



# SOUTHWEST GAS CORPORATION

ENGINEERING STAFF

## MATERIAL SPECIFICATION

*Prepared By:* Engineering Staff 

*Approved By:* Jerome T. Schmitz 

<b>Section No:</b>	MS B-11
<b>Page No.:</b>	1 of 12
<b>Issue Date:</b>	10/09/18
<b>Superseded Date:</b>	12/11/15

### PIPE FITTINGS

Unions, Steel

---

#### 1. SCOPE

This specification covers Class 3000 regular and insulating steel pipe unions 1/8-inch through 2-inch. These unions have a maximum working pressure of 3000 psig.

Unions covered under this material specification, when installed as a single component, may be installed without an installation pressure test.

#### 2. APPLICABLE DOCUMENTS

- 2.1 American National Standards Institute (ANSI) B-1.20.1, "NPT American National Standard Taper Pipe Thread."
- 2.2 American National Standards Institute (ANSI) B-36.10, "Welded and Seamless Wrought Steel Pipe."
- 2.3 American National Standards Institute (ANSI) Z-55.1 "Finishes for Industrial Apparatus and Equipment."
- 2.4 ASTM International (ASTM) A-105, "Standard Specification for Carbon Steel Forgings for Piping Applications".
- 2.5 ASTM International (ASTM) A-106M-10, "Specification for Seamless Carbon Steel Pipe for High-Temperature Service."
- 2.6 Manufacturers Standardization Society Standard Practice (MSS SP) 83, "Class 3000 and 6000 Pipe Unions, Socket Welding and Threaded (Carbon Steel, Alloy Steel, Stainless Steels, and Nickel Alloys."
- 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 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. In the event that 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.



**SOUTHWEST GAS CORPORATION**

® ENGINEERING STAFF

**MATERIAL SPECIFICATION**

*Prepared By:* Engineering Staff 

*Approved By:* Jerome T. Schmitz 

<b>Section No:</b>	MS B-11
<b>Page No.:</b>	2 of 12
<b>Issue Date:</b>	10/09/18
<b>Superseded Date:</b>	12/11/15

**PIPE FITTINGS**

Unions, Steel

---

**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 MANUFACTURE**

- 4.1 The unions will be manufactured in accordance with MSS SP 83 and shall be manufactured from forged steel in accordance with ASTM A-105.
- 4.2 The tail and swivel (pipe ends) shall provide a suitable wrench grip. This may be accomplished by providing paralleling surfaces or a round surface with lugs.
- 4.3 The pipe ends of the swivel and threaded piece may be octagonal, decagonal or cylindrical. The nut may be hexagonal or octagonal.
- 4.4 The insulating unions shall meet the same requirements as the regular unions, except that the swivel piece shall be electrically insulated from the nut and threaded piece.
- 4.5 The sealing gasket, for insulating unions, between the swivel piece and the threaded piece will not allow leakage during testing and operating conditions.
- 4.6 The insulator for insulating unions shall be integrally molded on the swivel piece. The insulation shall cover the flat joint face and beyond the outside edge of the nut in an unbroken surface. The minimum insulation thickness shall be at least .20-inch. Dielectric strength at 0.2 percent moisture shall be a minimum of 400V per .001-inch of insulating material.



**SOUTHWEST GAS CORPORATION**

® ENGINEERING STAFF

**MATERIAL SPECIFICATION**

*Prepared By:* Engineering Staff 

*Approved By:* Jerome T. Schmitz 

<b>Section No:</b>	MS B-11
<b>Page No.:</b>	3 of 12
<b>Issue Date:</b>	10/09/18
<b>Superseded Date:</b>	12/11/15

