SOUTHWEST GAS CORPORATION

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ENGINEERING STAFF

MATERIAL SPECIFICATION

Prepared By: Engineering Staff LM

Approved By: Kevin Lang

PIPE AND TUBING

Plastic Pipe Used For Sleeving

1. SCOPE

This specification covers plastic pipe used as sleeving material for natural gas distribution systems. Sleeving can be coiled or straight lengths of pipe in nominal diameters of ¾-in IPS, 1-inch IPS, 1 ¼-inch IPS, 1 ½-inch IPS, 2-inch IPS, 3-inch IPS, 4-inch IPS, 6-inch IPS, 8-inch IPS and 10-inch IPS.

2. APPLICABLE DOCUMENTS

2.1 ASTM International (ASTM) D1238, “Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer.”

2.2 ASTM International (ASTM) D1785, “Specification for PVC Plastic Pipe, Schedules 40, 80 and 120.

2.3 ASTM International (ASTM) D2513, “Standard Specification for Thermoplastic Gas Pressure Piping Systems” and its references.

2.4 Title 49, Code of Federal Regulations, Part 192, “Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards” (49 CFR 192).

NOTE: Unless otherwise specified, the editions of the 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.

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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 "approved," "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.

4. MATERIALS AND MANUFACTURING

4.1 All sleeving will be yellow in color with black (or other pre-approved color) lettering.

4.2 Polyethylene (PE) or Polyvinylchloride (PVC), or pre-approved equivalent, shall be used for straight lengths of sleeving.

4.3 Polyethylene (PE) pipe (or pre-approved equivalent) shall be used for coiled sleeving.

4.4 The resins from which the polyethylene sleeving is extruded will be PE 2708 or PE 4710 and have a current listing published by the Plastics Pipe Institute (PPI). The manufacturer will supply a PPI listing number for each resin used in the manufacture of sleeving for Southwest Gas.

4.5 All PE sleeving will be made from virgin material.

4. MATERIALS AND MANUFACTURING (Cont'd)

4.6 The sleeving will be uniform in physical and chemical properties, and free of cracks, holes, foreign inclusions, areas of unpigmented polymer (windows) or other injurious defects.

4.7 The PE sleeving will contain suitable ultraviolet inhibitors so that its physical properties will not be adversely affected by exposure to natural ultraviolet light in locations throughout Southwest's service area for at least three (3) years from the date of manufacture.

4.8 The sleeving will be clean and internally free of paint, dirt, sand and other debris.

4.9 The PE sleeving will contain suitable antioxidants which protect against changes in molecular weight and enables heat fusion joining.

5. PERFORMANCE REQUIREMENTS

5.1 Qualification Testing

5.1.1 All sleeving considered for qualification by Southwest Gas will be tested using the requirements outlined in ASTM D2513. Tests will include minimum hydrostatic burst pressure and sustained pressure.

5.1.2 Additional tests or the use of expanded testing environment may be utilized by SWG as a part of the material qualification process.

5.1.3 Materials will be accepted or rejected using the criteria stated in ASTM D2513. Each of the above referenced tests will be conducted on six specimens of each type and size of sleeving. Failure on any test of two or more specimens for each classification will constitute a failure to meet this material specification for that sleeving. Failure of a single specimen on any test will result in retest of the classification. A failure in the retest group will result in the failure of the material per this specification.

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5. PERFORMANCE REQUIREMENTS (Cont'd)

5.1 Qualification Testing (Cont'd)

5.1.4 Material qualification will be retained if the material passes periodic acceptance testing. Any revisions to design or processing by the manufacturer after the initial testing requires immediate notification to SWG and retesting of the product to assure this material specification is met.

6. DIMENSIONS AND TOLERANCES

NOMINAL PIPE SIZE (Inches)	O.D. AVERAGE (Inches)	TOLERANCE Inches	WALL MINIMUM Inches	THICKNESS TOLERANCE Inches	NOMINAL SDR
¾ IPS	1.050	0.004	0.095	±0.011	11
1 IPS	1.315	±0.005	0.119	±0.014	11
1 ¼ IPS	1.660	±0.0005	0.151	±0.018	11
2 IPS	2.375	±0.006	0.216	±0.026	11
3 IPS	3.500	±0.008	0.318	±0.038	11
4 IPS	4.500	±0.009	0.333	±0.040	13.5
6 IPS	6.625	±0.011	0.390	±0.047	17
8 IPS	8.625	±0.013	0.410	±0.049	21
10 IPS	10.75	±0.015	0.413	±0.050	26

