



# **SOUTHWEST GAS CORPORATION**

® ENGINEERING STAFF

## **MATERIAL SPECIFICATION**

*Prepared By:* Engineering Staff 

*Approved By:* Jerome T. Schmitz 

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### **GASKETS AND SEALANTS**

Gaskets, Non-Insulating and Insulating

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#### **1. SCOPE**

This specification covers non-insulating and insulating gaskets, insulating sleeves and washers, and SAE steel washers used to provide a pressure-tight seal between bolted flanges. Insulating gaskets, sleeves and washers will be used to electrically insulate flanged joints. Non-insulating and insulating gaskets will have pressure ratings corresponding to ANSI Class 150, 300, 400 and 600.

Machine or stud bolts used for insulating flange joints should be ¼" longer than bolts used for non-insulating flange joints.

#### **2. APPLICABLE DOCUMENTS**

- 2.1 American National Standards Institute (ANSI) B-16.1, "Cast Iron Flanges and Flanged Fittings."
- 2.2 American National Standards Institute (ANSI) B-16.5, "Steel Pipe Flanges and Flanged Fittings."
- 2.3 United States Department of Transportation (DOT), code of Federal Regulations, Title 49, Part 192 are applicable. Documents not incorporated by DOT 49 CFR 192 will be the most recent edition.

**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 "Gaskets" wherever used in this specification will include both non-insulating and insulating gaskets.



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**3. TERMINOLOGY (Cont'd)**

3.1.4 "Product Information Package" 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.

The following are ANSI Class ratings as recognized by SWG:

ANSI Class	Pressure Rating (psig)
150	275
300	720
400	960
600	1440

**TABLE H-1.1**

**4. MATERIALS AND MANUFACTURING**

4.1 Gaskets will contain no harmful or hazardous substances.

4.2 Gaskets will be made of a material which is compatible with natural gas and agents commonly found in natural gas pipelines. A list of approved materials is shown below:

APPROVED GASKET MATERIALS
NEMA Grade G-10
Teflon
Nitrile
Graphite
304 Stainless Steel
316 Stainless Steel

**TABLE H-1.2**



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**4. MATERIALS AND MANUFACTURING (Cont'd)**

4.3 Plastic used in gaskets will contain suitable ultraviolet inhibitors which are acceptable to SWG so their physical properties will not be adversely affected by exposure to natural ultraviolet light in locations throughout SWG's service area for at least 1 year from the date of manufacturer.

4.4 Metal used in gaskets will be corrosion resistant.

4.5 Gaskets will be uniform in physical and chemical properties and free of cracks, foreign inclusions, or other injurious defects.

4.6 Gaskets will be either ring (Type F) or full-faced (Type E) and will be compatible with flanges manufactured in accordance with ANSI B-16.1 and B-16.5.

4.7 Insulating Gaskets

4.7.1 Any metal used in the insulating gaskets will be finely dispersed as reinforcing or filler material.

4.7.2 Insulating gaskets will have a minimum dielectric strength of 400 volts/mil.

4.8 Insulating Sleeves and Washers

4.8.1 Insulating sleeves/washers will be integrated into a one-piece design.

4.8.2 Insulating sleeves/washers will be made of Minlon or other material approved by SWG.

4.8.3 Insulating sleeves/washers will have a minimum dielectric strength of 400 volts/mil.

4.8.4 Insulating washers will have a minimum compressive strength of 19,000 psig.

4.9 Steel washers will be Type SAE die cut from 11 gauge (0.120") zinc hot-rolled steel.



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**5. PERFORMANCE REQUIREMENTS**

- 5.1 Gasket and insulating sleeves/washers will have a minimum operating temperature range of -30 degrees Fahrenheit to 225 degrees Fahrenheit.
- 5.2 When assembled using SWG procedures, gaskets will provide a bubble-tight seal under all rated operating conditions and the test pressure limitations in ANSI B-16.1 and B-16.5. No leakage will be noted when soapy water is applied to a gasket under pressure.
- 5.3 Insulating gaskets and sleeves/washers will provide electrical insulation at or above their rated dielectric strength (volts/mil).

**6. DIMENSIONS AND TOLERANCES**

6.1 Gaskets

- 6.1.1 Gaskets will meet the dimensions and tolerance requirements for inside diameter (I.D.) and outside diameter (O.D.) as shown in Appendix A.
- 6.1.2 Gaskets will meet the following thickness tolerances:

THICKNESS (In Inches)
1/16 ± 0.007
3/32 ± 0.011
1/8 ± 0.015
5/32 ± 0.018

**TABLE H-1.3**

- 6.1.3 The eccentricity between the inner and outer circumference of the gasket will not exceed 1/16".