**PIPE FITTINGS**

Unions, Steel

---

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

- 4.7 Threads will be tapered pipe threads in accordance with ANSI B-1.20.1.4.
- 4.8 The mutual contact surfaces of the swivel for regular unions and nuts subjected to pressure in tightening shall be finished smooth and shall be at right angles to the center line of the threads. The seating surfaces between the tail swivel shall be accurately ground to a polished surface with no scoring.
- 4.9 All parts of the union shall be finished and assembled. They shall be uniform in thickness and strength and free from blow holes, seams, porosity or other injurious defects. They shall be cleaned of sand, scale and all irregularities.
- 4.10 The tail and swivel of the union shall, when assembled, be concentric with the centerline of the threads.
- 4.11 The design wall thickness shall be at least 1.25 times the nominal thickness of Schedule 80 pipe of the same size as the union, as established by ANSI/ASME B-36.10.
- 4.12 The minimum body wall thickness, other than socket wall, must be equal to or greater than the nominal wall thickness of Schedule 80 pipe of the same size as the union, as established by ANSI/ASME B-36.10.
- 4.13 The minimum wall thickness at the root of the pipe thread at the wrench tight plane must equal or exceed the nominal wall for Schedule 80 pipe.
- 4.14 Unless otherwise specified, all threaded unions shall be coated with an Industrial Gray Coating No. 49 per ANSI Z-55.1. The paint system used shall be one of the systems listed in Tables B-11.1 and B-11.2 or a pre-approved equivalent.
- 4.15 The coating shall be a minimum of 5 mils thick, unless otherwise approved by Southwest Gas due to the coating process.
- 4.16 The coating will cover no more than 4 threads. There must not be any major coating build-up on the threads. Overspray beyond the first 4 threads and on female threads is allowable so long as it does not exceed 0.5 mil film thickness.
- 4.17 For non-insulated unions, the coating shall not be applied to any of the sealing/mating surfaces.



**SOUTHWEST GAS CORPORATION**

ENGINEERING STAFF

**MATERIAL SPECIFICATION**

*Prepared By:* Engineering Staff

*Approved By:* Jerome T. Schmitz

<b>Section No:</b>	MS B-11
<b>Page No.:</b>	4 of 12
<b>Issue Date:</b>	10/09/18
<b>Superseded Date:</b>	12/11/15

**PIPE FITTINGS**

Unions, Steel

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

<b>APPROVED PAINT SYSTEMS</b>				
<b>SYSTEM NUMBER</b>	<b>SURFACE PREPARATION</b>	<b>PRIMER COAT</b>	<b>INTERMEDIATE COAT</b>	<b>FINISH COAT</b>
1	Solvent Cleaning (SSPC-SP 1)  THEN  Power Tool Cleaning (SSPC-SP 3) Rusted Spots	High-Build Polyamide Epoxy, DFT 4.0 to 5.0 Mils.	None	Aliphatic Polyurethane, DFT 2.0 to 3.0 Mils.
2	Solvent Cleaning (SSPC-SP 1)  THEN  Power Tool Cleaning (SSPC-SP 3) Rusted Spots	Modified Alkyd, Inhibited, Chromate and Lead-Free, DFT 2.0 Mils.	Alkyd Enamel, DFT 1.5 to 2.0 Mils.	Alkyd Enamel, DFT 1.5 to 2.0 Mils.
3	Solvent Cleaning (SSPC-SP 1)  THEN  Power Tool Cleaning (SSPC-SP 3) Rusted Spots	Aluminum Flake Epoxy Mastic, DFT 4.0 to 5.0 Mils.	None	Aliphatic Polyurethane, DFT 2.0 to 3.0 Mils.

**TABLE B-11.1**



**SOUTHWEST GAS CORPORATION**

ENGINEERING STAFF

**MATERIAL SPECIFICATION**

Prepared By: Engineering Staff

Approved By: Jerome T. Schmitz

<b>Section No:</b>	MS B-11
<b>Page No.:</b>	5 of 12
<b>Issue Date:</b>	10/09/18
<b>Superseded Date:</b>	12/11/15

**PIPE FITTINGS**

Unions, Steel

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

APPROVED PAINT SYSTEMS MANUFACTURER'S PART NUMBERS				
SYSTEM NUMBER	CARBOLINE	SHERWIN WILLIAMS	RUST-OLEUM	KRYLON
1 <sup>1</sup>	801	B58 T 104	9100 Series	
	834	B65 W 300 Series	9400 Series	
2 <sup>1</sup>	GP-818	B50 HZ 1	7669	00691
	Subsil B	B56 Series	7686	00871
3 <sup>1</sup>	Carbomastic 15	B62 S 100		
	834	B65 W 300 Series		

**NOTE:** <sup>1</sup>For each paint system, the top part number is for the primer and the bottom part number is for the top coat.

