CGA E-14—2013

MAXIMUM LEAKAGE RATES (GAS TIGHTNESS) OF EQUIPMENT USED FOR WELDING, CUTTING, AND ALLIED PROCESSES

SECOND EDITION

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Work Item 11-041
Industrial Gases Apparatus Committee

NOTE—Technical changes from the previous edition are underlined.

NOTE—Appendices A and B (Normative) are a requirement.

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Appendices

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1 Introduction

Compressed gas equipment is used in applications where leakage can create hazardous conditions for personnel. These hazards can include the risk of fire, explosion, or asphyxiation. This standard outlines the recommended maximum leakage rates for various types of equipment. Additionally, this standard includes information that can be used by manufacturers, purchasers, safety directors, and users of compressed gas equipment. The leak rate values have been compiled from existing CGA standards that address specific equipment.

2 Scope

This standard specifies the maximum leakage rates allowed for equipment used in welding, cutting, and allied processes. It applies only to individual components of a system that are connected to an upstream gas supply.

3 Definitions

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

3.1 Leakage, external
Unintentional escape of gas from a pressurized device to the atmosphere.

3.2 Leakage, internal
Unintentional escape of gas from a pressurized device in a closed system. These leakages normally occur across operating valve seats and cause a rise in internal pressure.

3.3 Leakage rate
Numerical expression for the amount of gas unintentionally leaked to the atmosphere, from the surrounding atmosphere, or inside a closed system. In this standard, the leakage rates will be given in either cubic centimeters per second (cc/s) or cubic centimeters per hour (cc/h).

3.4 Leakage test, inboard
Method to determine the amount of leakage occurring through the device from the surrounding atmosphere. This is usually accomplished by creating a vacuum inside the device and measuring the internal leakage of a tracer gas (normally helium) from the atmosphere with a mass spectrometer.

3.5 Leakage test, outboard
Method to determine the amount of leakage in a device that is pressurized internally. The leakage may occur to the atmosphere or inside a closed system.

4 Test media

Devices to be used with helium or hydrogen shall be tested with helium. Devices to be used with other gases may be tested with helium; oil-free, dry air; or nitrogen. It is also permissible to test devices with their intended gas service provided the necessary safety precautions are taken.

Results will be expressed in cc/s helium or cc/s air or nitrogen as it relates to the intended gas service. See Appendix A for additional information on test gases.

5 Test pressures

5.1 Welding/Cutting torches and attachments

Minimum test pressure shall be 150 psi (1030 kPa) or the manufacturer's maximum operating pressure, whichever is greater.[1, 2]

[1] kPa shall indicate gauge pressure unless otherwise noted as (kPa, abs) for absolute pressure or (kPa, differential) for differential pressure. All kPa values are rounded off per CGA P-11, *Metric Practice Guide for the Compressed Gas Industry* [1].

[2] References are shown by bracketed numbers and are listed in order of appearance in the reference section.