TABLE A-10.1

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6. DIMENSIONS AND TOLERANCES (Cont'd)

NOMINAL PIPE SIZE (Inches)	O.D. AVERAGE (Inches)	TOLERANCE (Inches)	WALL MINIMUM (Inches)	THICKNESS TOLERANCE (Inches)
¾ IPS	1.050	±0.004	0.113	±0.020
1 IPS	1.315	±0.005	0.133	±0.020
1 ¼ IPS	1.660	±0.005	0.140	±0.020
1 ½ IPS	1.900	±0.006	0.145	±0.020
2 IPS	2.375	±0.006	0.154	±0.020
3 IPS	3.500	±0.008	0.216	±0.026
4 IPS	4.500	±0.009	0.237	±0.028
6 IPS	6.625	±0.011	0.280	±0.034
8 IPS	8.625	±0.015	0.322	±0.039
10 IPS	10.75	±0.015	0.365	±0.044

TABLE A-10.2

7. INSPECTION

7.1 Successful review of the Product Information Package (PIP), as well as any future reference by SWG to the manufacturer'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 Manufacturer agrees that SWG shall have the right, at its discretion and expense, to inspect the manufacture and testing of all materials, products and systems referenced in this specification that are sold to SWG.

7. INSPECTION (Cont'd)

7.3 Southwest will make appropriate inspections and tests of all materials, products or systems supplied to this specification. SWG will have the right, at its option, to reject any material which 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 Southwest assumes possession. Notice of 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 of previously approved materials, products or systems described in this material specification for sale to SWG, must be approved in advance by SWG's Engineering Staff prior to fulfilling any orders placed by SWG. **Failure to obtain SWG's approval may be cause for rejection**.

8. CERTIFICATION

The manufacturer's or supplier's certification for the manufactured products will be furnished to Southwest. 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 manufacturer shall permit Southwest to conduct at the manufacturing facility, at Southwest's expense, these required certifications by an independent third-party indicating conformance to these specifications.

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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 98512
Las Vegas, NV 89193-8512

10. PRODUCT MARKING

Marking on the sleeving will consist of permanent marking at least as good as hot stamp printing and be as large as possible. The marking will consist of the following:

10.1 The words “NATURAL GAS SLEEVING” in black (or other pre-approved color) which will contrast with the yellow sleeving. They will be placed at intervals not exceeding two (2) feet.

10.2 Control bands shall be included on the pipe coils so that approximately 150 feet (45.72 meters) is loose at one time.

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11. PACKAGING AND PACKAGE MARKING

11.1 Seller will adequately prepare all sleeving for shipment. Seller will furnish and install necessary covers to protect the sleeving from sunlight, excessive heat, photochemical smog, rain, hail, wind, dust, etc. Sleeving 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.

11.2 Sleeving coils or bundles will be firmly banded utilizing the manufacturer's recommendations which must be approved by Southwest Gas. The maximum number of sleeving coils per pallet will be eight.

11.3 Control bands shall be included on the pipe coils so that approximately 150 feet (45.72 meters) is loose at one time.

11.4 Each reel, spool or sleeving bundle will be marked or tagged with the following information:

- Manufacturer's Name
- Nominal Size of Sleeving
- Wall Thickness or SDR
- Length of Sleeving
- Southwest Gas Corporation Purchase Order Number
- Manufacturer's Plant Code

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11. PACKAGING AND PACKAGE MARKING (Cont'd)

11.5 Ventilated dust caps will be placed on the ends of all sleeving in a color which is significantly different from yellow.

11.6 Pallet and package sizes will be determined and/or approved by Southwest Gas Corporate Purchasing Department.

11.7 All products covered in this specification will be packaged in a manner to prevent damage during transportation and storage.

12. STOCK CLASSIFICATION DESCRIPTION

PIPE, MEDIUM DENSITY POLYETHYLENE (PE 2708), _____-INCH IPS BY SDR _____, YELLOW IN COLOR, MARKED "NATURAL GAS SLEEVING," FOR USE AS SLEEVING ONLY, ____ -FOOT JOINTS OR COILS.

PIPE, POLYVINYLCHLORIDE (PVC), _____-INCH IPS BY SCHEDULE 40, YELLOW IN COLOR, MARKED "NATURAL GAS SLEEVING,' FOR USE AS SLEEVING ONLY, ____-FOOT JOINTS.