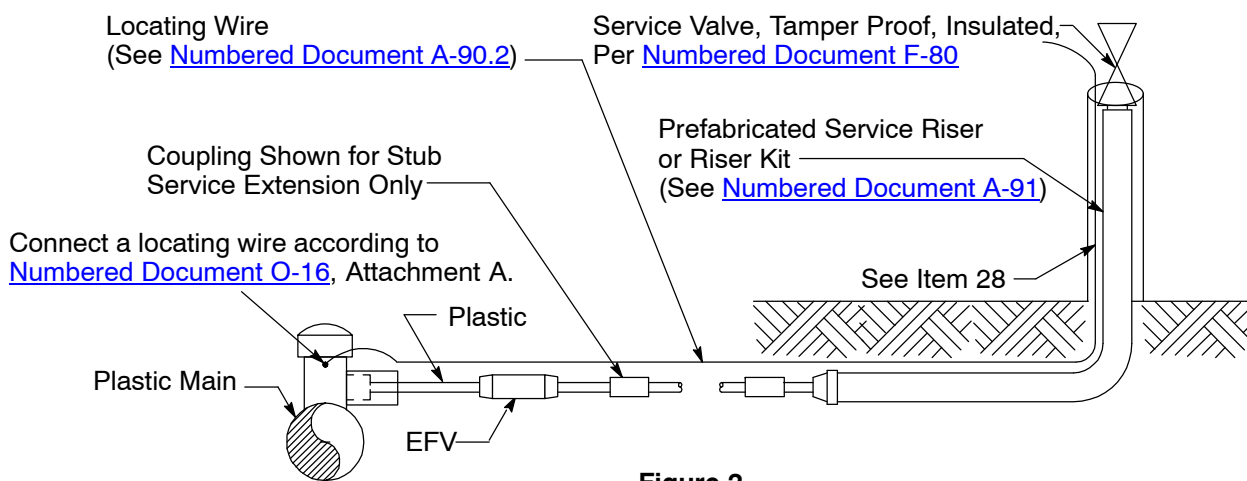


Figure 2
Plastic Service Installation

21. Repair all the coating damage on risers as described in [Numbered Document E-25](#).

22. Install sun shields on all prefabricated risers and riser kits. Shields shall extend from 1" below the top of the riser or below the bypass to ground level or below.
23. Do not paint a sun shield.
24. When installing prefabricated risers, use a locating wire (see Numbered Documents [A-90.2](#), [A-90.3](#), and [O-16](#) for details). Do not cadweld on prefabricated risers.
25. If the ground slopes away from the gas service riser, straighten the 90° riser bend to match the slope. Straighten so that the vertical leg of the riser is not bent when installed. Wrap the riser if the protective coating on the riser is damaged.
26. If the ground slopes upward from the gas service riser, do not bend the riser to match the slope. Use a short, prefabricated riser and dig a deeper trench. Taper-up the slope with service tubing.
27. The final grade level at the riser must be at or below the burial line indicated on the riser.
28. Strap the end of the locating wire to the riser above ground but below the insulated service valve. Install the locating wire between the sun shield and the casing. Leave at least 3" of the wire above the bottom of the valve before wrapping the wire around the riser. Do not bond the wire to the riser (see [Numbered Document O-16](#)).

Notes Apply to Figure 3 on Page 5

29. Do not use 1-1/4" IPS or 3" IPS PE pipe. Use 2", 4", 6", or 8" IPS pipe.
30. The local gas distribution engineer shall specify main-line rib sizes and tie-in locations.
31. Do not terminate gas distribution facilities at the end of a development to clear paving or other improvements unless the applicant requests an extension to serve adjacent future development. Otherwise, terminate these facilities approximately 5' past the last service or to the next property line within the project area, unless approved by the area senior gas operations engineer.