**TABLE B-11.2**

**5. PERFORMANCE REQUIREMENTS**

- 5.1 The dielectric strength of the insulating union shall be at least 2,500 volts.
- 5.2 The temperature range for all unions will be at least -40°F to 150°F.
- 5.3 Regular unions will meet the following test requirements:
  - Unions will have a tensile strength equal to the same nominal pipe size with standard wall thickness and manufactured according to ASTM A-106.
  - Each assembled union shall be capable of withstanding a hydrostatic test of 4500 psig without showing any evidence of leakage.
- 5.4 When an insulating union is assembled to make-up torque listed in Table B-11.3, it shall be capable of meeting the performance requirements of paragraphs 5.5 through 5.8.



**SOUTHWEST GAS CORPORATION**

® ENGINEERING STAFF

**MATERIAL SPECIFICATION**

*Prepared By:* Engineering Staff

*Approved By:* Jerome T. Schmitz

<b>Section No:</b>	MS B-11
<b>Page No.:</b>	6 of 12
<b>Issue Date:</b>	10/09/18
<b>Superseded Date:</b>	12/11/15

**PIPE FITTINGS**

Unions, Steel

**5. PERFORMANCE REQUIREMENTS (Cont'd)**

<b>NOMINAL SIZE (Inches)</b>	<b>MAKE-UP TORQUE (Foot Pounds)</b>
1/2	85
3/4	120
1	120
1 1/4	130
1 1/2	130
2	130

**TABLE B-11.3**

- 5.5 There will be no less than 100,000 ohms of electrical resistance between the swivel piece and the thread piece when dry and not less than 1,000 ohms after being immersed in tap water for 24 hours and then removed and wiped dry.
- 5.6 The union shall not leak when subjected to an air test pressure of 100 psig after being immersed in 106°F hot water for 15 minutes and then in ice cold water (approximately 34°F) for 15 minutes. Each union tested must pass this air test three (3) times.
- 5.7 Each assembled union shall be capable of withstanding a hydrostatic test of 4500 psig without showing any evidence of leakage.
- 5.8 A union assembled with a 14-inch or longer nipple and a bending force applied while subjected to air pressure of 100 psig, shall withstand a bending moment indicated in Table B-11.4 without developing an air leak or reducing the electrical resistance.

<b>NOMINAL SIZE (Inches)</b>	<b>BENDING TORQUE (Foot Pounds)</b>
1/2	100
3/4	150
1	200
1 1/4	250
1 1/2	300
2	400

**TABLE B-11.4**



## SOUTHWEST GAS CORPORATION

ENGINEERING STAFF

### MATERIAL SPECIFICATION

Prepared By: Engineering Staff 

Approved By: Jerome T. Schmitz 

Section No:	MS B-11
Page No.:	7 of 12
Issue Date:	10/09/18
Superseded Date:	12/11/15

### PIPE FITTINGS

Unions, Steel

## 6. DIMENSIONS AND TOLERANCES

- 6.1 Each regular union will meet the dimensional specifications in Appendix A.
- 6.2 Each insulated union will meet the dimensional specifications in the manufacturer's PIP.

## 7. INSPECTION

- 7.1 Successful review 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 products 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 the manufacturing of previously approved materials, products or systems described in this document 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 SWG. This certification will state that union 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 this specification may be considered at Southwest's expense.



