



SOUTHWEST GAS CORPORATION

® ENGINEERING STAFF

MATERIAL SPECIFICATION

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Issue Date:	03/01/16
Superseded Date:	01/29/15

Prepared By: Engineering Staff 

Approved By: Jerome T. Schmitz 

PIPE COATING

Pritec Protective Pipe Coating

1. SCOPE

This specification defines the minimum requirements for materials, application and inspection of the PRITEC extruded polyethylene and butyl adhesive pipe coating system. This coating is used to electrically isolate buried steel pipe from surrounding soil.

This coating is applied in a pipe coating mill only.

2. APPLICABLE DOCUMENTS

- 2.1 ASTM International (ASTM) D-149, "Test Methods for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies."
- 2.2 ASTM International (ASTM) D-638, "Test Methods for Tensile Properties of Plastics."
- 2.3 ASTM (ASTM) D-1505, "Test Method for Density of Plastics by the Density Gradient Technique."
- 2.4 ASTM International (ASTM) D-1693, "Test Method for Environmental Stress-Cracking of Ethylene Plastics."
- 2.5 ASTM International (ASTM) G-6, "Test Method for Abrasion Resistance of Pipeline Coatings."
- 2.6 ASTM International (ASTM) G-8, "Test Method for Cathodic Disbonding of Pipeline Coatings."
- 2.7 ASTM International (ASTM) G-9, "Test Method for Water Penetration into Pipeline Coatings."
- 2.8 ASTM International (ASTM) G-14, "Test Method for Impact Resistance of Pipeline Coatings (Falling Weight Test)."
- 2.9 ASTM International (ASTM) G-17, "Test Method for Penetration Resistance of Pipeline Coatings (Blunt Rod)."



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2. APPLICABLE DOCUMENTS (Cont'd)

- 2.10 American Petroleum Institute (API) Specification 5L, "Specification for Line Pipe."
- 2.11 Deutsche Industrial Normen (DIN) 30.670-3.2.3.1, "Peel Strength."
- 2.12 National Association of Corrosion Engineers (NACE) Joint Surface Preparation Standard NACE No. 3/SSPC-SP6 Commercial Blast Cleaning.
- 2.13 National Association of Pipe Coating Applicators (NAPCA).
- 2.14 United States Department of Transportation (DOT) Code of Federal Regulation (CFR), Title 49, Part 192, "Transportation of Natural and Other Gas by Pipeline; Minimum Safety Standards."

NOTE: Unless otherwise specified, the editions of the above documents incorporated by DOT 49 CFR 192 are applicable. Documents not incorporated by DOT 49 CFR will be the most recent edition.

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 the specification and any 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.





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4. MATERIALS AND MANUFACTURING

4.1 The nominal thickness of the PRITEC pipe coatings system are listed in the table below:

STANDARD THICKNESS*			
Pipe Size	Coating Thickness	Butyl Thickness	Polyethylene Thickness
4 1/2" & less	45 mils	10 mils	35 mils
5 9/16" & larger	50 mils	10 mils	40 mils

SPECIAL THICKNESS**			
Pipe Size	Coating Thickness	Butyl Thickness	Polyethylene Thickness
4 1/2" & larger	60 to 75 mils	10 to 15 mils	50 to 60 mils
* For pipe sizes larger than 20-inch, coating thickness shall be determined by Engineering Staff in accordance with manufacturer's recommendations.			
** Requires Engineering Staff's approval.			