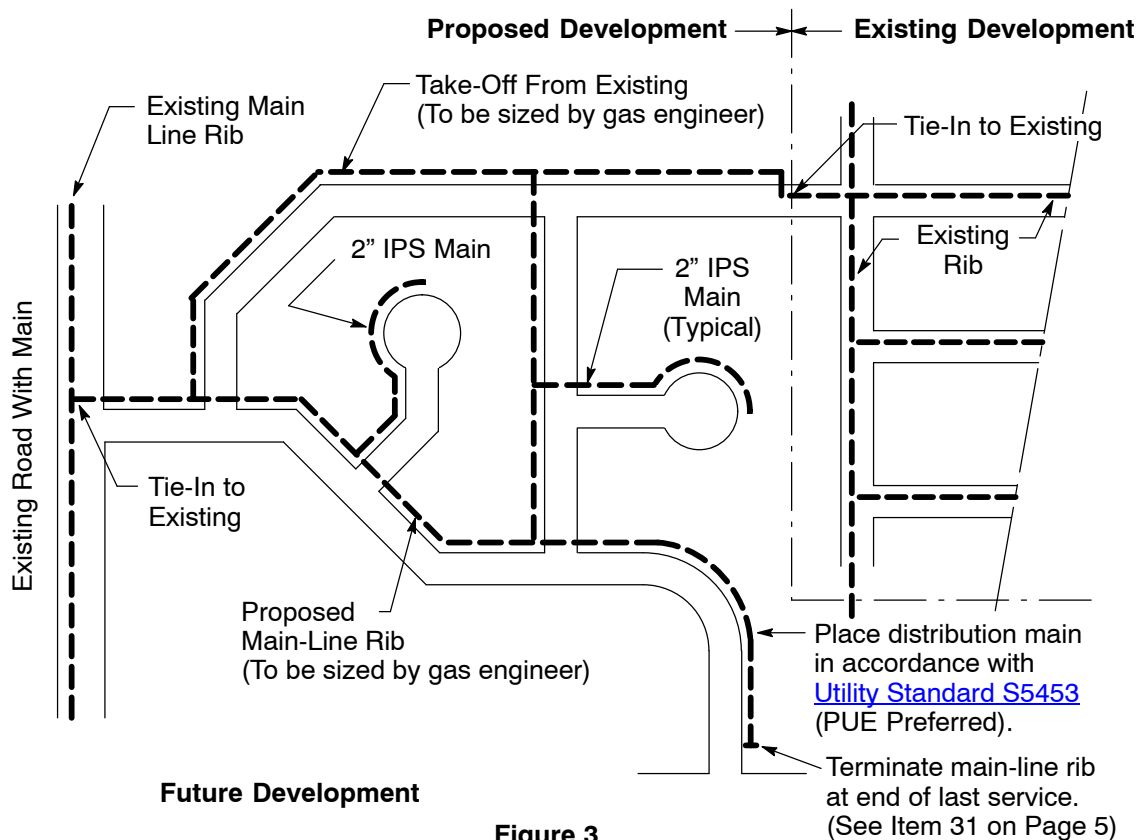


Figure 3
Typical Subdivision Design - Infill

- 32. To make sharp turns or offsets, install full-opening heat fusion fittings per [Numbered Document B-90](#), except at hot tie-in locations. The use of electrofusion fittings and tapping tees per [Numbered Document B-90.3](#) is limited to making hot tie-in connections.
- 33. Place the gas facilities in the distribution trench per [Utility Standard S5453](#). Placement in a PUE is preferred.

