SOUTHWEST GAS CORPORATION
ENGINEERING STAFF

MATERIAL SPECIFICATION

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PIPE FITTINGS
Electrofusion System

1. SCOPE

This specification covers polyethylene electrofusion fittings and the associated equipment for joining or repairing polyethylene pipe in nominal diameters of 1/2" CTS, 1" CTS, 1 ¼" IPS, 2" IPS, 3" IPS, 4" IPS, and 6" IPS and 8" IPS intended for use in natural gas distribution systems. All values in this specification will be in English units.

2. APPLICABLE DOCUMENTS

2.1 ASTM International (ASTM) D2513, "Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing and Fittings."

2.2 ASTM International (ASTM) F1055, "Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing."

2.3 ASTM International (ASTM) D2897, "Standard Specification for Tracking and Traceability Encoding System of Natural Gas Distribution Components (Pipe, Tubing, Fittings, Valves, and Appurtenances)"

2.4 ASTM International (ASTM) D3350, "Standard Specification for Polyethylene Plastics Pipe and Fittings Materials."

2.5 Plastic Pipe Institute (PPI) TR-4, "PPI Listing of Hydrostatic Design Basis (HDB), Hydrostatic Design Stress (HDS), Strength Design Basis (SDB), Pressure Design Basis (PDB) and Minimum Required Strength (MRS) Ratings For Thermoplastic Piping Materials or Pipe"

2.6 Southwest Gas Corporation Material Specification (MS) A7, "High Density Polyethylene Pipe and Tubing."

2.7 Title 49, Code of Federal Regulations, Part 192, "Transportation of Natural and Other Gas by Pipeline; Minimum Safety Standards" (49 CFR 192).

NOTE: Unless otherwise specified, the editions of the above document incorporated in whole or in part by 49 CFR 192 are applicable. The above documents, and parts of documents (including annexes), not incorporated by 49 CFR 192 are incorporated by this Material Specification and will be the most recent edition. If a conflict exists between the applicable documents and/or this Material Specification, the requirements of 49 CFR 192 shall govern, and in the event of all other conflicts, the more stringent requirement shall govern.

3. TERMINOLOGY

3.1 General

3.1.1 "Southwest Gas," "Southwest" or "SWG" wherever used in this specification and other related documents will refer exclusively to Southwest Gas Corporation.

3.1.2 The terms "approve," "as approved," "satisfactory," "as directed," "or equal," or other similar terms wherever used in this specification and other related documents, will mean "as determined by Southwest Gas," unless specifically stated otherwise.

3.1.3 "Product Information Package" or "PIP" wherever used in this specification and other related documents will mean the required technical product information that a manufacturer must submit to SWG to determine if the product is suitable for use by SWG, unless specifically stated otherwise.

3.1.4 Electrofusion Heat fusion joining process in which the heat source is an integral part of the fitting. Electric current is applied to a coiled wire inside the fitting, which produces heat and melts the plastics together.

4. MATERIALS AND MANUFACTURING

4.1 The resins from which the electrofusion polyethylene fittings are molded will be in accordance with ASTM F1055 and will have a current listing published by the Plastics Pipe Institute (PPI) TR-4.

4.2 All fittings will be made from virgin material.

4.3 The fittings will be uniform in physical dimensions and chemical makeup.

4.4 The fittings and associated electrical equipment will be clean and internally free of paint, dirt, sand, and other debris.

4. MATERIALS AND MANUFACTURING (Cont'd)

4.5 Electrofusion System

4.5.1 The electrofusion system will be designed especially for piping connections in a polyethylene piping system carrying natural gas. The fittings will be designed for use in 60 psig gas distribution systems in all class locations, at temperatures up to 140°F (60°C), either underground or in casing installations. All fittings must be capable of operating at 60 psig and 140°F (60°C) simultaneously. The electrofusion system will be of a heavy-duty type suitable for continuous service. All features will be acceptable to SWG.

4.5.2 The electrofusion system will be designed in compliance with Department of Transportation 49 CFR, Part 192 requirements.

4.5.3 The electrofusion system will be designed in accordance with all applicable federal, state, and local laws and regulations for direct installation throughout the SWG service area.

4.5.4 The electrofusion system will be designed in accordance with ASTM F1055.

4.6 Electrofusion Polyethylene Fittings

4.6.1 The fittings will contain suitable antioxidants to protect against changes in molecular weight and enable electrofusion joining of system components.

4.6.2 The fittings will be designed so that no harmful or hazardous substances will be released into the gas and/or ground.

4.6.3 The fittings will be designed so that no harmful or hazardous substances will be released into the air during the electrofusion joining process.

4.6.4 The fittings will be designed so that oils and other agents and debris commonly found in natural gas pipelines will not adversely affect the serviceability.

4.6.5 The repair saddles will be designed to reinforce existing butt fusion joints and prevent the possibility of joint failure.

5. PERFORMANCE REQUIREMENTS

5.1 All electrofusion couplings reviewed for qualification by SWG will meet the requirements outlined in ASTM F1055, Section 5, Performance Requirements. Tests will include minimum hydraulic burst pressure, sustained pressure, tensile strength and joint crush.

5.2 Specimens for the qualification tests will be prepared outlined in ASTM F1055, Section 8, Specimen Preparation.

5.3 Testing will be conducted as described in ASTM F1055, Section 9, Testing Methods.

5.4 Materials will be accepted or rejected using the criteria stated in ASTM F1055.

5.5 The fittings will be compatible with all the various types and grades of medium and high-density polyethylene used in SWG's system. The fittings will permit mixed fusions with all the various types and grades of medium and high-density polyethylene used in SWG's system.

