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ANSI/CAN/UL 144:2021

JOINT CANADA-UNITED STATES
NATIONAL STANDARD

STANDARD FOR SAFETY

LP-Gas Regulators

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ANSI/UL 144-2021



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UL Standard for Safety for LP-Gas Regulators, ANSI/CAN/UL 144

Ninth Edition, Dated January 22, 2021

Summary of Topics

This New Edition of ANSI/CAN/UL 144, Standard for LP-Gas Regulators, has been issued to reflect the latest ANSI and SCC approval dates, and to incorporate the proposals dated June 19, 2020, September 16, 2020, and October 9, 2020.

The new requirements are substantially in accordance with Proposal(s) on this subject dated June 19, 2020, September 16, 2020, and October 9, 2020.

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Standard for LP-Gas Regulators

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Ninth Edition

January 22, 2021

This ANSI/CAN/UL Safety Standard consists of the Ninth Edition.

The most recent designation of ANSI/UL 144 as an American National Standard (ANSI) occurred on January 22, 2021. 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 January 22, 2021.

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Preface

This is the Ninth Edition of ANSI/CAN/UL 144, Standard for LP-Gas Regulators.

UL is accredited by the American National Standards Institute (ANSI) and 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 144 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 Eighth Edition of UL 144 as well as ULC/ORD-C144.

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 On-Line 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 UL Standards Technical Panel (STP) on LP-Gas Regulators, STP 144.

This list represents the STP 144 membership when the final text in this standard was balloted. Since that time, changes in the membership may have occurred.

STP 144 Membership

Name	Representing	Interest Category	Region
Bathalon, Susan	US Consumer Product Safety Commission	Non-voting member	USA
Baxter, Rick	The Inspections Group Inc	AHJ	Alberta, Canada
Diel, William	M B Sturgis Inc	Supply Chain	USA
Layson, P.	Applications Engineering Group Inc.	General	USA

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Mailvaganam, Miles	M Mailvaganam	General	Canada
Olds, Charlie	Marshall Gas Controls Inc	Producer	USA
Petersen, James	Petersen Engineering	General	USA
Prusko, Jeffrey	Underwriters Laboratories Inc.	Project Manager – Non-voting member	USA
Swiecicki, B.	National Propane Gas Association	General	USA
Thomas, Chad	Engineered Controls International Inc	Producer	USA
Wade, John A.	ULC Standards	STP Chair - Non-voting member	Canada
Werner, Laura	ULC Standards	Project Manager – Non-voting member	Canada
Willis, Jerry	LP Gas Industrial Equipment Co.	Supply Chain	USA
Wolff-Klammer, Edgar	UL LLC	Testing and Standards Org	USA
Woodward, L.	Fairview Fittings & Mfg Inc.	Producer	Canada

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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 pressure regulators for use with LP-Gas equipment.

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

1.2 Regulators covered by these requirements are intended to be installed and used in systems 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) Liquefied Petroleum Gas Code, NFPA 58;
- 2) National Fuel Gas Code, NFPA 54;
- 3) Outdoor Cooking Gas Appliances, CSA/AM ANSI Z21.58/CSA 1.6; and

b) In Canada:

- 1) Natural gas and propane installation code, CSA B149.1;
- 2) Outdoor Cooking Gas Appliances, CSA/AM ANSI Z21.58/CSA 1.6;
- 3) CAN/CSA Z240 RV Series, Recreational Vehicles;
- 4) CAN/CSA Z241 Series, Park model trailers; and
- 5) Provincial or other Regulations.

1.3 These requirements do not cover:

- a) Compressed gas regulators;
- b) Gas appliance pressure regulators;
- c) Regulators for use in chemical, petroleum, or utility power plants; pipeline or marine terminals; or related storage facilities at such plants or terminals;
- d) Combination gas control valves for gas appliances;
- e) Regulators for use in oxygen-fuel, gas-welding, and cutting operations; and
- f) Regulators for use in engine fuel (automotive and/or marine) applications.

