CGA

Compressed Gas Association

The Standard For Safety Since 1913

CGA G-6.11—2016

CONCENTRATION OF IMPURITIES IN BULK CARBON DIOXIDE STORAGE TANKS AT CUSTOMER SITES

SECOND EDITION

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Work Item 12-048
Carbon Dioxide Committee

NOTE—Technical changes from the previous edition are underlined.

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1 Introduction

Multiple factors can lead to the concentration of impurities over time in product delivered within specification to bulk carbon dioxide installations at customer sites.

Unlike other industrial gases, carbon dioxide is a polar molecule with properties similar to water. Therefore, most impurities tend to be soluble in liquid carbon dioxide. For information on the physical and chemical properties, physiology, toxicity, special hazards, production, regulations, storage, handling, and applications of carbon dioxide, see CGA G-6, *Carbon Dioxide* [1].[1]

2 Scope

This publication provides best practices for preventing the introduction or concentration of impurities in bulk carbon dioxide installations. This publication defines these impurity categories and includes a troubleshooting table that assists in determining the source of the contaminant. It also addresses impurity issues commonly experienced at customer sites and includes a review of bulk installation equipment and best practices to prevent the introduction or buildup of these impurities.

This publication does not cover the product specifications or supply requirements. For information on carbon dioxide specifications and testing procedures, see G-6.2, *Commodity Specification for Carbon Dioxide* [2].

3 Definitions

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

3.1 Publication terminology

3.1.1 Shall
Indicates that the procedure is mandatory. It is used wherever the criterion for conformance to specific recommendations allows no deviation.

3.1.2 Should
Indicates that a procedure is recommended.

3.1.3 May
Indicates that the procedure is optional.

3.1.4 Will
Is used only to indicate the future, not a degree of requirement.

3.1.5 Can
Indicates a possibility or ability.

3.2 Technical definitions

3.2.1 Nonvolatile organic residue (NVOR)
Solvent-soluble impurities.

NOTE—NVORs are typically an oil or oil-like residue that can be found in vaporizers or process equipment that distills the carbon dioxide.

3.2.2 Nonvolatile residue (NVR)
Particulates (typically black), rust, debris, and other small solid objects.

NOTE—Examples of NVRs include trace amounts of dirt, rust, metal oxides, metal fines, filter media (carbon, alumina, etc.), oil, or grease.

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