

# CGA

Compressed Gas Association

The Standard For Safety Since 1913

**CGA S-7—2018**  
**STANDARD METHOD FOR**  
**SELECTING PRESSURE**  
**RELIEF DEVICES FOR**  
**COMPRESSED GAS**  
**MIXTURES IN CYLINDERS**

**SIXTH EDITION**

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Work Item 17-007  
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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## 1 Introduction

This standard presents a method for selecting pressure relief devices (PRDs) for compressed gas mixtures packaged in cylinders having water capacities of less than or equal to 1000 lb (454 kg) (see U.S. Department of Transportation (DOT) Title 49 of the U.S. *Code of Federal Regulations* (49 CFR) Part 173.301[f]). This standard also applies to DOT 3AX, 3AAX, and 3T cylinders having water capacities greater than 1000 lb (454 kg) that comply with the specifications, charging, and maintenance regulations of DOT or the corresponding specifications and regulations of Transport Canada (TC) [1, 2].<sup>1</sup>

This method is more involved than the method for determining the appropriate valve outlet connections for gas mixtures. For the latter, as described in CGA V-7, *Standard Method of Determining Cylinder Valve Outlet Connections for Industrial Gas Mixtures*, mixture component rating numbers are assigned to the various compressed gases based on the physical properties of the gases: flammability (F), toxicity (T), state of the gas (G), and corrosivity (C) (FTSC) [3, 4]. The higher the mixture component rating number (1 through 6), the more influential that gas becomes in determining the outlet connection for the mixture in which that gas is a component.

Valve outlet connection assignments are broadly separated into connections for groups of gases having similar properties such as high and low pressure, flammability, corrosivity, toxicity, and inertness. Since 1978, this system has proven satisfactory in avoiding hazardous connections.

The physical characteristics of a mixture consisting of several pure gases could be dramatically different depending on the concentration of each gas in the mixture. Depending on these concentrations, a mixture could be flammable or nonflammable, toxic or nontoxic, liquefied or nonliquefied, and corrosive or noncorrosive. Since the mixture is released to the atmosphere when the relief device functions, the characteristics of the escaping gas mixture shall be well defined.

A method was established for assigning the relief device for each mixture, just as is done for pure gases in CGA S-1.1, *Pressure Relief Device Standards—Part 1—Cylinders for Compressed Gases* [5]. To use this method, the FTSC code shall be determined (see CGA P-7, *Guidelines for FTSC Codes and Current Gas Listings*) [4]. In some cases, determining the FTSC number is straightforward. However, in other cases the FTSC number is not as obvious, and in most cases this determination is the responsibility of the gas mixture producer. It shall be understood that some of the considerations made in determining the selection of the PRD used in this standard are based on experience.

The method outlined in this standard is designed to handle the proliferation of mixtures entering the commercial market.

The continued use of previously recognized and installed devices is not restricted by this edition of the standard. However, if a PRD is replaced, the new device shall meet the requirements of this standard.

## 2 Scope

This method is applicable to the determination of the PRD to use with compressed gas mixtures in cylinders having water capacities of less than or equal to 1000 lb (454 kg). This standard also applies to DOT 3AX, 3AAX, and 3T cylinders having water capacities greater than 1000 lb (454 kg) that comply with the specifications, charging, and maintenance regulations of DOT or the corresponding specifications and regulations of TC [1, 2].

This method is limited to those compressed gas mixtures with known flammability, toxicity, state, and corrosivity. In addition, the DOT/TC rating and dimensions of the cylinder and the final pressure shall be known.

For the selection of PRDs for a single component compressed gas, see CGA S-1.1 [5]. For multicomponent compressed gases (mixtures), the method for selection of relief devices in this standard shall be used. Where a mixture is predominantly made up of a single component in a mixture, the gas producer shall determine whether the properties of this mixture dictate it being treated as a single component compressed gas or a gas mixture.

<sup>1</sup> References are shown by bracketed numbers and are listed in order of appearance in the reference section.