**SOUTHWEST GAS CORPORATION**

® ENGINEERING STAFF

**MATERIAL SPECIFICATION**

*Prepared By:* Engineering Staff 

*Approved By:* Jerome T. Schmitz 

<b>Section No:</b>	MS B-11
<b>Page No.:</b>	8 of 12
<b>Issue Date:</b>	10/09/18
<b>Superseded Date:</b>	12/11/15

**PIPE FITTINGS**

Unions, Steel

---

**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**

Each union will be marked with a minimum of the following:

- Manufacturer's name or trademark
- A-105
- Class 3000
- Nominal pipe size

**11. PACKAGING AND PACKAGE MARKING**

Each fitting will be marked with the following:

- Manufacturer's name
- Manufacturer's part number
- Class designation or pressure rating
- Size
- Lot number or equivalent



**SOUTHWEST GAS CORPORATION**

® ENGINEERING STAFF

***MATERIAL SPECIFICATION***

*Prepared By:* Engineering Staff 

*Approved By:* Jerome T. Schmitz 

<b>Section No:</b>	MS B-11
<b>Page No.:</b>	9 of 12
<b>Issue Date:</b>	10/09/18
<b>Superseded Date:</b>	12/11/15

**PIPE FITTINGS**

Unions, Steel

---

**12. STOCK CLASS DESCRIPTION**

UNION, STEEL, \_\_\_\_-INCH, CLASS 3000, THREADED,

UNION, INSULATING, STEEL, \_\_\_\_-INCH, CLASS 3000 CWP, THREADED.



**SOUTHWEST GAS CORPORATION**

ENGINEERING STAFF

**MATERIAL SPECIFICATION**

Prepared By: Engineering Staff

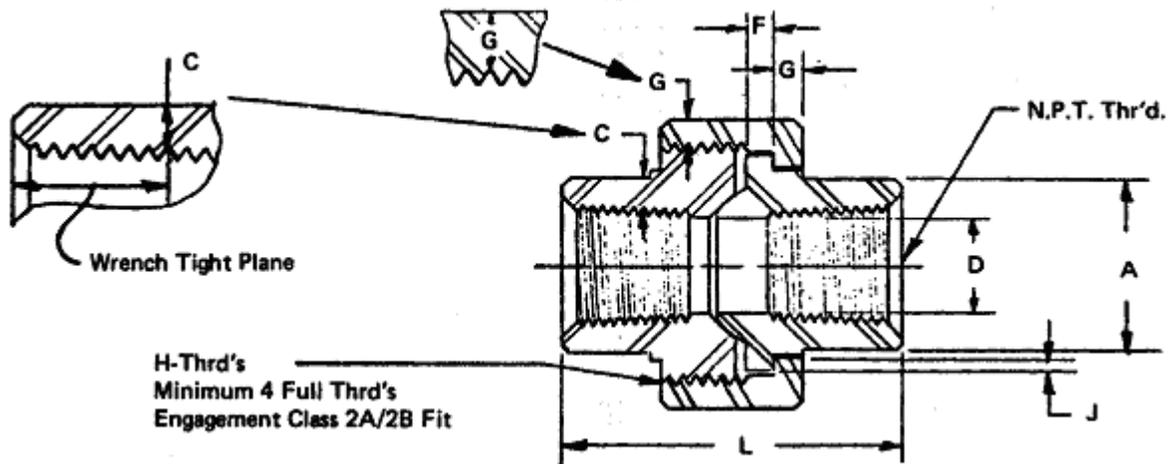
Approved By: Jerome T. Schmitz

Section No: MS B-11  
 Page No.: 11 of 12  
 Issue Date: 10/09/18  
 Superseded Date: 12/11/15

**PIPE FITTINGS**

Unions, Steel

**APPENDIX A**



CLASS 3000 STEEL REGULAR PIPE UNIONS — THREADED ENDS								
Nominal Pipe Size (Inches)	Pipe End (Minimum)	Wall (Minimum)	Bore	Male Flange (Minimum)	Nut (Minimum)	Threads Per Inch (Maximum)	Bearing (Minimum)	Length Assembly Nominal
	A	C	D	F	G	H	J	L
1/8	0.58	0.095	0.269 0.253	0.125	0.125	16	0.049	1.63
1/4	0.75	0.119	0.388 0.372	0.125	0.125	16	0.049	1.63
3/8	0.90	0.126	0.548 0.532	0.135	0.135	14	0.054	1.81
1/2	1.09	0.147	0.688 0.672	0.145	0.145	14	0.059	1.93
3/4	1.32	0.154	0.858 0.842	0.160	0.160	11	0.066	2.24
1	1.63	0.179	1.108 1.092	0.180	0.175	11	0.073	2.44
1-1/4	1.99	0.191	1.408 1.392	0.210	0.205	11	0.084	2.80
1-1/4	2.25	0.200	1.638 1.622	0.230	0.220	10	0.091	3.01
2	2.76	0.218	2.068 2.052	0.260	0.250	10	0.106	3.39

