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CGA V-7—2021
STANDARD METHOD OF DETERMINING CYLINDER VALVE OUTLET CONNECTIONS FOR INDUSTRIAL GAS MIXTURES

SEVENTH EDITION

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Work Item 20-042
Cylinder Valve Committee

NOTE—Technical changes from the previous edition are underlined.

NOTE—Appendix A (Normative) is a requirement.

NOTE—Appendix B (Informative) is for information only.

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Contents **Page**

Tables

Appendices

1 Introduction

CGA V-1, *Standard for Compressed Gas Cylinder Valve Outlet and Inlet Connections* provides valve outlet connections for numerous pure gases but only includes a few mixtures that have a history of being commercially or medically important and for which standards were in demand [1].[1]

In recent years, there has been a tremendous increase in the number of industrial, specialty, and semiconductor gas mixtures entering the commercial market, and the need to have some separation in the applicability of valve outlets to the thousands of gas mixtures is apparent. CGA undertook the development of a procedure for providing some safe separation of valve outlets for gas mixtures having similar properties.

It was recognized that it was physically impossible to establish a sufficient number of different valve outlets to provide a major separation for these thousands of gas mixtures. After much consideration, CGA concluded that a practical and reasonable separation could be achieved by selecting a limited number of existing connections and assigning these to mixtures having similar properties. This was intended to minimize the misconnection of gas mixtures whereby a serious hazard could occur.

CGA V-1 provides outlet connections in a logical and orderly manner [1]. The method for determining a cylinder valve outlet connection for various industrial gas mixtures is based on a four-digit numerical code assigned to each gas based on its fire potential, toxicity, state of the gas, and corrosiveness (FTSC). FTSC codes have been consolidated into CGA P-47, *Guidelines for FTSC Codes and Current Gas Listings* and as such, the application of this standard requires referencing CGA P-47 [2].

References in this standard to valve outlet connection numbers are those contained in CGA V-1 [1].

Medical gases and medical gas mixtures are given special treatment because of their applications, which involve the care and critical handling of medical patients. For this reason, outlet connections for mixtures of medical gases are considered on a mixture-by-mixture basis and are not covered in this standard. They are covered in CGA V-7.1, *Standard Method of Determining Cylinder Valve Outlet Connections for Medical Gases* [3].

2 Scope and purpose

2.1 Scope

This standard applies to the selection of a suitable cylinder valve outlet connection for industrial, specialty, and semiconductor gas mixtures for pressures up to 3000 psi at 70 °F (20 680 kPa at 21.1 °C).[2] It applies to cylinders filled for individual use, cylinders filled individually for the purpose of assembling into a cylinder bundle, and for all cylinder bundle manifold outlet connections.

This standard does not apply to cylinders contained within an assembled cylinder bundle filled as one individual unit by use of the cylinder bundle manifold outlet connections. It also does not apply to medical gas mixtures (see CGA V-7.1) [3].

For the assignment of ultra high integrity service (UHIS) connections for mixtures, see Appendix A. Appendix A is reproduced with permission from International Organization for Standardization (ISO) 10692-1:2001, *Gas cylinders—Gas cylinder valve connections for use in the micro-electronics industry—Part 1: Outlet connections* [5].

For the purpose of this standard, a mixture is understood to be the purposeful combination of two or more components. An odorant shall be considered a component when added to either a pure gas or a mixture. Blanketing of a pure gas or mixture is not considered the generation of a new mixture. However, the effect of the pressure increase needs to be considered when determining the FTSC code.

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

[2] 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, *Guideline for Metric Practice in the Compressed Gas Industry* [4].