

**CGA P-8.4–2013**

**SAFE OPERATION OF  
REBOILERS/CONDENSERS  
IN AIR SEPARATION UNITS**

**THIRD EDITION**



## PREFACE

Recognizing the need for a standard on reboilers/condensers in air separation units, the European Industrial Gases Association (EIGA), with the participation of the Compressed Gas Association (CGA), has produced CGA P-8.4—2013, *Safe Operation of Reboilers/Condensers in Air Separation Units*. 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.

Other than the removal of the working group members and their respective companies, this is an exact duplication of EIGA Doc 65, *Safe Operation of Reboilers/Condensers in Air Separation Units*.

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NOTE—Technical changes from the previous edition are underlined.

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<b>Contents</b>	<b>Page</b>
1 Introduction.....	1
2 Scope and purpose .....	1
2.1 Scope .....	1
2.2 Purpose .....	1
3 Definitions.....	1
4 Reboiler Incidents.....	3
4.1 Major explosions.....	3
4.2 Limited explosions.....	4
4.3 Internal leaks .....	4
5 Air contaminants.....	4
6 Design consideration .....	5
6.1 Plant surroundings .....	5
6.2 Design of pre-purifying systems .....	6
7 Operations .....	6
7.1 Importance of carbon dioxide removal .....	6
7.2 Proper reboiler operations .....	7
7.3 Control of contaminants.....	9
7.4 Contaminant analysis .....	11
7.5 Transient conditions .....	12
7.6 Deriming .....	14
7.7 Cleaning and maintenance.....	15
8 References .....	18
9 Additional References .....	18

## Appendix

Appendix A—Plugging, flammable and corrosive contaminants of air.....	19
Appendix B—Properties of air contaminants .....	20
Appendix C—Adsorption of air contaminants .....	21
Appendix D—Typical default air quality design basis (for adsorptive FEP system).....	22
Appendix E—Maximum contaminant levels in liquid oxygen thermosyphon reboiler operation at 1.2 bar, abs ..	23
Appendix F—Maximum contaminant levels in liquid oxygen downflow reboiler operation at 1.2 bar, abs .....	24
Appendix G—Representation of reboiler core submergence.....	25

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## 1 Introduction

This publication has been prepared by member associations of the International Harmonization Council, 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 Japan Industrial and Medical Gases Association (JIMGA). Regional editions may use non SI units and refer to national, and/or regional legislation.

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 above 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 feeding krypton/xenon columns and the krypton/xenon distillation system are excluded from the scope of this publication. These systems and their methods of dealing with hydrocarbon accumulation vary widely. Reboiler operation and safety for plants with these units should be discussed with the supplier on a plant-specific basis.

### 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 might be present in the ambient atmosphere is addressed. The thought is that this has been the prime cause of the majority of reported reboiler incidents.

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 Terminology

Shall is used only when procedure is mandatory. Used wherever criterion for conformance to specific recommendation allows no deviation. Shall can be used in text of voluntary compliance standards.

Should is used only when a procedure is recommended.

May and Need Not are used only when procedure is optional.

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

Can is used to indicate a possibility or ability.