TABLE C-1.1




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4. MATERIALS AND MANUFACTURING (Cont'd)

4.2 The polyethylene material shall be black in color.

4.3 The properties of the polyethylene material shall be in accordance with Table C-1.2.

PROPERTY & UNIT	VALUE	TEST METHOD
Elongation at Break, %	500 minimum	ASTM D-638
Tensile Strength, psig	2,700 minimum	ASTM D-638
Dielectric Strength, V/mil	800 minimum	ASTM D-1505
Environmental Stress Crack Resistance	10% Igepal CO-630; T ₅₀ =165 hrs. 100% Igepal CO-630 T ₅₀ =1,000 hrs.	ASTM D-1693
Density, g/cc	0.94 – 0.96	ASTM D-1505
Impact Resistance, in lbs/mil	1 minimum	ASTM G-14
Blunt Rod Penetration, %	13 maximum	ASTM G-17
Abrasion Resistance	No change in electrical resistance or appearance	ASTM G-6
Adhesion	Cohesive failure – does not fail adhesively	DIN 30 670
Water Penetration	0.0046 in. dissipation factor and water penetration remained constant	ASTM G-9
Cathodic Disbondment, in ²	30 days, 0–0.15 @ 77EF 30 days, 0.50 @ 144EF	ASTM G-8

TABLE C-1.2

4.4 The adhesive material shall be butyl rubber compound and shall be made from isobutylene and 1.5 percent to 2.0 percent by weight of isoprene. The butyl rubber compound shall contain no asphaltic, coal tar, or other property- degrading extenders.

4.5 The exterior of the pipe shall be free of mill scale, rust, rust preventatives or other foreign matter. Pipe shall be blast cleaned with sand, grit or shot to a NACE No. 3 commercial finish. Pipe shall be preheated to remove all moisture prior to blast cleaning.



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4. MATERIALS AND MANUFACTURING (Cont'd)

- 4.6 Extruded polyethylene coatings, shall consist of a two component extrusion consisting of one layer of butyl rubber adhesive and one layer of polyethylene. The longitudinal weld seam of submerged arc welded pipe shall be coated with a 3-inch wide strip of an approved 50 mil tape prior to extrusion. No taping is required on ERW pipe.
- 4.7 The coating process shall immediately follow the completion of surface preparation without interruption.
- 4.8 Each component of the coating system shall be applied in the form of an extruded sheet or sheets. Extruding heads shall be placed in the immediate vicinity of the steel pipe section to be coated. Extruding heads shall be arranged such that the polyethylene coating is applied immediately following application of the butyl rubber adhesive coating.
- 4.9 During the entire coating operation, the steel pipe section and the coating component shall each be maintained at the optimum temperature for maximum adhesion at the contact surfaces. The temperature of the section to be coated shall be maintained at a minimum of 5°F (-15°C) above the dew point at the time of coating application. Butyl rubber adhesive shall be applied at the point of application at a temperature not to exceed 350°F (177°C), and the polyethylene coating shall be applied at the point of application at a temperature not to exceed 575°F. In cases where extrusion friction does not raise the coating materials to the specified temperature, heat from an external source shall be applied.
- 4.10 For standard coating, Butyl rubber adhesive shall be applied in single or multiple layers to a nominal thickness of 10 mils and shall be sufficiently edge-lapped to ensure against voids and thin sections. For special coating, butyl rubber will be increased in increments of 5 mils to a thickness shown in Table C-1.1.
- 4.11 For standard coating, polyethylene coating shall be applied in single or multiple layers to a nominal thickness of 35 to 40 mils, with lapped surfaces completely fused together. The combined thickness of adhesive and backing shall not be less than that shown in Table C-1.1.
- 4.12 For special coating, polyethylene coating will be increased in increments of 10 mils to a thickness shown in Table C-1.1. The combined thickness of adhesive and backing shall not be less than 90 percent of the specified thickness in Table C-1.1.



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4. MATERIALS AND MANUFACTURING (Cont'd)

- 4.13 After completion of the coating application, the heated materials may be cooled by water quenching. The entire coated surface shall then be tested using an electrical holiday detector operating at a minimum of 10,000 volts. Any defects found in the coating shall be repaired at the pipe coater's own expense. The coated pipe shall leave the coater's facility free of holidays.
- 4.14 Each coated joint of pipe shall have a nominal cutback (uncoated length) of 3 inches (± 1 inch) at each end to facilitate welding the pipe without damaging the coating. The cutback shall be clean of any adhesive. Allowing for shrinkage, the maximum length from the end of polyethylene to the end of the pipe is 6 1/2 inches.
- 4.15 The coating applicator shall be a current registered member of NAPCA.

