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NATIONAL STANDARD

ANSI/CAN/UL/ULC 25:2023A

STANDARD FOR SAFETY

Meters for Flammable and Combustible Liquids and LP-Gas

Approved American National Standard
ANSI

ANSI/UL 25-2023

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SCC FOREWORD

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UL Standard for Safety for Meters for Flammable and Combustible Liquids and LP-Gas, ANSI/CAN/UL/ULC 25

Tenth Edition, Dated October 27, 2021

Summary of Topics

This revision of ANSI/CAN/UL/ULC 25 dated December 12, 2023 includes clarification of low temperature test for composite elastomeric parts; 5.3A, 8.11, and 8.16.

Text that has been changed in any manner or impacted by ULSE's electronic publishing system is marked with a vertical line in the margin.

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated July 28, 2023.

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Tenth Edition

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This ANSI/CAN/UL/ULC Safety Standard consists of the Tenth Edition including revisions through December 12, 2023.

The most recent designation of ANSI/UL 25 as an American National Standard (ANSI) occurred on December 12, 2023. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page, Preface or SCC Foreword.

This standard has been designated as a National Standard of Canada (NSC) on December 12, 2023.

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Preface

This is the Tenth Edition of ANSI/CAN/UL/ULC 25, Standard for Meters for Flammable and Combustible Liquids and LP-Gas.

ULSE is accredited by the American National Standards Institute (ANSI) and the Standards Council of Canada (SCC) as a Standards Development Organization (SDO). ULC Standards is accredited by the Standards Council of Canada (SCC) as a Standards Development Organization (SDO).

This Standard has been developed in compliance with the requirements of ANSI and SCC for accreditation of a Standards Development Organization.

This ANSI/CAN/UL/ULC 25 Standard is under continuous maintenance, whereby each revision is approved in compliance with the requirements of ANSI and SCC for accreditation of a Standards Development Organization. In the event that no revisions are issued for a period of four years from the date of publication, action to revise, reaffirm, or withdraw the standard shall be initiated.

In Canada, there are two official languages, English and French. All safety warnings must be in French and English. Attention is drawn to the possibility that some Canadian authorities may require additional markings and/or installation instructions to be in both official languages.

This joint American National Standard and National Standard of Canada is based on, and now supersedes, the Ninth Edition of UL 25 and ULC/ORD-C25.

Comments or proposals for revisions on any part of the Standard may be submitted at any time. Proposals should be submitted via a Proposal Request in the Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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This edition of the Standard has been formally approved by the Technical Committee (TC) on Meters for Flammable and Combustible Liquids and LP-Gas, TC 25.

This list represents the TC 25 membership when the final text in this standard was balloted. Since that time, changes in the membership may have occurred.

TC 25 Membership

Name	Representing	Interest Category	Region
Ebert, Miles	Fill-Rite Company	Producer	USA
Karimov, Dmitri	Advanced Flow Solutions, Inc.	Producer	USA
Kawate, Marcia	UL Standards & Engagement	Project Manager – Non-voting member	USA
Koch, Wolf	Technology Resources International	General	USA
Legault, Pierre	Integrated Review Services – Consulting	General	Canada
Mailvaganam, Miles	M Mailvaganam	General	Canada

TC 25 Membership Continued on Next Page

TC 25 Membership Continued

Name	Representing	Interest Category	Region
Moriarty, Kristi	National Renewable Energy Laboratory	Government	USA
Moses, Randy	Wayne Fueling Systems LLC	Producer	USA
Petersen, James	Petersen Engineering	General	USA
Price, Brent	Gilbarco	Producer	USA
Swiecicki, Bruce	National Propane Gas Association	General	USA
Werner, Laura	ULC Standards	TC Chair – Non-voting member	Canada
Wolff-Klammer, Edgar	UL Solutions	Testing and Standards Org	USA

International Classification for Standards (ICS): 17.120.01, 75.180.30

This Standard is intended to be used for conformity assessment.

The intended primary application of this standard is stated in its scope. It is important to note that it remains the responsibility of the user of the standard to judge its suitability for this particular application.

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INTRODUCTION

1 Scope

1.1 These requirements cover:

a) Meters for flammable and combustible liquids, of the type and size commonly used in the assembly of motor fuel dispensing devices; and

b) Meters for liquefied petroleum gas (LP-Gas), of the type and size commonly used in the assembly of motor fuel dispensing devices and tank trucks

The meters are of the positive liquid displacement type.