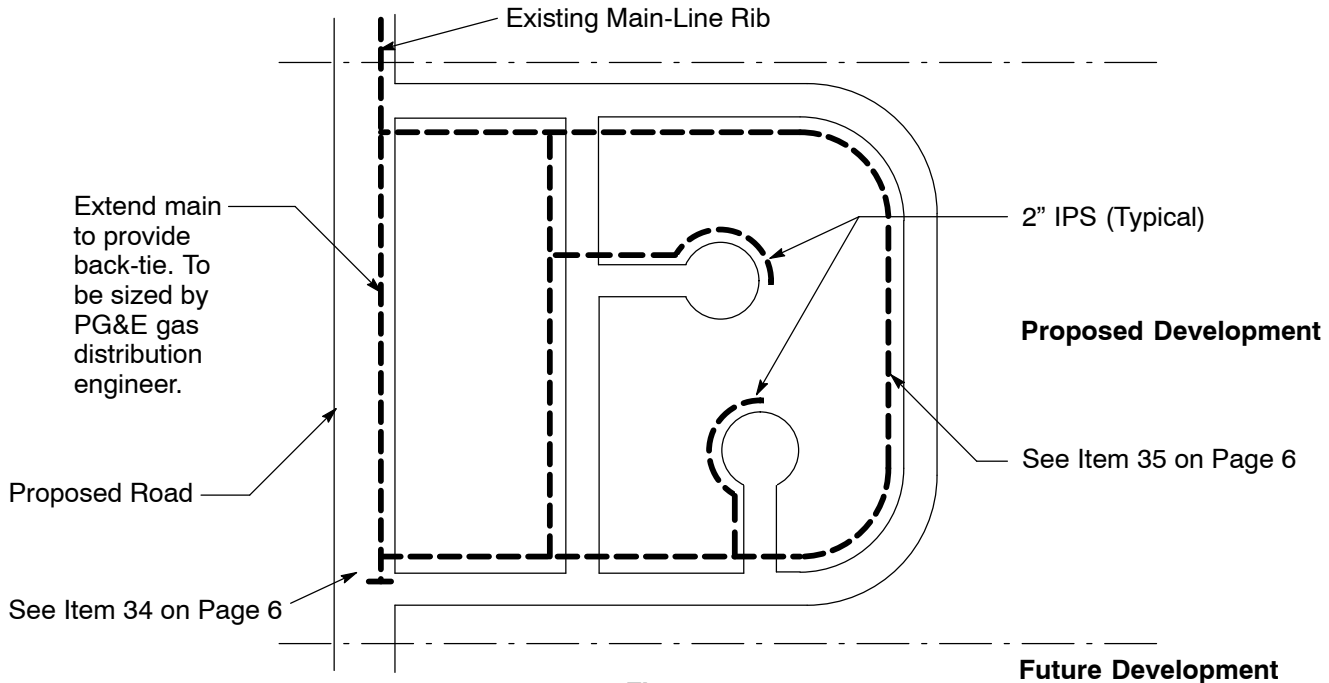


Figure 4
Typical Subdivision Design – End of System Growth

Notes Apply to Figure 4 on Page 6

- 34. Extend the distribution main along the proposed road to provide a back-tie to the proposed development. Do not extend the distribution main to future development unless requested by the applicant to clear paving or other improvements. Otherwise, terminate the main 5' beyond the tie-in point or to the next property line within the project area, unless approved by the area senior gas operations engineer.
- 35. To be sized by the gas engineer.
- 36. Do not use 1-1/4" IPS or 3" IPS PE pipe.
- 37. To make sharp turns or offsets, install full-opening heat fusion fittings per [Numbered Document B-90](#), except at hot tie-in locations. The use of electrofusion fittings and tapping tees per [Numbered Document B-90.3](#) is limited to making hot tie-in connections.
- 38. Place the gas facilities in the distribution trench per [Utility Standard S5453](#). Placement in a PUE is preferred.

Standard Branch-Service Installation

Notes Apply to Figure 5 on Page 7 and Detail A on Page 8

- 39. Materials and Construction
 - A. The materials installed and the methods of construction followed shall conform to this document and [Numbered Document A-93](#), except for rare instances where a steel branch is installed. Install steel branches using pipe in [Numbered Document A-15](#). The provisions of this section also apply to steel branches.
 - B. Deviations from standard materials and construction methods shall not be made unless prior approval is obtained from the senior area operations engineer.

40. Permissible Use

- A. Branch services shall be used only to serve residential buildings which front on the same street and are located on adjoining lots or premises. Figure 5 shows two acceptable methods of making a branch connection.

