CGA P-8.4—2020

SAFE OPERATION OF REBOILERS/CONDENSERS IN AIR SEPARATION UNITS

FOURTH EDITION

CGA
Compressed Gas Association
The Standard For Safety Since 1913

PREFACE

As part of a program of harmonization of industry standards, the Compressed Gas Association (CGA) has issued CGA P-8.4, *Safe Operation of Reboilers/Condensers in Air Separation Units*, jointly produced by members of the International Harmonization Council and originally published by the European Industrial Gases Association (EIGA) as Doc 65, *Safe Operation of Reboilers/Condensers in Air Separation Units*.

This publication is intended as an international harmonized standard for the worldwide use and application of all members of the Asia Industrial Gases Association (AIGA), Compressed Gas Association (CGA), European Industrial Gases Association (EIGA), and Japan Industrial and Medical Gases Association (JIMGA). Each association's technical content is identical, except for regional regulatory requirements and minor changes in formatting and spelling.

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NOTE—Technical changes from the previous edition are underlined.

FOURTH EDITION: 2020
THIRD EDITION: 2013
SECOND EDITION: 2006
FIRST EDITION: 2000

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Appendices

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1 Introduction

Industrial cryogenic air separation technology used to produce oxygen, nitrogen, argon, and rare gases has an extremely good safety record. However, as with many present-day production processes, it has inherent potential hazards that shall be recognized and addressed by design and operating practice.

2 Scope and purpose

2.1 Scope

This publication addresses the operation of the reboilers of air separation plants. It contains a summary of current knowledge and industrial practices used in their safe application. It specifically applies to the main reboiler and oxygen product reboilers in which the oxygen concentration is greater than 75% in the liquid phase. Its guiding principles may be used for other reboilers within air separation plants, including auxiliary vaporizers, guard adsorber vaporizers, argon condensers, and the main reboilers in nitrogen generators.

Reboilers that are used in conjunction with krypton/xenon production are typically operated with higher hydrocarbon limits than typical air separation unit (ASU) reboilers. The allowable levels of hydrocarbons as well as additional safeguards for the bath-type reboilers used in these systems are listed in Appendix A.

2.2 Purpose

The purpose of this publication is to describe the design and operating practices that shall be followed in the reboiler sections of cryogenic air separation plants. In particular, the potential hazard introduced by hydrocarbons or other contaminants that could be present in the ambient atmosphere is addressed. It is thought that this has been the prime cause of the majority of reboiler incidents that have been reported.

This publication is based upon the experimental data, operating experience, and design practices of major producers and operators of air separation plants. It is recognized that legislation or regulation can impose more stringent requirements for plant design and operation.

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 Analytical plant derime
Derime during which some flow rates and concentration of trace components are measured, allowing the total accumulation of these components to be calculated.