NOTE: For the purposes of this standard the terms “LP-Gas” and “Propane” are interchangeable.

1.2 Flammable and Combustible Liquids shall be handled at pressures not exceeding 350 kPa (50 psig) and at temperatures within the range of -29 °C (-20 °F) to 52 °C (125 °F).

1.3 Products covered by this Standard are intended to be installed and used in accordance with the applicable Codes and Regulations as determined by the Authority Having Jurisdiction (AHJ), such as, but not limited to:

a) In the United States:

1) Flammable and Combustible Liquids Code, NFPA 30;

2) Code for Motor Fuel Dispensing Facilities and Repair Garages, NFPA 30A;

3) Liquefied Petroleum Gas Code, NFPA 58.

b) In Canada:

1) The Canadian Electrical Code;

2) The National Fire Code of Canada;

3) Natural gas and propane installation code, CSA B149.1;

4) Propane storage and handling code, CSA B149.2;

5) Provincial or other Regulations.

1.4 These requirements do not cover:

a) Meters for use with liquefied petroleum gas in the gaseous phase above 55.1 kPa (8 psig);

b) Velocity meters, head meters, or area meters;

c) Meters for use in centralized fuel oil distribution systems; and

d) Meter components incorporating electrical circuits except those meeting intrinsically safe or explosion standards.

1.5 Determinations of the suitability of registers, counters, or computers used or provided with these meters, or the accuracy of measurement resulting from or required in actual application are not within the scope of these requirements.

1.6 For requirements for meters for gasoline/ethanol blends with nominal ethanol concentrations above 10 %, refer to the Standard for Meters for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0 – E85), UL 25A, for additional requirements.

1.7 For requirements for meters for biodiesel fuel, diesel/biodiesel blends with nominal biodiesel concentrations up to 20 % (B20), refer to the Standard Meters for Diesel Fuel, Biodiesel Fuel, Diesel/Biodiesel Blends with Nominal Biodiesel Concentrations up to 20 Percent (B20), Kerosene, and Fuel Oil, UL 25B for additional requirements.

2 Components

2.1 Except as indicated in 2.2, a component of a product covered by this standard shall comply with the requirements for that component.

2.2 A component is not required to comply with a specific requirement that:

a) Involves a feature or characteristic not required in the application of the component in the product covered by this standard, or

b) Is superseded by a requirement in this standard.

2.3 A component shall be used in accordance with its rating established for the intended conditions of use.

2.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

3 Units of Measurement

3.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

4 Referenced Publications

4.1 The documents shown below are referenced in the requirements text of this standard. Unless otherwise stated elsewhere in this Standard such reference shall be interpreted as referring considered to indicate the latest edition and/or revisions of that code the document available at the date on which the Committee approved this UL/ULC Standard.

ASME B1.20.1, *Pipe Threads, General Purpose*

ASME B36.10M, *Welded and Seamless Wrought Steel Pipe*

ASTM A47/A47M, *Standard Specification for Ferritic Malleable Iron Castings*

ASTM A48/A48M, *Standard Specification for Gray Iron Castings*

ANSI/ASTM A53/A53M, *Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless*

ASTM A106/A106M, *Standard Specification for Seamless Carbon Steel Pipe for High Temperature Service*

ASTM A178/A178M, *Standard Specification for Electric-Resistance Welded Carbon Steel and Carbon-Manganese Steel Boiler and Superheater Tubes*

ASTM A395/A395M, *Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures*

ASTM A536, *Standard Specification for Ductile Iron Castings*

ASTM B42, *Standard Specification for Seamless Copper Pipe, Standard Sizes*

ASTM B43, *Standard Specification for Seamless Red Brass Pipe, Standard Sizes*

ASTM B75/B75M, *Standard Specification for Seamless Copper Tube*

ASTM B88, *Standard Specification for Seamless Copper Water Tube*

ASTM B135/B135M, *Standard Specification for Seamless Brass Tube*

ASTM B280, *Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service*

ASTM B858, *Standard Test Method for Ammonia Vapor Test for Determining Susceptibility to Stress Corrosion Cracking in Copper Alloys*

ANSI/ASTM D396, *Standard Specification for Fuel Oils*

ANSI/ASTM D3699, *Standard Specification for Kerosine*

ANSI/ASTM D4806, *Standard Specification for Denatured Fuel Ethanol for Blending with Gasolines for Use as Automotive Spark-Ignition Engine Fuel*