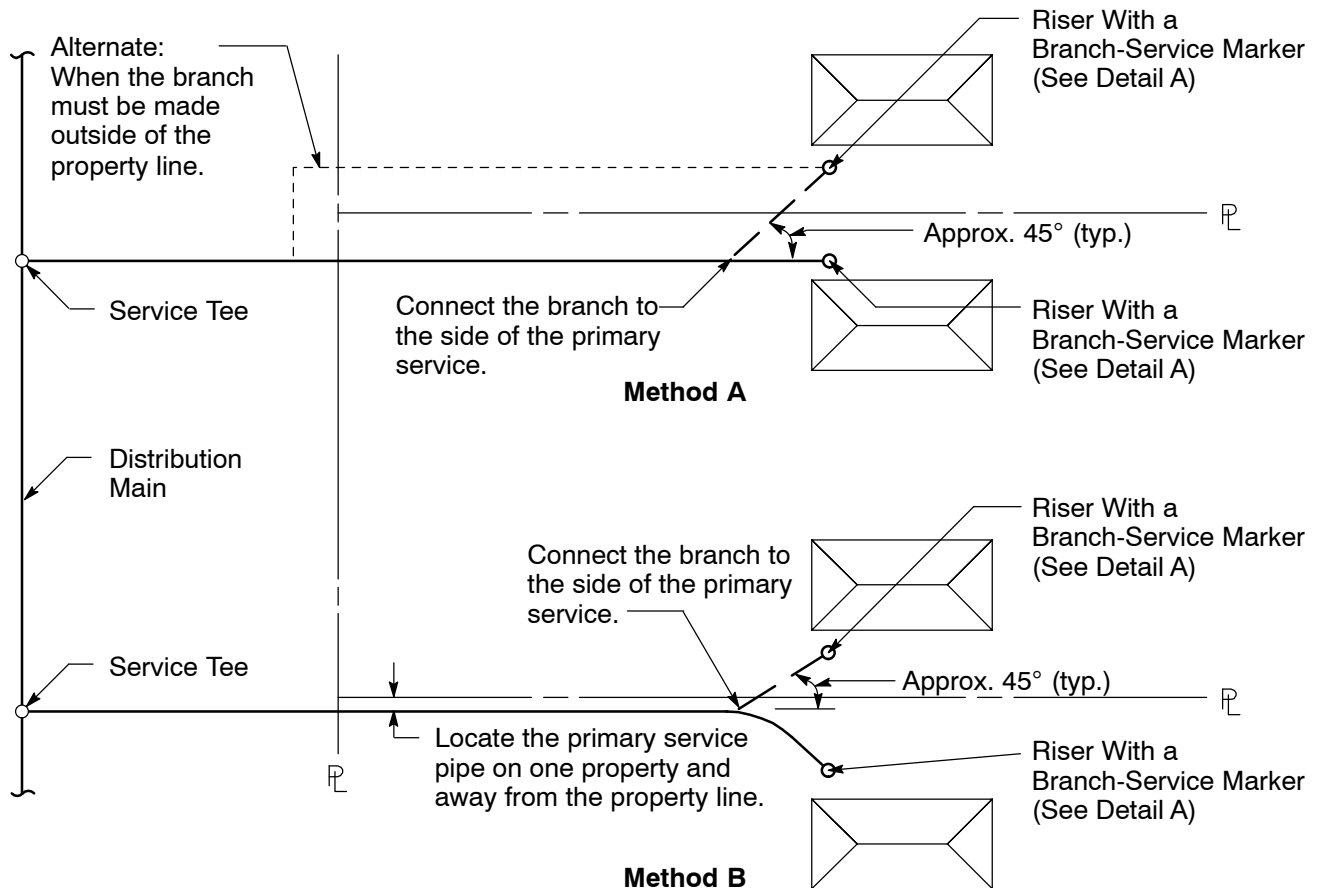
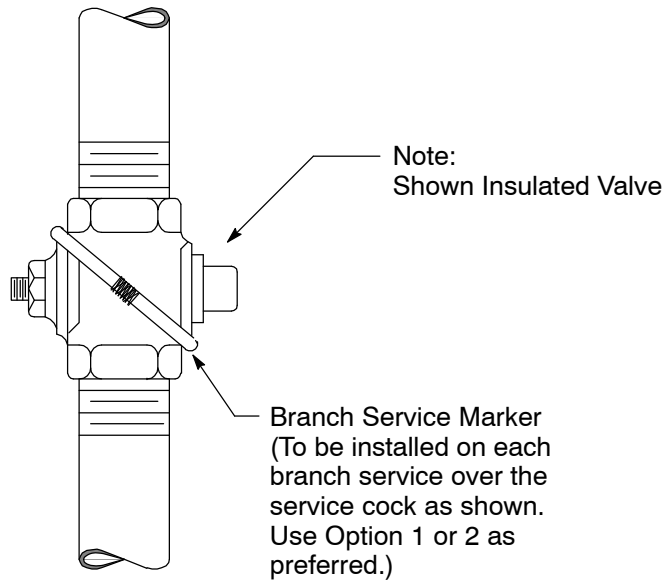


Figure 5
Typical Branch Configurations

- B. Branching shall be used to provide service to no more than two buildings. In every instance, the meter installations shall be located on the adjacent sides of the two buildings served. Where a branch-service installation is justified, a separate location for the gas meter and electric meter is permissible, if necessary.

41. Identification

- A. A standard identification marker shall be installed and maintained on each service riser adjacent to the meter installation wherever a branch service is installed.
- (1) A marker made of #8, #10, or #14 copper wire is formed around the service valve and secured by twisting to a solid connection.
 - (2) Do not braze, weld, or otherwise apply heat to install markers as the heat may damage the inserted PE tubing or service valve on the riser.
 - (3) Detail A on Page 8 depicts the acceptable means of installing a marker.
- B. Branch services shall be identified on all map records.
- C. Separate service orders shall be issued for the straight-through service and the adjacent-lot service. Each service order is to be identified as a branch service.
- D. When a branch connection is made on private land, the appropriate land acquisition file number for the formal grant shall be referenced on the service order. When a branch connection is made as a result of written or oral consent, the record of consent shall be attached to the appropriate service order for permanent filing.



Detail A
Branch Service Marker

42. Location of Branch

- A. When there is no objection from the concerned property owners or occupants, the branch connection may be made on private land. Otherwise, the branch connection shall be made in the sidewalk area of the public street.
- B. On new installations, where the branch connection is to be made on private land, the joint service and any straight-through extension there should be located within a 3-foot strip lying on one side of the common lot line. The piping shall not underlie the lot line.