The requirements for (a) – (e) are covered in: the Standard for Compressed Gas Regulators, UL 252, or CGA E-4, Standard for Compressed Gas Regulators; and in the Standard for Gas Appliance Pressure Regulators, CSA/AM CSA/ANSI Z21.18/CSA 6.3, and in the Standard for Combination Gas Controls for Gas Appliances, CSA/AM CSA/ANSI Z21.78/CSA 6.20, respectively.

1.4 The assigning of flow ratings to regulators is not within the scope of these requirements

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2 Units of Measurement

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

3 Components

3.1 Except as indicated in [3.2](#), a component of a product covered by this standard shall comply with the requirements for that component.

3.2 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.

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

3.4 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.

4 Referenced Publications

4.1 The documents shown below are referenced in the text of this Standard. Any undated reference to a code or standard appearing in the requirements of this Standard shall be interpreted as referring to the latest edition of that code or standard.

UL Standards

UL 252, *Standard for Compressed Gas Regulators*

UL 569, *Standard for Pigtails and Flexible Hose Connectors for LP-Gas*

UL 2061, *Standard for Adapters and Cylinder Connection Devices for Portable LP-Gas Cylinder Assemblies*

Other Standards

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

ASME B16.26, *Cast Copper Alloy Fittings for Flared Copper Tubes*

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

ASTM B16, *Standard Specification for Free-Cutting Brass Rod, Bar and Shapes for Use in Screw Machines*

ASTM B26/B26M, *Standard Specification for Aluminum-Alloy Sand Castings*

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

ASTM A48, *Standard Specification for Gray Iron Castings*

ASTM B61, *Standard Specification for Steam or Valve Bronze Castings*

ASTM B62, *Standard Specification for Composition Bronze or Ounce Metal Castings*

ASTM B85, *Standard Specification for Aluminum-Alloy Die Castings*

ASTM B86, *Standard Specification for Zinc-Alloy Die Castings*

ASTM B108, *Standard Specification for Aluminum-Alloy Permanent Mold Castings*

ASTM B124, *Standard Specification for Copper and Copper Alloy Forging Rod, Bar, and Shapes*

ASTM B176, *Standard Specification for Copper-Alloy Die Castings*

ASTM B211, *Standard Specification for Aluminum or Aluminum-Alloy Bar, Rod, and Wire*
 ASTM B283, *Standard Specification for Copper and Copper-Alloy Die Forgings (Hot-Pressed)*
 ASTM A395, *Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures*
 ASTM D471, *Standard Test Method for Rubber Property-Effect of Liquids*
 ASTM A536, *Standard Specification for Ductile Iron Castings*
 ASTM B584, *Standard Specification for Copper Alloy Sand Castings for General Applications*
 ASTM B858, *Standard Test Method for Ammonia Vapor Test for Determining Susceptibility to Stress Corrosion Cracking in Copper Alloys*
 CGA V-1, *Standard for Compressed Gas Cylinder Valve Outlet and Inlet Connections*
 CGA E-4, *Standard for Gas Pressure Regulators*
 CSA/AM ANSI Z21.58/CSA 1.6, *Outdoor Cooking Gas Appliances*
 CSA/AM CSA/ANSI Z21.18/CSA 6.3, *Standard for Gas Appliance Pressure Regulators*
 CSA/AM CSA/ANSI Z21.78/CSA 6.20, *Standard for Combination Gas Controls for Gas Appliances*
 CSA 8.1, *Elastomeric composite hose and hose couplings for conducting propane and natural gas*
 CSA 8.3, *Thermoplastic hose and hose couplings for conducting propane and natural gas*
 CSA B149 Series, *Propane storage and handling code*
 NFPA 54, *National Fuel Gas Code*
 NFPA 58, *Liquefied Petroleum Gas Code*
 SAE J512, *Automotive Tube Fittings*

Abbreviations

ANSI – American National Standards Institute
 ASME – American Society of Mechanical Engineers
 ASTM – American Society for Testing and Materials
 CGA – Compressed Gas Association
 CSA – CSA Group
 NFPA – National Fire Protection Association
 SAE – Society of Automotive Engineers

5 Terminology

5.1 The term "regulator" as used in this standard refers to a device placed in a gas line for reducing, controlling, and maintaining the pressure in that portion of the piping system downstream of the device.