ANSI/ASTM D4814, *Standard Specification for Automotive Spark-Ignition Engine Fuel*

ANSI/ASTM D975, *Standard Specification for Diesel Fuel Oils*

CSA C22.2 No. 0.15, *Adhesive Labels*

CSA B149.1, *Natural gas and propane installation code*

CSA B149.2, *Propane storage and handling code*

NFPA 30, *Flammable and Combustible Liquids Code*

NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages*

NFPA 58, *Liquefied Petroleum Gas Code*

National Fire Code of Canada 2015

UL 25A, *Standard for Meters for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0 – E85)*

UL 25B, *Standard Meters for Diesel Fuel, Biodiesel Fuel, Diesel/Biodiesel Blends with Nominal Biodiesel Concentrations up to 20 Percent (B20), Kerosene, and Fuel Oil*

UL 157, *Standard for Gaskets and Seals*

UL 969, *Standard for Marking and Labeling Systems*

5 Glossary

5.1 For the purpose of this standard, the following definitions apply.

5.2 AUTHORITY HAVING JURISDICTION (AHJ) – The governmental body responsible for the enforcement of any part of this Standard or the official or agency designated by that body to exercise such a function.

5.3 COMBUSTIBLE LIQUID – Any liquid having a flash point at or above 37.8 °C (100 °F) and below 93.3 °C (200 °F) and as defined in the National Fire Code of Canada and NFPA 30, Flammable and Combustible Liquids Code.

5.3A COMPOSITE GASKET MATERIAL – A material of one of the following types:

a) Type I – Composite cork consisting of granular cork mixed in a binder other than rubber.

b) Type II – Plant fiber consisting of different saturated grades of paper.

c) Type III – Plant fiber and cork particles mixed in a binder other than rubber.

d) Type IV – Granular cork and rubber compound mixed in a rubber binder.

e) Type V – Fibers such as aramid, glass, and carbon mixed in a rubber or other binder.

5.4 FLAMMABLE AND COMBUSTIBLE LIQUIDS – Fuel oil, gasoline, gasoline/alcohol blends up to 10 % ethanol, diesel, kerosene, and similar petroleum products which are formulated in accordance with Regulation of Fuels and Fuel Additives, 40CFR80, and the following:

a) Gasoline formulated in accordance with the Standard Specification for Automotive Spark-Ignition Engine Fuel, ANSI/ASTM D4814;

b) Gasoline/ethanol blends at levels designated as "gasohol" (E10) or less formulated in accordance with ANSI/ASTM D4814, when blended with denatured fuel ethanol formulated in accordance with the Standard Specification for Denatured Fuel Ethanol for Blending with Gasolines for Use as Automotive Spark-Ignition Engine Fuel, ANSI/ASTM D4806;

c) Diesel fuel formulated in accordance with the Standard Specification for Diesel Fuel Oils, ANSI/ASTM D975;

d) Kerosene formulated in accordance with the Standard Specification for Kerosine, ANSI/ASTM D3699;

e) Fuel oil (heating fuel) formulated in accordance with the Standard Specification for Fuel Oils, ANSI/ASTM D396; or

f) Liquefied petroleum gas (LP-Gas) in the gaseous phase, not in excess of 6.9 kPa (1 psi), and manufactured and natural fuel gases.

5.5 FLAMMABLE LIQUID – Any liquid having a flashpoint below 37.8 °C (100 °F) and having a vapour pressure not exceeding 275 kPa (40 psi) (absolute) at 37.8 °C (100 °F) and as defined in the National Fire Code of Canada and NFPA 30, Flammable and Combustible Liquids Code.

5.6 PRESSURE INDICATING DEVICE – A device of one of the following types:

a) An analog gauge having a pressure range such that the test pressure is between 30 % and 70 % of the maximum scale reading of the gauge;

b) A digital pressure transducer, or other digital gauge, that is calibrated over a range of pressure that includes the test pressure; or

c) Other device that is equivalent to the devices in (a) or (b).

CONSTRUCTION

6 General

6.1 A meter designed to handle flammable and combustible liquids shall be constructed for a minimum working pressure of 345 kPa (50 psig), and an ultimate rupture pressure of not less than five times the rated working pressure.

6.2 A meter designed to handle LP-Gas shall be constructed for a minimum working pressure of 2408 kPa (350 psig), and an ultimate rupture pressure of not less than five times the rated working pressure.