43. Easements or Consents

- A. A formal grant of right-of-way or a PUE should be obtained to provide for installation of gas services that branch on private lands. When negotiating for a formal grant is impractical but permission will otherwise be granted, it is permissible to install a branch connection if written or oral consent is obtained from the landowner. Whenever installation is made as a result of oral consent, a memorandum signed by the negotiating PG&E representative shall be prepared giving names, date, and conditions regarding consent.
- B. Where a right-of-way is described, it shall generally be a strip 3' in width. The description need cover only the location required for that part of the service (including the joint service) that is not located on the premises to be served.
- C. Where a PUE is specified for a filed tract subdivision map, they shall generally be strips 3' in width. Such an easement should be suitably located for the installation of a branch connection and is to lie solely on one lot and adjacent to the common lot line.

Typical Insert/Cased Main and Service Installation

Notes Apply to Figure 6, Figure 7, and Figure 8 on Page 10

44. Clean the casing pipe. Ream the ends of steel casings to protect the plastic main insert from the sharp edges of the casing. Push the plastic pipe through the casing. Evaluate the first 5' of the plastic pipe for damage as it leaves the casing pipe. If there is damage that is caused by the casing pipe, remove the plastic pipe and repair the pipe as described in [Numbered Document A-93.1](#). See [Numbered Document A-93.1](#) for further instructions on insert construction. See [Numbered Document A-75](#) for further instructions on installing plastic casings. Install plastic gas lines on bridge structures per the requirements of [Numbered Document A-33.1](#).
45. Provide for future laterals by installing stubs or opening up the casing at appropriate locations.

46. Plug the end of the plastic pipe before inserting, and provide for a guide line, if necessary. When inserting services, install the plastic tubing protection provided with the service head adapter packaging.
47. Protect all exposed plastic at entry and exit points with a rigid support. For example, use at least a 12" long redwood board, protective sleeve, half sleeve, or plastic pipe. (If a protective sleeve is supplied with a fitting, the sleeve is required to be installed.) See [Numbered Document B-90.2](#) for more information on sleeves. (All remaining non-cased plastic pipe must be well supported with backfill.)
48. Provide enough slack in all plastic lines before completing the final tie-in to avoid stress due to thermal expansion and contraction. Refer to Numbered Documents [A-93](#) and [A-93.1](#).
49. Plug the space between the plastic and the casing pipe with casing seals (see Numbered Documents [A-70](#) and [A-73](#)), duct seal, or other suitable means not detrimental to plastic pipe. See [Numbered Document A-75](#) for the plastic casing/sleeve sealing requirements.
50. Do not transfer copper services to a new main or alter copper services (see [Numbered Document A-67](#)). Replace copper services with 1/2" CTS or larger PE tubing, or by inserting 1/4" CTS PE tubing into the service. Install an EFV (if available) per [Numbered Document A-93.3](#).
51. Pipe may not be pulled through a casing pipe using mechanical equipment without taking special precautions (see [Numbered Document A-93.1](#)).

