CGA P-58—2013

SAFE PREPARATION OF COMPRESSED OXIDANT-FUEL GAS MIXTURES IN CYLINDERS

FIRST EDITION

CELEBRATING CGA Compressed Gas Association 100 YEARS

PREFACE

As a part of a program of harmonization of industry standards, the Compressed Gas Association (CGA), working collaboratively with the European Industrial Gases Association (EIGA), has produced a North American version of EIGA Doc 139/10, *Safe Preparation of compressed oxidant-fuel gas mixtures in cylinders.* The CGA edition, CGA P-58—2013, *Safe Preparation of Compressed Oxidant-Fuel Gas Mixtures in Cylinders* has the same technical content as the EIGA edition. However, there are editorial changes primarily in formatting and spelling and references to regional regulatory requirements.

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1 Introduction

Cylinders containing both oxidant and flammable components (oxidant-fuel gas mixtures) are widely used in industry, medical applications, and other fields. Typical applications include calibration of flammable gas detectors, emission monitoring equipment and refinery process analyzers.

Due to the inherent nature of the gases used to manufacture oxidant-fuel gas mixtures there is always the possibility of an explosive mixture being produced. To prevent the inadvertent production of explosive mixtures strict rules and procedures shall be followed during the formulation and manufacturing processes.

Historically the gases industry has experienced accidents and losses resulting from the manufacture and use of these gas mixtures resulting in explosions that have caused injuries and death. These incidents have been caused by mixtures being manufactured that have been within the explosion range.

Compressed oxidant-fuel gas mixtures can be manufactured safely provided the principles contained in this publication are followed.

2 Scope and purpose

2.1 Scope

This publication documents the minimum recommendations for the safe preparation of compressed oxidant-fuel gas mixtures in cylinders by static methods (addition of one component after another in cylinders). The publication specifically addresses:

- key principles for compressed oxidant-fuel gas mixture manufacture;
- manufacturing feasibility studies;
- gas mixing equipment, filling and analysis; and
- audit of oxidant-fuel gas mixture manufacturing procedures and operations.

This publication specifically describes the manufacture of compressed oxidant-fuel gas mixtures under the conditions of gas temperatures and pressures detailed within this publication. The manufacture of liquefied and liquid oxidant-fuel gas mixtures and the manufacture of compressed oxidant-fuel gas mixture by dynamic methods (filling into the cylinder by blending the components dynamically at calculated flow rates) are outside of the scope of this publication.

This publication shall be used in conjunction with the information and principles contained in CGA P-36, *The Safe Preparation of Gas Mixtures.*

2.2 Purpose

The purpose of the publication is to describe practices to be used for the safe preparation of compressed oxidant-fuel gas mixtures and to ensure that they are nonexplosive at the end of the manufacture.

- The safe formulation of compressed oxidant-fuel gas mixture by trained and competent personnel.
- Defined safety considerations which are applied and maintained during the manufacturing process.
- An overall quality system with formally approved documented procedures shall be used for manufacture and these procedures and practices shall be subject to the regular technical review and audit by technical experts independent of the routine production process.

3 Definitions

- Combustible gas/flammable gas/fuel: gas able to undergo exothermic reaction with an oxidant when ignited.