**TABLE B-11.5**



**SOUTHWEST GAS CORPORATION**

ENGINEERING STAFF

**MATERIAL SPECIFICATION**

Prepared By: Engineering Staff

Approved By: Jerome T. Schmitz

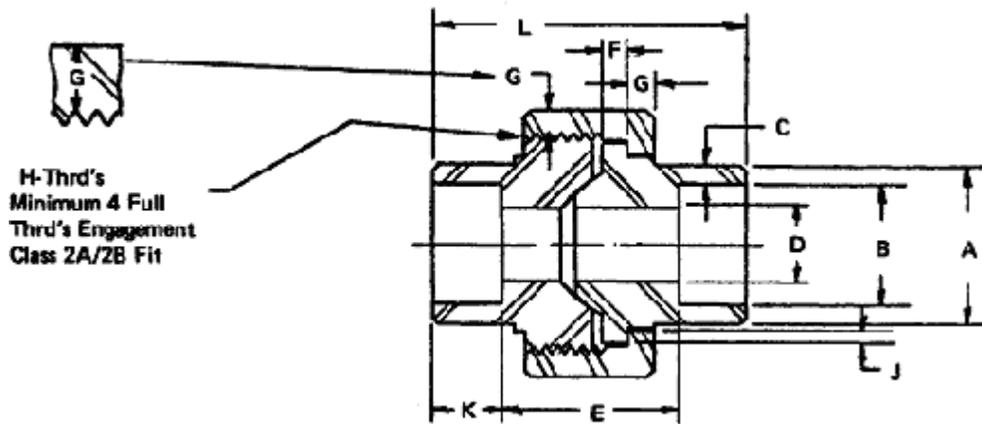
Section No: MS B-11  
 Page No.: 12 of 12  
 Issue Date: 10/09/18  
 Superseded Date: 12/11/15

**PIPE FITTINGS**

Unions, Steel

**APPENDIX A**

(Cont'd)



CLASS 3000 STEEL REGULAR PIPE UNIONS — SOCKET WELDING ENDS									
Nominal Pipe Size (Inches)	Pipe End (Minimum)	Socket Bore Diameter	Socket Wall (Minimum)	Bore	Male Flange (Minimum)	Nut (Minimum)	Socket Depth	Socket Depth (Minimum)	Length Assembly Nominal
	A	B	C	D	F	G	J	K	
1/8	0.86	0.430 0.420	0.125	0.269 0.253	0.125	0.125	0.049	0.38	1.63
1/4	0.86	0.565 0.555	0.130	0.388 0.372	0.125	0.125	0.049	0.38	1.63
3/8	1.02	0.700 0.690	0.138	0.548 0.532	0.135	0.135	0.054	0.38	1.81
1/2	1.23	0.865 0.855	0.161	0.688 0.672	0.145	0.145	0.059	0.38	1.93
3/4	1.46	1.075 1.065	0.168	0.858 0.842	0.160	0.160	0.066	0.50	2.24
1	1.79	1.340 1.330	0.196	1.108 1.092	0.180	0.175	0.073	0.50	2.44
1-1/4	2.16	1.685 1.675	0.208	1.408 1.392	0.210	0.205	0.084	0.50	2.80
1-1/2	2.42	1.925 1.915	0.218	1.638 1.622	0.230	0.220	0.091	0.50	3.01
2	2.96	2.416 2.406	0.238	2.068 2.052	0.260	0.250	0.106	0.62	3.39
2-1/2	3.61	2.921 2.906	0.302	2.548 2.532	0.295	0.280	0.121	0.62	4.03
3	4.30	3.550 3.535	0.327	3.058 3.042	0.325	0.315	0.139	0.62	4.29

**TABLE B-11.6**