5.6 All fittings shall have 4.0 mm or 4.7 mm shrouded terminals that can be connected to the controller boxes operated in automated and manual modes and approved by the Purchaser.

6. DIMENSIONS AND TOLERANCES

The fittings will be designed to join coiled as well as straight lengths of polyethylene pipe covered in Southwest Gas Material Specification MS A-7, "High Density Polyethylene Pipe and Tubing."

7. INSPECTION

7.1 Successful review of the Product Information Package (PIP) as well as any future reference by SWG to the Seller's part number or internal code number in any future contract or purchase, will mean only that no conflict with the specification was found and will not relieve the Seller from meeting all the requirements of this specification.

7.2 SWG retains the option to inspect the manufacture and testing of all materials, products or systems referenced in this specification that are sold to SWG.

7.3 SWG will make appropriate inspections and tests of all materials, products or systems supplied to this specification. SWG will have the right, at their option, to reject any material that fails to conform to this specification. Any such rejection may take place at the manufacturer's facility; the supplier's warehouse or any subsequent delivery location, before or after SWG assumes possession. Notice of the rejection will be made promptly thereafter by SWG. The defective product will be replaced or returned for credit at the manufacturer's expense.

7.4 Any changes in the manufacturing or design of previously approved materials, products or systems described in this material specification for sale to SWG, must be approved by Southwest's Engineering Staff. **Failure to obtain Southwest's approval may be cause for rejection and disqualification as an approved supplier.**

8. CERTIFICATION

The manufacturers or supplier's certification will be furnished to SWG upon request. This certification will state that samples representing each lot have been manufactured, tested and inspected in accordance with this specification and that all requirements have been met. When requested or specified in the purchase order or contract, a report of test results will be provided.

Upon the request of Southwest, the certification of an independent third-party indicating conformance to the specification may be considered at Southwest's expense.

9. SAFETY DATA SHEETS

In accordance with law, the Seller will supply Safety Data Sheets for all applicable items supplied under this specification to the following:

1) The Receiving Location

2) Engineering Staff

3) Southwest Gas Corporation
Corporate Safety
Mail Station LVA-120
P.O. Box 98510
Las Vegas, NV 89193-8510

10. PRODUCT MARKING

10.1 Marking on plastic fittings will comply with the marking requirements of ASTM D2513. The marking method will provide permanent identification of the fitting, enabling access to quality and manufacturing records at any time and will include manufacturer's name or trademark (or both), size, the ASTM standard designation "D2513," material classification, serial number, manufacture date and temperature rating.

10. PRODUCT MARKING (Cont'd)

10.2 The temperature rating marking will be in accordance with ASTM D2513, which consists of, at minimum, a two-letter coding (i.e., "CE"). The first code letter is to identify the high temperature rating and the second code letter is to identify the HDB rating at that high temperature rating. A third code letter may be included which signifies the melt index. The first code letter must have a minimum of a "C" rating which signifies a temperature rating of 140°F (60°C). **The second code letter pertaining to the HDB rating must be a minimum of an "E" rating which signifies an HDB rating of 1000 psig.**

11. PACKAGING AND PACKAGE MARKING

11.1 Seller will adequately prepare all goods for shipment. Seller will furnish and install any necessary covers to protect the goods from sunlight, excessive heat, photochemical smog, rain, hail, wind, dust, etc. Goods will be adequately sealed and protected during shipment to prevent entrance of foreign matter and possible damage from rough handling during transit. Packaging will facilitate its safe handling and its reshipment between the stocking and user locations. Each fitting will be individually wrapped with transparent plastic.

11.2 SWG will store the goods indoors until they are transferred to various gas crew trucks.

12. STOCK CLASSIFICATION DESCRIPTION

TEE, TAPPING, PE4710, PLASTIC MATERIAL FOR SERVICE USE, ELECTROFUSION SADDLE STYLE INSTALLATION, _____ INCH IPS MAIN SIZE X _____ INCH CTS SERVICE SIZE FOR USE ON POLYETHYLENE MAIN, VENTED CAP, THIS ITEM MUST BE MARKED IN ACCORDANCE WITH ASTM D2513, AT A MINIMUM, MARKINGS MUST STATE “D2513” AND TEMPERATURE/PRESSURE RATING INITIALS “CE”.

TEE, TAPPING, HIGH VOLUME _____ INCH IPS MAIN X ____ INCH OUTLET, PE 4710 FOR MAIN BRANCH USE, ELECTROFUSION SADDLE STYLE INSTALLATION, THIS ITEM MUST BE MARKED IN ACCORDANCE WITH ASTM D2513, AT A MINIMUM MARKINGS MUST STATE “D2513” AND THE TEMPERATURE/PRESSURE RATING INITIALS “CE”.

COUPLING, ELECTROFUSION, ____ INCH IPS, HIGH DENSITY, PE 4710, THIS ITEM MUST BE MARKED IN ACCORDANCE WITH ASTM D-2513, AT A MINIMUM MARKINGS MUST STATE “D2513” AND HE TEMPERATURE/PRESSURE RATING “CE”.

EF PROCESSOR MINIMAXX UNIVERSAL 20’ LEADS

ELECTROFUSION PROCESSOR MSA340 W/SCANNER KIT