



ENGINEERING STAFF

**MATERIAL SPECIFICATION***Prepared By:* M.R. Haught*Approved By:* J.F. Wunderlin *JFW*

<b>Section No:</b>	MS P-2
<b>Page No.:</b>	1 of 6
<b>Issue Date:</b>	09/11/95
<b>Superseded Date:</b>	Original

**COMPRESSED NATURAL GAS (CNG) EQUIPMENT**High Pressure Tubing

---

**1. SCOPE**

This material specification covers high pressure annealed seamless ASTM A-269 TP304L stainless steel tubing used to connect (manifold) two or more cylinders together, provide a path for compressed natural gas (CNG) cylinder fueling and connecting CNG cylinder(s) to associated CNG components and controls.

**2. APPLICABLE DOCUMENTS**

- 2.1 American Society for Testing and Materials (ASTM) Standard Specification A-269, "Standard Specification for Seamless and Welded Austenitic Steel Tubing for General Service."
- 2.2 American Society for Testing and Materials (ASTM) Standard Specification A-632, "Specification for Seamless and Welded Austenitic Stainless Steel Tubing (Small Diameter) for General Service."
- 2.3 American Society for Testing and Materials (ASTM) Standard Specification A-370, "Mechanical Testing of Steel Products, Annex II, Steel Tubular Products."
- 2.4 American Society for Testing and Materials (ASTM) Standard Specification A-700, "Standard Practices for Packaging, Marking and Loading Methods for Steel Products."

**NOTE:** All applicable documents 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.



ENGINEERING STAFF

***MATERIAL SPECIFICATION***

*Prepared By:* M.R. Haught

*Approved By:* J.F. Wunderlin *JFW*

<b>Section No:</b>	MS P-2
<b>Page No.:</b>	2 of 6
<b>Issue Date:</b>	09/11/95
<b>Superseded Date:</b>	Original

**COMPRESSED NATURAL GAS (CNG) EQUIPMENT**

High Pressure Tubing

---

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

- 3.1.3 "UNS" wherever used in this specification will mean Unified Numbering System.
- 3.1.4 "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, unless specifically stated otherwise.

**4. MATERIALS AND MANUFACTURE**

- 4.1 Tubing purchased to this specification will be manufactured, at a minimum, in accordance with ASTM A-269, ASTM A-632 and additional requirements as defined in this specification.
- 4.2 The tubing material will be Grade TP304L or TP316L seamless austenitic stainless steel.
- 4.3 Welded stainless steel tubing of any type is unacceptable.
- 4.4 All tubing shall be heat treated according to ASTM A-269.
- 4.5 Finished tubes will be reasonably straight and have smooth ends free of burrs. The tubing surface will be free of scale, dents and other injurious defects and imperfections.

**5. CHEMICAL COMPOSITION**

The steel composition shall conform to ASTM A-269 chemical requirements for TP304L (UNS designation S30403) or TP316L (UNS designation S31603).



ENGINEERING STAFF

***MATERIAL SPECIFICATION***

*Prepared By:* M.R. Haught

*Approved By:* J.F. Wunderlin *JFW*

<b>Section No:</b>	MS P-2
<b>Page No.:</b>	3 of 6
<b>Issue Date:</b>	09/11/95
<b>Superseded Date:</b>	Original

**COMPRESSED NATURAL GAS (CNG) EQUIPMENT**

High Pressure Tubing

---

**6. PERFORMANCE REQUIREMENTS**

- 6.1 The material will conform to the tensile requirements of ASTM A-632, Table 2. Testing procedures will conform to the requirements of ASTM A-370.
- 6.2 All tubing will be subjected to a hydrostatic pressure test. The test pressure will be in accordance with Section 15, Pressure Test of ASTM A-632. The test pressure shall be 1000 psig.
- 6.3 Tests required by ASTM A-269 and A-632 not contained in this specification will be performed per ASTM requirements. Southwest Gas may, at its discretion, request the results of such tests if specified on the purchase order.

**7. DIMENSIONS AND TOLERANCES**

- 7.1 The outside diameter of tubing purchased under this specification will be 0.250 or 0.375 inches with a tolerance of +/- 0.005-inch for both.
- 7.2 The nominal wall thickness for 0.250 OD inch tubing shall be 0.035-inch and for 0.375 OD inch tubing, the wall thickness shall be 0.049-inch. The wall thickness will not vary more than +/- 15 percent of the nominal wall thickness.
- 7.3 Unless a specific length is specified on the materials requisition and purchase order, the tubing will be supplied in 20-foot lengths.

**8. INSPECTION**

- 8.1 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.
- 8.2 SWG retains the option to inspect the manufacture and testing of NGV high pressure tubing sold to SWG.



**SOUTHWEST GAS CORPORATION**

ENGINEERING STAFF

***MATERIAL SPECIFICATION***

*Prepared By:* M.R. Haught

*Approved By:* J.F. Wunderlin *JFW*

<b>Section No:</b>	MS P-2
<b>Page No.:</b>	4 of 6
<b>Issue Date:</b>	09/11/95
<b>Superseded Date:</b>	Original

**COMPRESSED NATURAL GAS (CNG) EQUIPMENT**

High Pressure Tubing

---

**8. INSPECTION** (Cont'd)

8.3 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 delivery location, before or after SWG assumes possession. Notice of the rejection will be made promptly to the supplier by SWG's Corporate Purchasing Department. The defective product will be replaced or returned for credit at the manufacturer's expense.

8.4 Any changes in the manufacturing of previously approved NGV high pressure tubing covered under 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.

**9. 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.

**10. MATERIAL SAFETY DATA SHEETS**

In accordance with law, the Seller will supply Material 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  
Staff Safety  
Mail Station LVA-581  
P.O. Box 98510  
Las Vegas, NV 89193-8510



**SOUTHWEST GAS CORPORATION**

ENGINEERING STAFF

***MATERIAL SPECIFICATION***

*Prepared By:* M.R. Haught

*Approved By:* J.F. Wunderlin *JFW*

<b>Section No:</b>	MS P-2
<b>Page No.:</b>	5 of 6
<b>Issue Date:</b>	09/11/95
<b>Superseded Date:</b>	Original

**COMPRESSED NATURAL GAS (CNG) EQUIPMENT**

High Pressure Tubing

---

**11. PRODUCT MARKING**

The tubing manufactured to this specification will be marked in accordance with ASTM A-269 and A-632. This will include, but not limited to, ASTM designation and grade, manufacturers name or trademark, size, weight and heat number.

**12. PACKAGING AND PACKAGE MARKING**

Packaging and package marking will conform with ASTM A-700 unless otherwise specified by Southwest Gas.

**13. STOCK CLASSIFICATION DESCRIPTION**

TUBING, STAINLESS STEEL, GRADE 304 OR 316, ASTM A-269, \_\_\_\_\_-INCH OD  
X \_\_\_\_\_ WALL THICKNESS, SEAMLESS, FOR CNG USE ONLY, SWG MS P-2.