7 Assembly

7.1 A meter shall be assembled as a unit and shall include all of the components necessary for its intended function.

7.2 If a meter requires the use of special pipe flanges, gaskets, bolts, or other special fittings or parts for making a proper installation, such parts shall be furnished by the manufacturer with each meter.

7.3 A brazing material used for joining fluid-confining parts of a meter shall have a melting point (solidus temperature) exceeding 538 °C (1000 °F).

8 Materials

8.1 A part of the meter in contact with the gas or fluid to be handled shall be resistant to the action of such fluid.

8.2 Except as indicated in 7.3, fluid-confining parts, other than a seal ring or a gasket, shall have a minimum melting point (solidus temperature) of 510 °C (950 °F) and a minimum tensile strength of 68,950 kPa (10,000 psi) at 204 °C (400 °F).

8.3 Fluid confining metal parts of meters for LP-Gas shall be one of the following materials or the equivalent:

a) Steel.

b) Ductile (nodular) iron –

1) As specified in the Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures, ASTM A395/A395M.

2) Grade 60-40-18 or 65-45-12 as specified in the Standard Specification for Ductile Iron Castings, ASTM A536.

c) Malleable iron as specified in the Standard Specification for Ferritic Malleable Iron Castings, ASTM A47/A47M.

d) Class 40B or higher strength gray iron as specified in the Standard Specification for Gray Iron Castings, ASTM A48/A48M.

e) Brass.

f) Aluminum.

8.4 If atmospheric corrosion of a part will interfere with the operation of a meter, or permit external leakage, it shall be of a corrosion-resistant material or be provided with a corrosion-resistant protective coating.

Exception: A coating need not be provided for ferrous materials used for fluid-confining parts which have the thickness specified in the following:

a) Castings have a minimum wall thickness of 6.4 mm (1/4 inch),

b) Standard pipe and fittings conforming to the Standard for Welded and Seamless Wrought Steel Pipe, ANSI/ASME B36.10M, Schedule 40, and

c) Fabricated sheet steel parts having a minimum wall thickness of 2.36 mm (0.093 inch).

8.5 A protective coating shall provide resistance against corrosion to a degree not less than that provided by the protective coatings specified in 8.6.

8.6 Cadmium plating shall have a minimum thickness of 0.0076 mm (0.0003 inch), and zinc plating shall have a minimum thickness of 0.0127 mm (0.0005 inch), except on parts where threads constitute the major portion of the area, in which case the minimum thickness of the cadmium or zinc plating shall be 0.0038 mm (0.00015 inch).

8.7 Sand castings used in the construction of fluid-confining parts, failure of which will allow external leakage, shall be free from porosity leakage and shall have a minimum design thickness as specified in Table 8.1. See the Leakage Test, Section 15, and 20.4, for additional test requirements.

Table 8.1
Minimum thickness of liquid-confining sand castings

Material	Meters for flammable and combustible liquids		Meters for LP-Gas[a]	
	mm	(inch)	mm	(inch)
Cast iron	4.8	(3/16)	6.4	(1/4)
Malleable iron, ductile iron, or cast steel	3.2	(1/8)	4.8	(3/16)
Brass or bronze	2.4	(3/32)	4.8	(3/16)
Aluminum	4.0	(5/32)	6.4	(1/4)

[a] Also see 8.3 concerning materials used

8.8 If warping of a casting affects the tightness of fluid-confining joints, or the necessary fit of parts, the casting shall be stress-relieved to reduce the possibility of warping to a minimum.

8.9 A liquid-confining transparent part provided for purposes of observation shall be of glass. It shall be protected against damage by recessing or guarding. The glass part shall not be adversely affected by changes in temperature. See the Temperature Reduction Test, Section 18.

8.10 For flat flanges, a plant fiber gasket shall be not more than 0.8 mm (1/32 inch) thick. A cork-composition gasket shall be shellacked in place on one side and coated with graphite on the other. Synthetic rubber gaskets shall have a minimum thickness of 1.6 mm (1/16 inch) and a maximum thickness of 2.4 mm (3/32 inch).

8.11 An elastomeric part used in contact with liquid shall have the following properties when tested as specified in the Standard for Gasket and Seals, UL 157:

a) Those properties relating to minimum tensile strength and elongation after oven aging, as specified in UL 157. The maximum service temperature used to determine the conditioning time and temperature for oven aging shall be 60 °C (140 °F), unless the product is designated for use at higher temperature;

b) Low temperature rating of -29 °C (-20 °F), except for composite gasket material with elastomeric parts which are subjected to 8.16; and

c) Volume change and extraction as specified in the requirements for UL 157:

1) For end use applications of gasoline, gasoline/alcohol blends up to 10 % Ethanol, diesel fuel, fuel oil, lubricating oil and kerosene, for meters handling flammable and combustible liquids;

2) For end use applications of LP-Gas, for meters handling LP-Gas; and

3) Other end use applications shall use the fluids intended for exposure.