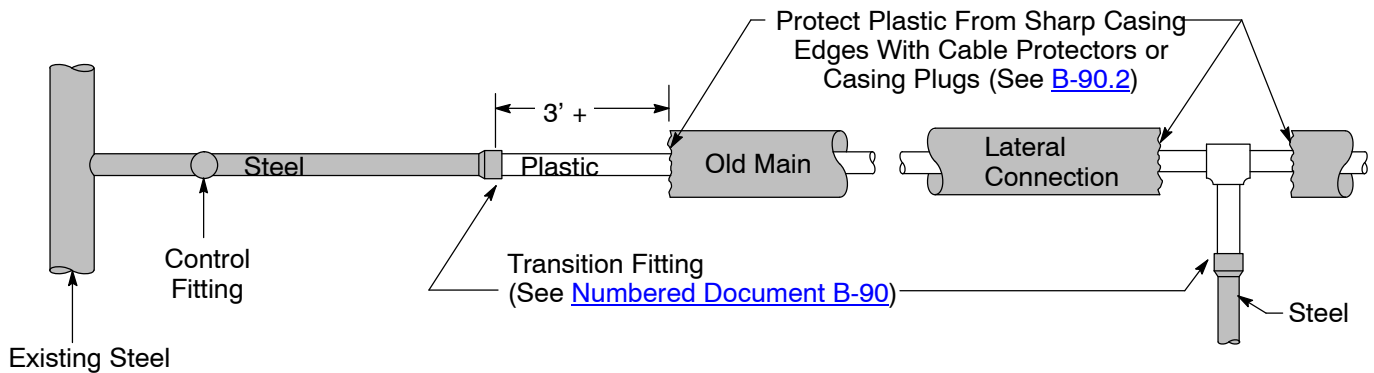


Figure 6
Tie-In to Steel

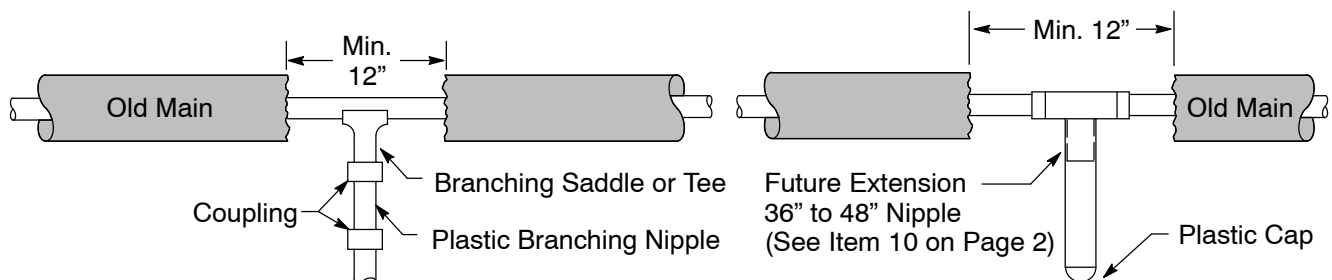


Figure 7
Laterals Off Plastic Main Insert

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Plastic Main and Service Installation

