CGA G-4.8—2020

SAFE USE OF ALUMINUM-STRUCTURED PACKING FOR OXYGEN DISTILLATION

FIFTH 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 published CGA G-4.8, *Safe Use of Aluminum-Structured Packing for Oxygen Distillation*, jointly produced by members of the International Harmonization Council.

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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Work Item 17-053
Atmospheric Gases and Equipment Committee

NOTE—Technical changes from the previous edition are underlined.

FIFTH EDITION: 2020
FOURTH EDITION: 2012
THIRD EDITION: 2005
SECOND EDITION: 2000

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1 Introduction

Many air separation plants use aluminum sieve trays in their distillation columns. Most plants built after 1990 have used structured packing in place of trays. The low pressure drop and good mass transfer effectiveness of packing make it attractive for some air separation applications, particularly for columns operating at near-atmospheric pressure.

2 Scope

This publication addresses the use of aluminum-structured packing in oxygen distillation. Other materials that can be used in this service such as brass, copper, or stainless steel are not addressed.

A summary of current knowledge and industrial practices used in the safe application of aluminum structured packing in columns for the distillation of oxygen is included.

This publication is not intended to be a mandatory standard. It is based upon the combined experimental work, operating experience, and design practices of major producers and operators of air separation plants.

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 Structured packing
Engineered structure consisting of numerous layers of thin, vertically oriented, corrugated metal sheets to facilitate intimate contact between liquid and vapor for mass transfer [1].[1]

3.2.2 Violent energy release (VER)
Experimental result in which the following indications were observed during the combustion of aluminum in oxygen: a loud noise, white light, and physical destruction or substantial deformation of the specimen and/or the test vessel.

4 Summary

Aluminum components have been used extensively in oxygen service since the late 1950s. This has included piping, heat exchangers, vaporizers, pressure vessels, distillation trays, and packing. Overall, the safety record of aluminum in oxygen service has been very good.

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