

CGA G-1.2—2012

**ACETYLENE METERING
AND PIPING**

FOURTH EDITION



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Acetylene Committee

NOTE—Technical changes from the previous edition are underlined.

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1 Introduction

In March 1956, the Board of Directors of the International Acetylene Association appointed a committee to study the metering of acetylene for the purpose of establishing recommendations. When the International Acetylene Association became affiliated with the Compressed Gas Association, the recommendations were issued as CGA G-1.2, *Recommendations for Chemical Acetylene Metering*, in November 1961. In a similar manner, the International Acetylene Association also developed a guide for the safe handling of acetylene in transmission piping systems. This information was adopted by the Acetylene Committee of the Compressed Gas Association, and CGA G-1.3, *Acetylene Transmission for Chemical Synthesis* was published in 1984.

While reviewing the information contained in these publications, CGA realized there were points of common interest in each, and the public would best be served by joining the two previous publications in an edition of CGA G-1.2, *Acetylene Metering and Pipeline Transmission*. Further study has indicated the benefits of addressing high pressure information in this publication, which has been renamed *Acetylene Metering and Piping*.

This publication is composed of three parts. The first part deals with properties of acetylene, the second part deals with pipeline acetylene transmission, and the third part deals with acetylene piping. In each part the included data are a compilation of practices, which have evolved through the years and have been demonstrated experimentally by test to be pertinent to the safe metering and transmission of acetylene.

2 Scope

The scope of this publication is limited to a maximum working pressure of 400 psi (2760 kPa).^{1,2} The data also covers acetylene of purity above 99.5% on a dry basis; no attempt has been made to include the use of dilute mixtures of acetylene and other gases.

Section 5 through Section 9 covers recommendations for acetylene metering. While the primary consideration is concerned with large-volume meters, information is also included on small-volume meters. A complete tabulation of the pertinent physical and chemical properties of the gas is included in Section 3. The reader is also directed to CGA G-1, *Acetylene* [2]. It is recommended that standard conditions be based on clean, water-saturated acetylene at 14.73 psia (102 kPa, abs) and 60 °F (15.6 °C), although the data in this report are applicable to other base conditions [3, 4].

Sections 10 through 14 are a review of the various components of an acetylene piping system. Section 15 discusses the general explosive behavior of acetylene in piping systems on the basis of numerous tests and observations that have been made over many years. Primary consideration was given to those properties peculiar to acetylene and requiring special handling techniques and protective measures. In addition to those special techniques required by the unstable nature of acetylene, precautions in construction and operation formally applicable to flammable gases must be observed.

Part 1: Properties of acetylene

3 Properties of acetylene

3.1 Physical properties

3.1.1 Density

Based on investigations by Kiyama, Holemann and Hasselmann, Legarde and Cambon, and Bottomley and Reeves, it is CGA's judgment that the most accurate value for the density of acetylene is 1.171 g/L at 760 mm of mercury and at 0° C [5, 6, 7, 8].

This value for the density of acetylene has been used in constructing the compressibility values for acetylene.

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.