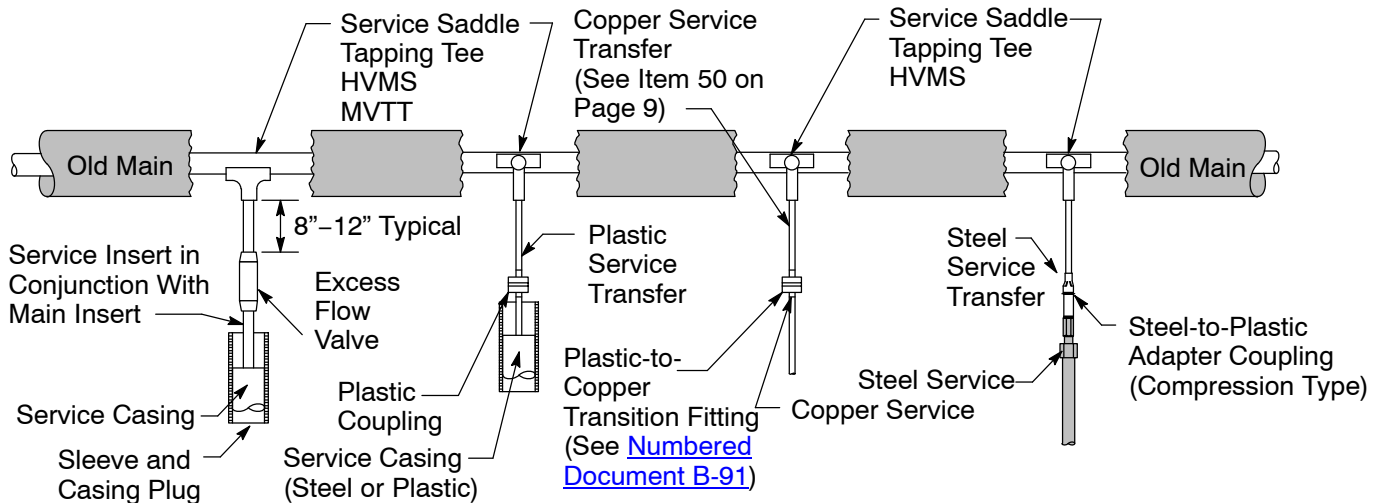


Figure 8
Service Connections Off Plastic Main Insert

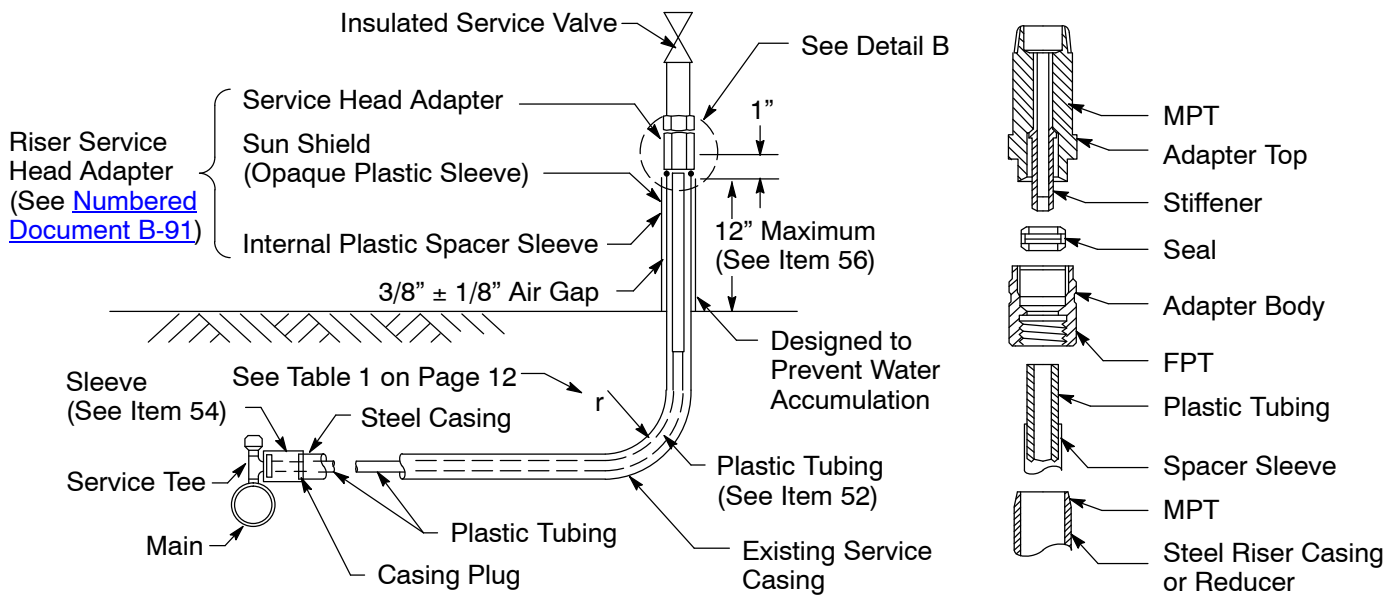


Figure 9
Typical Plastic Service Renewal

Detail B
Riser Insert Renewal Installation

Notes Apply to Figure 9 on Page 10

52. Before installing the adapter kit, inspect the plastic tubing for damage. Replace damaged tubing as described in [Numbered Document A-93.1](#).
53. When installing the service valve on the adapter, keep a backup wrench on the adapter body until the valve is properly tightened.
54. Where possible, the sleeve shall bridge the gap between the service tee and casing pipe. The plastic pipe must be supported by well-compacted sand or fine soil.
55. Refer to [Numbered Document O-16](#) for the requirements regarding locating wires.
56. To accommodate 3/4" CTS service casings extending more than 12" above ground level, order a 3' length of sun shield and plastic spacer separately and cut to size (see [Numbered Document B-91](#)).
57. The air gap between the outside diameter of the service casing and the inside diameter of the sun shield shall be 3/8" ($\pm 1/8$ ").

Plastic Service Insert Into Building or Meter Box

Notes Apply to Figure 10 on Page 11

58. Whenever possible, the service riser shall be relocated outside of the building (see [Numbered Document A-91](#)). This numbered document is intended only for use on service renewals where a new service riser cannot be relocated outside of the building.
59. Where possible, the sleeve shall bridge the gap between the service tee and the casing pipe. The plastic pipe shall be supported by well-compacted sand or fine soil.
60. Use 1/4" CTS copper or stainless steel tubing as a vent pipe. The vent pipe shall be inserted approximately 6" into the annulus between the casing pipe and plastic pipe. The tubing may be slightly oval to fit into the annulus. Use care to avoid restricting the carrying capacity of the tubing. Insulate the tubing from the steel casing by wrapping the tubing with tape. Drill a 3/8" hole into the plastic extension of the curb valve box and insert the tubing with a slight gooseneck to prevent dirt from clogging the vent.
61. Do not insert plastic pipe if the casing pipe radius is less than that shown in Table 1 on Page 12. Install a new riser with the proper bend radius.