8.12 The Standard for Gasket and Seals, UL 157, provides for the testing of either finished elastomeric parts, or sheet or slab material. Sheet or slab material shall be tested when the elastomeric parts are O-rings having a diameter less than 25.4 mm (1 inch). The material tested shall be the same as that used in the product, regardless of whether finished elastomeric parts, or sheet or slab material is tested.

8.13 When the limits for tensile strength and elongation, volume change, or extraction specified in 8.11 are exceeded, the gasket material may be retested in the complete meter after conditioning as outlined in 8.14 – 8.16.

8.14 When the limits for tensile strength, elongation, volume change, or extraction are exceeded, the complete assembly constructed with the gasket installed as intended shall be filled with the appropriate test fluid for 70 h at room temperature, and then shall comply with the Leakage Test, Section 15, and the Hydrostatic Strength Test, Section 17, while at the test temperature.

8.15 When the oven aging results are not in accordance with 8.11, the complete assembly with the gasket installed as intended, shall be placed in an air oven for the same duration and at the same temperature used when testing the gasket material, and then shall comply with the Leakage Test, Section 15, and the Hydrostatic Strength Test, Section 17, while at the test temperature.

8.16 A composite gasket material with elastomeric part or when the low temperature results are not in accordance with 8.11, the complete assembly with the gasket material installed as intended, shall be placed in a cold chamber for 24 h at the same temperature used when testing the gasket material and then shall comply with the Leakage Test, Section 15, and the Hydrostatic Strength Test, Section 17, while at the test temperature.

9 Bodies and Covers

9.1 Plugs and other parts, other than cap screws and bolts, threaded into non-corrosion-resistant ferrous parts of a meter shall be of corrosion-resistant metal or provided with a protective coating when their function is such that they are required to be removed for adjustment, repair, or other care of the meter.

9.2 A plug, cap, or other part threaded into or on the meter body shall engage with at least four full threads.

9.3 Tapped openings for ordinary studs or cap screws used for assembly shall not extend into a fluid-confining section of a meter.

10 Register-Shaft Seals

10.1 A shaft seal provided to prevent external leakage shall not require field adjustment to maintain it tight against leakage.

11 Springs

11.1 An operating spring shall be guided and arranged to prevent binding, buckling, or other interference with its free movement. If necessary, both ends of a spring shall be closed and squared.

12 Piping and Fittings

12.1 Joints in wrought iron, steel, brass, or copper pipe shall be threaded, welded, or brazed. Pipe threads shall be in accordance with the Standard for General Purpose (Inch) Pipe Threads, ANSI/ASME B1.20.1.

Exception: Meters intended for use in installations where pipe fittings incorporate other than NPT type threads may be provided with pipe threads complying with a national pipe thread standard compatible with those fittings. The pipe thread type shall be identified in accordance with 21.5.

12.2 An opening threaded for attachment to a pipe shall be constructed so that a pipe threaded two threads beyond the standard number (for the size in question) shall run into the opening. Application of the torque specified in Table 14.1 to the pipe shall not result in distortion of any part of the fitting.

12.3 A threaded pipe connection shall be made with litharge and glycerine cement, shellac and inert powder filler, or a pipe-joint sealing compound resistant to:

a) LP-Gas, for meters for handling LP-Gas; and

b) Gasoline, for meters for handling flammable and combustible liquids.

12.4 Pipe shall be wrought iron or steel (black or galvanized), brass or copper, and shall comply with the following requirements, as applicable:

a) For wrought iron pipe, the Standard for Welded and Seamless Wrought-Steel Pipe, ANSI/ASME B36.10M;

b) For steel pipe:

1) The Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless, ANSI/ASTM A53/A53M; or

2) The Standard Specification for Seamless Carbon Steel Pipe for High Temperature Service, ASTM A106/A106M;

c) For brass pipe, the Standard Specification for Seamless Red Brass Pipe, Standard Sizes, ASTM B43; or

d) For copper pipe, the Standard Specification for Seamless Copper Pipe, Standard Sizes, ASTM B42.