6 Glossary

6.1 For the purpose of this standard the following definitions apply.

6.2 **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.

6.3 **FLOW CAPACITY** – The maximum flow rate of a regulator at conditions as specified by the manufacturer, usually given in units of kW (BTU/h) and which is based upon factory setting of inlet and outlet (delivery) pressures.

6.4 **LOCKUP PRESSURE** – The outlet pressure of the regulator under no-flow conditions.

6.5 **MANIFOLD:**

AUTOMATIC CHANGEOVER MANIFOLD – A unit that combines two high-pressure regulators into a single unit that is intended to be connected to the inlet of a second-stage regulator.

incorporates two inlet connections with a single outlet connection, which is intended for use with dual or multiple cylinder installations. It incorporates a service-reserve indicator or provision for attachment of a service-reserve indicator. The manifold automatically changes the LP-Gas vapor withdrawal from the designated service cylinder to the designated reserve cylinder without interruption of service. A switching device is manually selected to alternate between the service and reserve cylinders.

6.6 OVERPRESSURE SHUTOFF (OPSO) FEATURE – A feature that shuts off the flow of LP-Gas vapor when the outlet pressure of the regulator reaches a predetermined maximum pressure.

6.7 REGULATOR:

a) AUTOMATIC CHANGEOVER REGULATOR – An integral two-stage regulator that combines two high-pressure regulators and a second-stage regulator into a single unit. It incorporates two inlet connections that is designed for use with dual or multiple cylinder installations. The system automatically changes the LP-Gas vapor withdrawal from the designated service cylinder(s) to the designated reserve cylinder(s) without interruption of service. It incorporates a service-reserve indicator or provision for attachment of a service-reserve indicator. The service-reserve indicator gives a visual indication of the cylinder(s) that are supplying the system. A switching device is manually selected to alternate between the service and reserve cylinders.

b) FIRST-STAGE REGULATOR – A type of high-pressure regulator for LP-Gas vapor service designed to reduce pressure from the container to a nominal pressure of 13.7 – 68.7 kPa (2 – 10 psig).

c) HIGH-PRESSURE REGULATOR – A pressure regulator for LP-Gas liquid or vapor service designed to reduce pressure from the container to a lower pressure in excess of 6.9 kPa (1.0 psig).

d) INTEGRAL 13.8 KPA (2 PSIG) SERVICE REGULATOR – A pressure regulator that combines a high-pressure regulator and a 13.8 kPa (2 psig) service regulator into a single unit.

e) INTEGRAL TWO-STAGE REGULATOR – A pressure regulator that combines a high-pressure regulator and a second-stage regulator into a single unit.

f) MANUAL CHANGEOVER REGULATOR – A single-stage regulator with a manifold that contains two inlets that allow LP-Gas to flow from one inlet or the other using a handle or lever through the single-stage regulator to the gas consuming equipment. It is designed to be used with two LP-Gas containers. When the supply is exhausted from one container, the lever or handle must be manually moved to allow LP-Gas to flow from the second container.

g) SECOND-STAGE REGULATOR – A pressure regulator for LP-Gas vapor service designed to reduce first-stage regulator outlet pressure to a pressure equal to or less than 356 mm (14 in) water column [nominal 279 mm (11 in) water column].

h) SINGLE-STAGE REGULATOR – A pressure regulator for LP-Gas vapor service designed to reduce pressure from the container to a pressure of 6.9 kPa (1 psig) or less [nominal 279 mm (11 in) water column].

i) SPECIAL-PURPOSE HIGH-PRESSURE REGULATOR – A pressure regulator for LP-Gas designed to reduce the prevailing cylinder, tank or other pressure in excess of 6.9 kPa (1 psig) to a lower pressure. This regulator is not intended for installation in two-stage piping systems that serve 3.45 kPa (0.5 psi) appliance systems.

j) SPECIAL-PURPOSE LOW PRESSURE REGULATOR – A pressure regulator for LP-Gas vapor service designed to reduce high-pressure or first-stage regulator outlet pressure to a maximum