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Issue Date:	03/01/16
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Prepared By: Engineering Staff 

Approved By: Jerome T. Schmitz 

PIPE COATING

Heat Shrink Joint Protection Sleeve

1. SCOPE

This specification covers pre-cut heat shrinkable wrap-around sleeves to be used for corrosion prevention of field welded steel pipe joints, and repair of mainline coating damages. These sleeves consist of a thick-walled material fabricated from an irradiated cross-linked polyolefin, pre-coated with a specially formulated mastic sealant. The mastic metal surfaces, and properly prepared polymer or thermoset mainline coatings. The Closure Seal provided with the heat-shrinkable sleeve is to secure the overlap/underlap areas of the sleeve together, which forms the wrap-around sleeve into a tube configuration, and prevents the sleeve ends from pulling apart during the shrinking process. The closure for the K-60 Heat Shrink Sleeve does not contain an adhesive.

2. APPLICABLE DOCUMENTS

- 2.1 ASTM International (ASTM) D-149, "Dielectric Breakdown Voltage and Dielectric Strength of Electrical Insulating Materials at Commercial Power Frequencies.
- 2.2 ASTM International (ASTM) D-257, "DC Resistance or Conductance of Insulating Materials."
- 2.3 ASTM International (ASTM) D-624, "Tear Resistance of Vulcanized Rubber."
- 2.4 ASTM International (ASTM) D-638, "Tensile Properties of Plastics."
- 2.5 ASTM International (ASTM) D-1000, "Pressure Sensitive Adhesive Coated Tapes used for Electrical Insulations."
- 2.6 ASTM International (ASTM) D-1002, "Strength Properties of Adhesives in Shear by Tension Loading (Metal-to-Metal)."
- 2.7 ASTM International (ASTM) D-2671, "Heat-Shrinkable Tubing"
- 2.8 ASTM International (ASTM) E-96, "Water Vapor Transmission of Materials in Sheet Form."
- 2.9 ASTM International (ASTM) G-6, "Abrasion Resistance of Pipeline Coatings."
- 2.10 ASTM International (ASTM) G-8, "Cathodic Disbonding of Pipeline Coatings."
- 2.11 ASTM International (ASTM) G-11, "Effects of Outdoor Weathering on Pipeline Coatings."



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2. APPLICABLE DOCUMENTS (Cont'd)

- 2.12 ASTM International (ASTM) G-13, "Impact Resistance of Pipeline Coatings (Limestone Drop Test)."
- 2.13 ASTM International (ASTM) G-14, "Pipeline Coatings (Falling Weight Test)."
- 2.14 ASTM International (ASTM) G-17, "Penetration Resistance of Pipeline Coatings (Blunt Rod)."
- 2.15 ASTM International (ASTM) G-21, "Determining Resistance of Synthetic Polymeric Materials to Fungi."
- 2.16 ASTM International (ASTM) G-22, "Determining Resistance of Plastics to Bacteria."
- 2.17 United States Department of Transportation (DOT), Code of Federal Regulations, Title 49, Part 192, "Transportation of Natural and Other Gas by Pipelines 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 192 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 this specification and other related documents will mean the required technical product information that a manufacturer must submit to Southwest to determine if the product is suitable for use by Southwest, unless specifically stated otherwise.



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4. MATERIALS AND MANUFACTURING

- 4.1 The wrap-around sleeves shall be composed of an irradiated semi-rigid polyolefin heat shrinkable backing pre-coated with a mastic sealant that provides a bond between the sleeve and the bare or pre-coated metal pipe.
- 4.2 The wrap-around sleeves shall have a pre-attached or separate closure consisting of an irradiated, semi-rigid polyolefin backing.
- 4.3 Both the wrap-around sleeve and the closure are to include an integrated temperature sensitive indicator, which visually indicates when the correct bonding temperature has been reached. The closure is to be packaged with each sleeve, or pre-attached to the sleeve.

5. PERFORMANCE REQUIREMENTS

The sleeves shall meet the requirements as shown in Table C-11.1.

PROPERTY	VALUE	TEST METHOD
<u>SLEEVE BACKING</u>		
Tensile Strength	2,200 psi min.	ASTM D-638
Elongation	500% min.	ASTM D-638
Heat Shock	No dripping, flowing or cracking	ASTM D-2671
Penetration Resistance	0.02 inch max.	ASTM G-17
Tear Strength	500 lb./inch min.	ASTM D-624
<u>MASTIC SEALANT</u>		
Lap Shear	45 psi min.	ASTM D-1002
<u>FINISHED SLEEVE</u>		
Adhesive Peel	30PLI min.	ASTM D-1000 (Method B w/Jaw Sep. Speed 4"/min.
Impact Resistance	50 inch/lbs. min. (70 inch/lbs. min.)	ASTM G-14
Limestone Drop Test	50 drops min.	ASTM G-13 (35 lbs.)
Abrasion Resistance	No Holidays	ASTM G-6
Outdoor Weathering	No deterioration of performance	ASTM G-11
Low Temperature Flexibility	Below-15C	ASTM D-2671 (Proc. C, 1-inch Mandrel)
Cathodic Disbondment	<=10mm	ASTM G-8 (30 days)
Fungi Resistance	Rating <= 1	ASTM G-21
Bacterial Resistance	No growth 21 days	ASTM G-22
Water Vapor Transmission	.05 gr/24 hrs/100m ² max.	ASTM E-96 (Method B)
Dielectric Withstand	20,000 volts	ASTM D-149
Insulation Resistance	1012 ohm.Xcm min.	ASTM D-257
Thickness Backing	.030 inch min.	ASTM D-2671 (Recovered)
Thickness Mastic – Wraparound	.045 inch	ASTM D-2671 (As Supplied)

TABLE C-11.1



**ENGINEERING STAFF
MATERIAL SPECIFICATION**

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6. DIMENSIONS AND TOLERANCES

Wraparound sleeves shall be sized for the specific pipe diameter. The length of sleeve required for the specific cutback of the factory applied pipeline coating shall conform to Table C-11.2. Wraparound sleeves are approved for pipe sizes 6" diameter and larger.

Wraparound Sleeves			
COATING CUT BACK [1]	SLEEVE LENGTH [2]	MAXIMUM THEORETICAL NECKING (12.4%) [3]	MINIMUM INSTALLED LENGTH
≤ 3	11	1.4	9.6
> 3 and ≤ 6	17.5	2.1	15.3
> 6 and ≤ 9	24	3	21

[1] Coating Cut Back is distance from the end of the pipe to the edge of the factory coating where it has been cut back.
[2] Sleeve Length is the dimension of the sleeve as measured longitudinally with the pipe prior to shrinking.
[3] The installed sleeve length will be shorter than the length as supplied.

NOTE: All sleeves will be supplied in 24-inch lengths unless otherwise approved by SWG. All dimensions are in inches unless otherwise specified.

TABLE C-11.2

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 any and all materials, products or systems sold to SWG.
- 7.3 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.



SOUTHWEST GAS CORPORATION

ENGINEERING STAFF

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7. INSPECTION (Cont'd)

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 by SWG's Engineering Staff. **Failure to obtain SWG's approval may be cause for rejection and disqualification as an approved supplier.**

8. CERTIFICATION

The manufacturer's or supplier's certification 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 specified in the purchase order or contract, a report of 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. STOCK CLASS DESCRIPTION

SHRINK SLEEVE FOR ____-INCH STEEL PIPE, WRAP AROUND, 24.000 INCH WIDTH