



# **CGA G-5.6—2005**

**REAFFIRMED 2013**

## **HYDROGEN PIPELINE SYSTEMS**

**FIRST EDITION**

## PREFACE

As a part of a program of harmonization of industry standards, the European Industrial Gases Association (EIGA) and the Compressed Gas Association (CGA) formed an ad hoc task force and developed CGA G-5.6, *Hydrogen Pipeline Systems*. This standard is intended as a joint EIGA/CGA international harmonized standard for the use and application of all members of EIGA and CGA worldwide. The CGA edition is identical in technical content to the EIGA edition except for regional regulatory requirements (noted), and it has changes in formatting and spelling.

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Work Item 09-022  
HYCO Committee

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NOTE—No technical information has been changed from the 2005 edition. This reaffirmed edition may include minor editorial changes.

NOTE—Appendices C, G, H (Normative) are a requirement.

NOTE—Appendices A, B, D, E, F, I, J, and K (Informative) are for information only.

REAFFIRMED: 2013  
FIRST EDITION: 2005

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## 1 Introduction

This publication has been prepared by a group of specialists in pipeline systems representing major industrial gases producers in various countries of Europe and North America and is based on the technical information and experience currently available to the authors.

This publication has been prepared by member associations of the International Harmonization Council, IHC, under the lead of EIGA and is intended for the worldwide use and application by all members of the International Harmonization Council. The International Harmonization Council is composed of members from the Asia Industrial Gases Association (AIGA), Compressed Gas Association, (CGA), European Industrial Gases Association, (EIGA), and the Japanese Industrial and Medical Gases Association (JIMGA). Regional editions may use non SI units and refer to national, and or regional legislation.

It shall be recognized, however, that pipeline systems developed over 50 years in the various countries of Europe and North America have shown good and comparable safety records, although national practices show many differences in design and operations. Some national authorities have also introduced legislation that is mandatory for the operators in those countries.

Thus, the information contained in this document applies only to future installations and not to existing installations or those in the project phase as of the date of this publication. Furthermore, to the extent that they exist, federal, state, provincial/territorial, and local laws supersede the suggested practices listed in this publication. It should not be assumed that every local standard, test, safety procedure, or method is contained in these recommendations or that abnormal or unusual circumstances may not warrant additional requirements or procedures. CGA makes no representations or warranties on the information in or the completeness of this document and disclaim all warranties, express or implied including, but not limited to, the warranty of merchantability and the warranty of fitness for a particular use or purpose.

SI units and corresponding customary U.S. units in brackets are used in this document. Corresponding values can be approximate.

Those involved in the safe design, operation, and maintenance of gaseous transmission and distribution systems should be aware of various documents, guidance, publications, and standards prepared by various multinational organizations that can be pertinent to such systems. These are listed in Appendix K. In addition to these documents, there are a number of pertinent publications, technical papers, and bulletins that provide useful information on materials of construction, metallurgy, and environmental degradation mechanisms found also in Appendix K. While the cited references provide valuable background, it cannot be stated that these are all of the standards, documents, or technical papers published by international organizations that could be pertinent to the subject of this publication.

## 2 Scope and purpose

The scope of this document is for metallic transmission and distribution piping systems carrying pure hydrogen and hydrogen mixtures as shown in Figure 1 of Appendix A. It is limited to gaseous products with:

- a temperature range between  $-40\text{ }^{\circ}\text{C}$  and  $175\text{ }^{\circ}\text{C}$  ( $-40\text{ }^{\circ}\text{F}$  and  $347\text{ }^{\circ}\text{F}$ );
- total pressures from 1 MPa (150 psi) up to 21 MPa (3000 psi) or for stainless steels only partial hydrogen pressure higher than 0.2 MPa (29 psi); and
- concentration criteria defined in Appendix G.

Specific guidance is provided in Appendix I concerning ultra high purity (UHP) hydrogen.

This document does not apply to the following processes:

- cylinder filling plants;
- producing plants;
- compressor units;