



COMPATIBILITY BETWEEN ALUMINIUM ALLOY CYLINDERS AND HALOGENATED GASES

Document 161/24

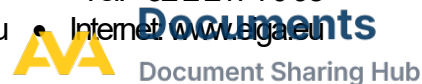
Revision of Doc 161/16

EUROPEAN INDUSTRIAL GASES ASSOCIATION AISBL

AVENUE DE L'ASTRONOMIE 30 • B – 1210 BRUSSELS

Tel: +32 2 217 70 98

E-mail: info@eiga.eu • Internet: www.eiga.eu





COMPATIBILITY BETWEEN ALUMINIUM ALLOY CYLINDERS AND HALOGENATED GASES

Prepared by WG-4 Specialty Gases

Disclaimer

All technical publications of EIGA or under EIGA's name, including Codes of practice, Safety procedures and any other technical information contained in such publications were obtained from sources believed to be reliable and are based on technical information and experience currently available from members of EIGA and others at the date of their issuance.

While EIGA recommends reference to or use of its publications by its members, such reference to or use of EIGA's publications by its members or third parties are purely voluntary and not binding.

Therefore, EIGA or its members make no guarantee of the results and assume no liability or responsibility in connection with the reference to or use of information or suggestions contained in EIGA's publications.

EIGA has no control whatsoever as regards, performance or non performance, misinterpretation, proper or improper use of any information or suggestions contained in EIGA's publications by any person or entity (including EIGA members) and EIGA expressly disclaims any liability in connection thereto.

EIGA's publications are subject to periodic review and users are cautioned to obtain the latest edition.

© EIGA grants permission to reproduce this publication provided the Association is acknowledged as the source

EUROPEAN INDUSTRIAL GASES ASSOCIATION AISBL
Avenue de l'Astronomie 30 B 1210 Brussels Tel: +32 2 217 70 98
E-mail: info@eiga.eu Internet: www.eiga.eu



Table of Contents

1	Introduction	1
2	Scope and purpose	1
2.1	Scope	1
2.2	Purpose	1
3	Definitions	1
3.1	Publications terminology	1
3.2	Technical definitions	2
4	Organization principles	2
5	Composition of different aluminium alloys and specification	2
6	Feasibility	3
7	Destructive or non-destructive testing	3
8	Guidelines to perform the tests	4
8.1	Current experience	4
8.2	Tests for new and higher concentration mixtures	4
9	Cylinder selection	5
10	Cylinder preparation	5
11	Mixtures components purity and compatibility	5
12	Cylinder preparation before filling	5
13	Instability of production mixture	5
14	Traceability	5
15	Control and reuse of returned cylinders	6
16	Residual mixture evacuation before the hydraulic retesting	6
17	Customer information to avoid contamination	6
18	Audit guideline	6
19	References	7
	Appendix A - Gases not compatible with aluminium according to ISO 11114-1 (Informative)*	8
	Table 1 - Gas compatibility with aluminium alloy cylinders	7

Amendments to 161/16

Title	Change title from "Gas compatibility with aluminium alloy cylinders" to "Compatibility between aluminium alloy cylinders and halogenated gases" to better reflect the content of the document.
3.2	Updating and addition of some definitions
8	Recommendations for tests for new and higher concentration mixtures have been completed.
9	Former section 9 Gas and concentration has been deleted as its content is the scope of the document
10	The description of the method to minimise cylinder moisture content has been removed as it is not specific to the scope of this document.
13	Changed the title of the section from "Results of the analysis" to "Instability of production mixture".
16	First paragraph has been rewritten for better clarity.

NOTE Technical changes from the previous edition are underlined

1 Introduction

Information on gas material compatibility is given in ISO 11114-1 *Transportable gas cylinders - Compatibility of cylinder and valve materials with gas contents - Part 1: Metallic materials* [1]¹.

ISO 11114-1 covers the compatibility between pure gases and some common metals and gives some guidance for the compatibility of mixtures with these metals. For mixtures containing halogenated components, the standard gives an overall limit of 0.1% (mol/mol) to be compatible with aluminium alloys. The current experience from the special gases industry is that the limit of 0.1% (mol/mol) may be exceeded provided that the dryness of the gas and of the cylinder is strictly controlled.

2 Scope and purpose

2.1 Scope

This publication details the criteria necessary to establish the compatibility between aluminium alloy cylinders and gas mixtures exceeding the overall limit of 0.1% (mol/mol) reactive halogenated components. The scope of the publication includes fully vaporised liquid components present in gaseous mixtures but excludes liquid mixtures.

The publication does not cover issues relating to the compatibility of valves, valve seat materials or cylinder materials other than aluminium alloy.

2.2 Purpose

The purpose of the publication is to establish rules and criteria to ensure the safe production and use of gas mixtures containing reactive halogenated components that are listed in ISO 11114-1 as incompatible with aluminium cylinders. [1]

3 Definitions

3.1 Publications 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.

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