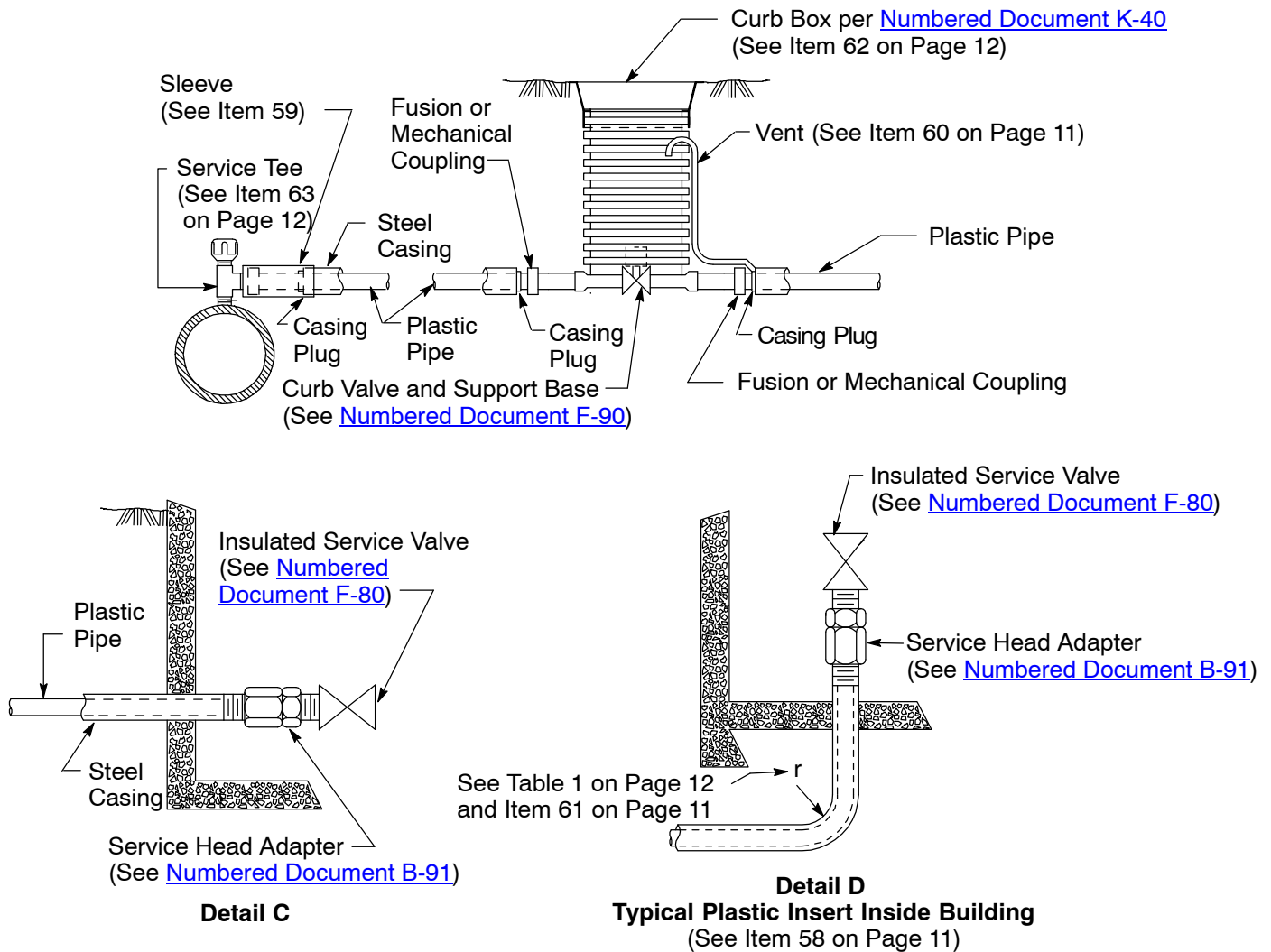


Figure 10
Typical Plastic Insert Into Basement or Meter Box

62. Install the curb box so that external loads are not transmitted to the service. The valve box shall not rest on the service pipe or casing.
63. See [Numbered Document A-44](#) for information on connecting plastic to cast iron.

Table 1 Minimum Bend Radius in a Casing for Specified Pipe Sizes

Pipe Size (Inches)	Minimum r (Inches)
1/4 CTS	7-1/2
1/2 CTS	12
1 CTS	18
1-1/4 IPS	30

Revision Notes

Revision 05 has the following changes:

1. Added [Numbered Document A-67](#) and [Numbered Document B-91.1](#) to the “References” section.
2. Revised Item 5 in the “General Information” section on Page 2 to incorporate Gas Distribution Information Bulletin 283.
3. Clarified that a steel-to-plastic adapter coupling is used to join steel source pipe and plastic tubing in Figure 1 on Page 3.
4. Added a 3-way blind end wye or tee in Figure 1.
5. Added 1/4” CTS PE tubing connector reference to Item 20 on Page 4.
6. Clarified an exception by the area senior gas operations engineer in Items 31 on Page 5 and 34 on Page 6.
7. Added the “Standard Branch-Service Installation” section on Page 6 with Figure 5 on Page 7 and Detail A on Page 8.
8. Specified following [Numbered Document A-67](#) for copper services in Item 50 on Page 9. Also referred [Numbered Document A-93.3](#) and eliminated direct bury requirement.
9. Edited Figure 8 on Page 10 to add a reference to [Numbered Document B-91](#) and to specify a steel-to-plastic adapter coupling for steel service transfer.
10. Deleted material code reference from Item 60 on Page 11.
11. This document is part of Change 61.