5. PERFORMANCE REQUIREMENTS

- 5.1 Repairs to small holidays may be made by using an approved shrink-type polyolefin material. The affected area shall be roughed with course emery cloth or equivalent and manufacturer's recommendation followed regarding primer application. The patch shall over wrap the damaged area a minimum of two inches on either side.
- 5.2 Repairs will be inspected with a holiday detector.
- 5.3 Defective coating shall be recoated to meet specifications.

6. INSPECTION

- 6.1 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.
- 6.2 SWG retains the option to inspect the manufacture and testing of any and all materials, products or systems referenced in this specification that are sold to SWG.



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6. INSPECTION (Cont'd)

- 6.3 SWG will make appropriate inspections and tests of any and all materials, products or systems supplied to this specification. SWG will have the right, at their 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 SWG assumes possession. Notice of the rejection will be made promptly to the supplier by SWG. The defective product will be replaced or returned for credit at the manufacturer's expense.
- 6.4 Any changes in the manufacturing of previously approved materials, products or systems described in this material specification for sale to SWG must be approved by SWG's Engineering Staff. **Failure to obtain SWG's approval may be cause for rejection and disqualification as an approved supplier.**

7. CERTIFICATION

The manufacturer's or supplier's certification will be furnished to SWG. 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.

8. 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-1201
P.O. Box 98510
Las Vegas, NV 89193-8510



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9. PRODUCT MARKING

- 9.1 The identification marking of the bare pipe (information per API 5L) shall be legibly reproduced on the O.D. of the coating along with the following:
- Coater's Name
 - PRITEC
 - Date the coating was applied
- 9.2 Pipe of different wall thickness for the same project shall have a specific colored stripe painted at both ends of the pipe over the coating to differentiate that wall thickness from any other wall thickness.

10. PACKAGING

- 10.1 Pipe shall be handled and stored in a manner to prevent damage to pipe walls, beveled ends and coating.
- 10.2 Prior to coating, there may be various operations unloading, stacking or moving pipe into the coating facility. These activities must be done in a manner to prevent any damage to the pipe walls, pipe roundness, and beveled ends.
- 10.3 After coating, there may be various operations of moving pipe, stacking and loading. Appropriate slings, padding, dunnage, etc. shall be used to prevent damage to the pipe, the coating and beveled ends.
- 10.4 External coated pipe shall be stacked upon supports that have broad padded bearing surfaces or covered sand rows that are free of rocks, sticks or other objects with sharp edges which might damage the coating. Where coated pipe is placed in storage, the bottom tier shall be removed far enough from the ground to prevent silt laden rainwater from washing into the open ends of the pipe.
- 10.5 Under no circumstances shall coated pipe be pyramided, each layer of pipe shall be supported separately by the use of padded skids. The ends of the padded skids shall be blocked to prevent the coated pipe from rolling off the end of the skid.



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10. PACKAGING (Cont'd)

10.6 Pipe sizes and maximum tier heights shall be as follows:

- Pipe sizes up to 3-inch shall be stacked using pipe bundles to a maximum of 6 high per bundle. This method of stacking provides for each layer of pipe to be supported separately. The boards and blocks used shall be a permanent part of the bundle.
- Pipe sizes 4-inch through 6-inch can be stacked to a maximum of 8 tiers high.
- Pipe sizes 8-inch through 10-inch can be stacked to a maximum of 6 tiers high.
- Pipe sizes 12-inch through 16-inch can be stacked to a maximum of 4 tiers high.
- Pipe sizes 20-inch through 24-inch can be stacked to a maximum of 3 tiers high.

NOTE: Short lengths of pipe shall always be stacked on the top tier to prevent flattening of the ends.

10.7 Pipe shall be loaded for shipping in compliance with existing shipping standards and regulations.