SOUTHWEST GAS CORPORATION
ENGINEERING STAFF
MATERIAL SPECIFICATION

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METERS
Positive Displacement Diaphragm-501 CFH thru 1000 CFH

1. SCOPE

This specification covers diaphragm-type meters, 501 cubic feet per hour thru 1000 cubic feet per hour capacity. The meters may be regular or temperature compensated.

2. APPLICABLE DOCUMENTS

2.1 ANSI (American National Standard Institute) B-109.2-1980, "Gas Displacement Meters (over 500 cubic feet per hour capacity)."

2.2 ANSI (American National Standard Institute) Z55.1-1967, "Gray Finishes for Industrial Apparatus and Equipment."

2.3 ANSI (American National Standard Institute) Z1.4, "Sampling Procedure and Tables for Inspection by Attributes."

2.4 Military Standard, MIL-STD-105D, 29 April 1963.

2.5 United States Department of Transportation (DOT), Code of Federal Regulations (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 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 information that a manufacturer must submit to SWG to determine if the product is suitable for use by SWG, unless specifically stated otherwise.

METERS
Positive Displacement Diaphragm-501 CFH thru 1000 CFH

4. MATERIALS AND MANUFACTURING

The meters shall conform to the American National for Gas Displacement Meters (over 500 cubic feet per hour capacity) ANSI B109.2-1980 and to the specifications listed below:

4.1 Connections:

Meters with maximum working pressures from 0 psig to 25 psig shall have the following connections:

CONNECTIONS		
Class 675	Threaded for 45LT	10-inch c/c
Class 750	Threaded for 45LT	11-inch c/c
Class 800	Threaded for 45LT	11-inch c/c
Class 1000	Threaded for 45LT	11-inch c/c

TABLE M-6.1

4.2 Meters with maximum working pressures from 26 psig to 100 psig shall be threaded for 1/1/2 inch FPT, 11-inch c/c.

4.3 Meters with maximum working pressures from 101 psig to 500 psig shall have 2-inch flanges.

4.4 Indexes:

4.4.1 All meters shall be equipped with pointer-type circular dial reading indexes; the first reading 1000 cubic feet per revolution.

4.4.2 Non-reading circles (test hands) shall be five (5) cubic feet for meters manufactured by Sensus or American and two point five (2.5) cubic feet and ten (10) cubic feet for meters manufactured by Actaris.

4. MATERIALS AND MANUFACTURING (Cont'd)

4.5 Exterior Finish

The external components of the meter shall be made of, or protected by, materials resistant to attack by atmosphere, weather or sunlight and of agents used in meter repair and cleaning. The exteriors shall be capable of meeting or exceeding exterior performance requirements in ANSI B109.4.

5. PERFORMANCE REQUIREMENTS

5.1 Pressure Tests:

Pressure tests shall be made on each meter to confirm that it does not leak when subjected to an internal pressure of 150 percent of its badged case pressure.

5.2 Proof Test:

Proof tests shall be made on each meter to confirm that it has been adjusted to have a preferred setting of 0.00 percent error with a tolerance of ± 0.30 percent at both of the following rates, using air values:

PROOF TEST		
Meter	**Check Rate**	**Capacity Rate**
Class 675	135 CFH	675 CFH
Class 750	150 CFH	750 CFH
Class 800	160 CFH	800 CFH
Class 1000	200 CFH	1000 CFH

TABLE M-6.2

5. PERFORMANCE REQUIREMENTS (Cont'd)

5.3 Differential Tests:

Differential tests shall be made on each meter at the check rates shown under proof tests to confirm that the differential pressure between the inlet and outlet of the meter does not exceed the following:

- .30 inches water column for Class 675
- .35 inches water column for Class 750
- .35 inches water column for Class 800
- .40 inches water column for Class 1000

5.4 Pilot Flow (Flow Fire) Tests:

The Pilot Flow tests shall be made on each meter to confirm that the meter will register a minimum of 85 percent of the flow at 1.50 CFH flow rate and 1.5 inches water column.

5.5 Security Sealing:

The Security Sealing shall be made on each meter in one of the following ways:

5.5.1 Meter's manufactured shall be sealed with a wire and lead seal properly crimped. A wire seal shall, as a minimum, go through one bolt in the hand hole plate and two retaining screws of the index cover.

5.5.2 Meters manufactured shall be sealed with a wire and a lead seal properly crimped. A wire seal shall, as a minimum, go through one bolt in the hand hole plate, two screws of the index plate and one screw of the index cover. In addition, a wire seal shall go through the two screws retaining the index cover back plate or the index screws that retain the index to the index cover.

5.5.3 Meters shall be sealed with a wire and lead seal properly crimped. A wire and lead seal properly crimped. A wire seal shall, as a minimum, go through one index cover retaining screw on the inlet side of the meter and one index cover retaining screw on the outlet side of the meter.

5.5.4 A red posi-cap security system may be substituted for all manufacturers' meters when feasible. When this type of security system is used all security requirements of the wire and lead seal method shall be met.

5. PERFORMANCE REQUIREMENTS (Cont'd)

5.5.5 Acceptance:

ACCEPTANCE QUALITY LEVELS		
Attribute	AQL	Inspection Tolerance
Proof, Open Rate	2.5	0.00 ± 0.8 percent error
Proof, Check Rate	2.5	0.00 ± 0.8 percent error
Differential, Max.	2.5	
Pilot Flow (Slow Fire)	2.5	
Leaks	1.0	
Exterior Finish	4.0	

TABLE M-6.3

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 supplied to SWG under this specification at the manufacturer's facility.

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 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. INSPECTION (Cont'd)

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 shall be furnished to Southwest. This certification shall state that samples representing each lot have been manufactured, tested and inspected in accordance with this specification and that 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-120
P.O. Box 98510
Las Vegas, NV 89193-8510

9. PRODUCT MARKING

9.1 Manufacturer's Badge:

The Manufacturer's Badge shall contain identification information in a permanent and legible form. It shall be permanently affixed to the meter so it is readable from the same general position as the index and also to minimize damage during handling. The numbers on the meter badge shall be as the following example:

1 2 3 4 5 6 7 8 9 0

The material serial number shall be at least 0.25 inch high and shall be embossed on the badge and shall be visible within an angle of 45 degrees from the perpendicular to the plane of the badge. The following information shall be contained on the badge:

- Meter Class.
- Manufacturer's name or trade-mark.
- Meter serial number.
- Year of Manufacture.
- Maximum Allowable Operating Pressure (MAOP).
- If the gas meter is a temperature compensating model, the badge shall be a durable red color and shall state that the meter is "temperature compensating."
- Meter capacity at a 0.5 inch water column pressure differential.

9.2 Purchaser's Badge:
A clear space shall be provided for the purchaser's badge.

9.3 Diaphragm Identification:
The diaphragm manufacturer's name or trade-mark, designation of the type of material and the year of manufacture shall be on the diaphragm assembly so that it is visible after the diaphragm is in place.

9.4 Inlet Identification:
The inlet connection shall be clearly and permanently identified.

10. PACKAGING AND PACKAGE MARKING

All products covered in this specification will be packaged in a manner to prevent entrance of foreign materials and to protect the threads, from damage, during shipment or storage.

11. STOCK CLASSIFICATION

Meter AL _____, T.C., _____# Working Pressure _____Inch.
Meter AL _____, Non T.C., _____# Working Pressure _____ Inch.