12.5 A pipe fitting shall be steel, brass, copper, malleable iron, or ductile (nodular) iron. A cast-iron pipe fitting shall not be used.

12.6 Tubing shall be steel, brass, or copper for meters for handling LP-Gas, and shall be steel, or seamless drawn aluminum or copper for meters for handling flammable and combustible liquids. The tubing shall have a wall thickness of not less than that specified in Table 12.1. Tubing shall also comply with the following requirements, as applicable:

a) For steel tubing, the requirements for Grade A steel in the Standard Specification for Electric-Resistance Welded Carbon Steel and Carbon-Manganese Steel Boiler and Superheater Tubes, ASTM A178/A178M;

b) For brass tubing, the Standard Specification for Seamless Brass Tube, ASTM B135/B135M; or

c) For copper tubing:

1) Type K or L, the Standard Specification for Seamless Copper Water Tube, ASTM B88;

2) The Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service, ASTM B280; or

3) The Standard Specification for Seamless Copper Tube, ASTM B75/B75M.

12.7 Steel tubing of the wall thickness specified in Table 12.1 shall be protected with a corrosion-resistant coating equivalent to that provided by hot-dip galvanizing.

Table 12.1
Wall thickness for aluminum, brass, copper, and steel tubing

Outside diameter		Minimum wall thickness			
		Aluminum, brass, or copper		Steel	
mm	(inches)	mm	(inches)	mm	(inches)
3.17	(1/8)	0.67	(0.0265)	0.71	(0.028)
6.35	(1/4)	0.67	(0.0265)	0.71	(0.028)
7.94	(5/16)	0.67	(0.0265)	0.71	(0.028)
9.53	(3/8)	0.67	(0.0265)	0.71	(0.028)
12.70	(1/2)	0.80	(0.0315)	0.71	(0.028)
15.88	(5/8)	0.93	(0.0365)	0.89	(0.035)
19.05	(3/4)	0.98	(0.0385)	0.89	(0.035)
22.23	(7/8)	1.04	(0.0410)	1.24	(0.049)
25.40	(1)	1.17	(0.0460)	1.24	(0.049)

Table 12.1 Continued on Next Page

Table 12.1 Continued

Outside diameter		Minimum wall thickness			
		Aluminum, brass, or copper		Steel	
mm	(inches)	mm	(inches)	mm	(inches)
28.58	(1-1/8)	1.17	(0.0460)	1.24	(0.049)
31.75	(1-1/4)	1.28	(0.0505)	1.24	(0.049)
34.93	(1-3/8)	1.28	(0.0505)	–	–
38.10	(1-1/2)	–	–	1.65	(0.065)

12.8 Fittings used in the construction of meters shall be only those specified by the manufacturer as compatible with the mated tubing. Brass or copper in combination with aluminum shall not be used unless it is coated with chromium or a metallic coating that has been determined to be equivalent to preclude electrolytic action. A coating shall have a thickness of not less than 0.005 mm (0.0002 inch).

12.9 Flared or compression type fittings furnished with the meter shall comprise the complete assembly for this purpose. Such fittings, whether partially furnished as a machined portion of the body or assembled into a pipe threaded connection, shall comply with the appropriate American National Standard.

PERFORMANCE

13 General

13.1 A representative sample of each size and specific design of meter shall be subjected to the tests described in these requirements. Additional samples of parts constructed of nonmetallic materials, such as gaskets and other seal materials, are required for physical and chemical tests.

13.2 Endurance and leakage tests on meters for handling flammable and combustible liquids shall use kerosene, Soltrol® 170, or the equivalent as the test medium.

NOTE: Soltrol® is a Registered Trademark of Chevron Phillips Chemical Company LP.

13.3 Endurance tests on meters for handling LP-Gas shall use normal hexane or LP-Gas as the test medium.

13.4 Leakage tests on meters for handling LP-Gas shall use a source of aerostatic pressure, such as air, nitrogen, or carbon dioxide gas.

13.5 Liquids, such as water or hydraulic oil, shall be used for developing the required pressure in a hydrostatic pressure strength test.

13.6 All leakage and hydrostatic-pressure strength tests shall be maintained for at least 1 min.

13.7 For the Leakage and Hydrostatic Strength tests, a calibrated pressure indicating device (as described in the Glossary), shall be used.

14 Deformation Test

14.1 A meter shall not leak, nor shall there be evidence of damage resulting from the stresses imposed on pipe-threaded sections on the body, when tested as described in this section.