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**6. DIMENSIONS AND TOLERANCES** (Cont'd)

6.1 Gaskets (Cont'd)

<b>ANSI 150 GASKETS</b>						
<b>NORMAL SIZE</b>	<b>TYPE E</b>				<b>TYPE F</b>	
	<b>I. D. MINIMUM</b>	<b>I.D. MINIMUM</b>	<b>O.D. MINIMUM</b>	<b>O.D. MAXIMUM</b>	<b>O.D. MINIMUM</b>	<b>O.D. MAXIMUM</b>
1	1.00	1.36	4.19	4.25	2.56	2.62
1 ¼	1.38	1.72	4.56	4.62	2.94	3.00
1 ½	1.60	1.97	4.94	5.00	3.32	3.38
2	2.00	2.44	5.94	6.00	3.88	4.12
3	3.00	3.56	7.44	7.50	5.13	5.38
4	4.00	4.56	8.94	9.00	6.63	6.88
6	6.00	6.68	10.94	11.00	8.50	8.75
8	8.00	8.68	13.44	13.50	10.75	11.00
10	10.00	10.81	15.94	16.00	13.13	13.38
12	12.00	12.81	18.94	19.00	15.88	16.13
16	15.25	16.12	23.38	23.50	20.00	20.25
18	17.25	18.12	24.88	25.00	21.38	21.62
20	19.25	20.12	27.38	27.50	23.63	23.88
24	23.25	24.12	31.88	32.00	28.00	28.25

**TABLE H-1.4**



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**6. DIMENSIONS AND TOLERANCES** (Cont'd)

6.1 Gaskets (Cont'd)

<b>ANSI 300/400/600 GASKETS</b>								
<b>NOMINAL SIZE</b>	<b>I.D. MIN.</b>	<b>I.D. MAX.</b>	<b>CLASS 300</b>		<b>CLASS 400</b>		<b>CLASS 600</b>	
			<b>O.D. MIN.</b>	<b>O.D. MAX.</b>	<b>O.D. MIN.</b>	<b>O.D. MAX.</b>	<b>O.D. MIN.</b>	<b>O.D. MAX.</b>
1	1.00	1.37	2.82	2.88	2.82	2.88	2.82	2.88
1 ¼	1.38	1.72	3.19	3.25	3.19	3.25	3.19	3.25
1 ½	1.60	1.97	3.69	3.75	3.69	3.75	3.69	3.75
2	2.00	2.44	4.18	4.38	4.18	4.38	4.18	4.38
3	3.00	3.56	5.68	5.88	5.68	5.88	5.68	5.88
4	4.00	4.56	6.93	7.13	6.80	7.00	7.44	7.62
6	6.00	6.68	9.68	9.88	9.55	9.75	10.31	10.50
8	8.00	8.68	11.93	12.13	11.80	12.00	12.43	12.62
10	10.00	10.81	14.06	14.25	13.92	14.12	15.56	15.75
12	12.00	12.81	16.44	16.63	16.30	16.50	17.81	18.00
16	15.25	16.12	21.06	21.25	19.92	21.12	22.06	22.25
18	17.25	18.12	23.31	23.50	23.08	23.38	23.94	24.12
20	19.25	20.12	25.56	25.75	25.30	25.50	26.68	26.88
24	23.25	24.12	30.38	30.50	30.05	30.25	30.93	31.12

**TABLE H-1.5**



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**6. DIMENSIONS AND TOLERANCES** (Cont'd)

6.2 Insulating Sleeves and Washers

6.2.1 Insulating sleeves/washers will meet the dimension and tolerance requirements shown in Appendix A.

<b>ONE-PIECE INSULATING SLEEVE/WASHER</b>					
<b>NOMINAL SIZE</b>	<b>SLEEVE</b>			<b>WASHER</b>	
	<b>I.D. MIN.</b>	<b>O.D. MAX.</b>	<b>MINIMUM LENGTH</b>	<b>O.D. MIN.</b>	<b>O.D. MAX.</b>
½	0.516	0.609	1.000	1.055	1.092
5/8	0.641	0.734	1.140	1.292	1.332
¾	0.766	0.859	1.562	1.480	1.520
7/8	0.891	0.984	1.812	1.668	1.702
1	1.016	1.109	2.187	1.980	2.020
1 1/8	1.141	1.123	2.500	2.743	2.780
1 1/4	1.266	1.359	3.187	2.993	3.030

**TABLE H-1.6**



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**6. DIMENSIONS AND TOLERANCES** (Cont'd)

6.3 Insulating Sleeves and Washers (Cont'd)

6.3.2 Insulating sleeves will have a wall thickness of 1/8" +/-0.015".

6.3.3 Insulating washers will have a thickness of 1/8" +/- 0.015".

6.4 Steel Washers

Steel Washers will meet the dimension and tolerance requirements as shown in the tables following:

<b>NOMINAL SIZE</b>	<b>I.D. MINIMUM</b>	<b>I.D. MAXIMUM</b>	<b>O.D. MINIMUM</b>	<b>O.D. MAXIMUM</b>
1/2	0.624	0.639	1.055	1.092
5/8	0.749	0.764	1.305	1.342
3/4	0.874	0.889	1.462	1.499
7/8	0.999	1.014	1.743	1.780
1	1.124	1.139	1.993	2.030
1 1/8	1.249	1.264	2.243	2.280
1 1/4	1.374	1.389	2.793	2.830

**TABLE H-1.7**



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**6. DIMENSIONS AND TOLERANCES (Cont'd)**

6.4 Steel Washers (Cont'd)

<b>ANSI 150</b>		
<b>FLANGE</b>	<b>NUMBER OF SLEEVES/STEEL WASHERS (Bolts)</b>	<b>SIZE OF SLEEVES/STEEL WASHERS (Bolts)</b>
1	4	1/2
1 1/4	4	1/2
1 1/2	4	1/2
2	4	5/8
2 1/2	4	5/8
3	4	5/8
3 1/2	8	5/8
4	8	5/8
5	8	3/4
6	8	3/4
8	8	3/4
10	12	7/8
12	12	7/8
16	16	1
20	20	1 1/8
24	20	1 1/4

**TABLE H-1.8**



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**6. DIMENSIONS AND TOLERANCES (Cont'd)**

6.4 Steel Washers (Cont'd)

<b>ANSI 300</b>		
<b>FLANGE SIZE</b>	<b>NUMBER OF SLEEVES/STEEL WASHERS (Bolts)</b>	<b>SIZE OF SLEEVES/WASHERS (Bolts)</b>
1	4	5/8
1 ¼	4	5/8
1 ½	4	¾
2	8	5/8
2 ½ to 5	8	¾
6	12	¾
8	12	7/8
10	16	1
12	16	1 1/8
16	20	1 ¼
20	24	1 ¼
24	24	1 ½

**TABLE H-1.9**



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**6. DIMENSIONS AND TOLERANCES (Cont'd)**

**6.4 Steel Washers (Cont'd)**

<b>ANSI 400</b>		
<b>FLANGE SIZE</b>	<b>NUMBER OF SLEEVES/STEEL WASHERS (Bolts)</b>	<b>SIZE OF SLEEVES/STEEL WASHERS (Bolts)</b>
1	4	5/8
1 ¼	4	5/8
1 ½	4	¾
2	8	5/8
2 ½	8	¾
3	8	¾
3 ½	8	7/8
4	8	7/8
5	8	7/8
6	12	7/8
8	12	1
10	16	1 1/8
12	16	1 ¼
16	20	1 3/8
20	24	1 ½
24	24	1 ¾

**TABLE H-1.10**



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**6. DIMENSIONS AND TOLERANCES (Cont'd)**

6.4 Steel Washers (Cont'd)

<b>ANSI 600</b>		
<b>FLANGE SIZE</b>	<b>NUMBER OF SLEEVES/STEEL WASHERS (Bolts)</b>	<b>SIZE OF SLEEVES/STEEL WASHERS (Bolts)</b>
1	4	5/8
1 ¼	4	5/8
1 ½	4	¾
2	8	5/8
2 ½	8	¾
3	8	¾
3 ½	8	7/8
4	8	7/8
5	8	1
6	12	1
8	12	1 1/8
10	16	1 ¼
12	20	1 ¼
16	20	1 ½
20	24	1 5/8
24	24	1 7/8

**TABLE H-1.11**



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## **7. INSPECTION**

- 7.1 Successful review of the 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 referenced in this specification that are 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.
- 7.4 Any changes in manufacturing of previously approved products covered under this document for sale to SWG must be approved by Southwest Engineering Staff. **Failure to obtain Southwest approval may be cause for rejection and disqualification as an approved supplier.**

## **8. CERTIFICATION**

The manufacturer's or supplier's certification shall 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 certification of an independent third party indicating conformance to the specification may be considered at Southwest's expense.



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**9. SAFETY DATA SHEETS**

In accordance with law, the seller shall 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 98193-8510

**10. PRODUCT MARKING**

Gaskets will be individually marked with the manufacturer's name, nominal pipe size, ANSI class rating and material designation.

**11. PACKAGING AND PACKAGE MARKING**

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

11.2 The following will be marked on the packaging:

- Manufacturer's Name
- Product Description



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**12. STOCK CLASSIFICATION DESCRIPTION**

GASKET, \_\_\_\_\_ (INSULATING, NON-INSULATING), TYPE \_\_\_\_\_ (E,F) ANSI \_\_\_\_\_ (150, 300, 400, 600), \_\_\_\_\_ (SIZE).

INSULATING SLEEVE \_\_\_\_\_ (SIZE), (LENGTH), ONE-PIECE MINLON COMBINATION SLEEVE AND WASHER.

WASHER, FLAT, \_\_\_\_\_ (SIZE), ZINC-PLATED STEEL, TYPE SAE, 11 GAUGE.