



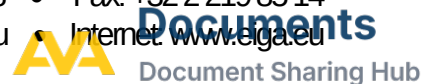
ACETYLENE INSTALLATIONS AT CUSTOMER PREMISES

Doc 212/18

EUROPEAN INDUSTRIAL GASES ASSOCIATION AISBL



AVENUE DES ARTS 3-5 • B – 1210 BRUSSELS
Tel: +32 2 217 70 98 • Fax: +32 2 219 85 14
E-mail: info@eiga.eu • Internet: www.eiga.eu





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Prepared by WG-12 Acetylene

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Avenue des Arts 3-5 B 1210 Brussels Tel +32 2 217 70 98 Fax +32 2 219 85 14
E-mail: info@eiga.eu Internet: www.eiga.eu



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1 Introduction

Acetylene is a substance with unique properties; it is extremely flammable and can decompose explosively.

These unique properties shall be taken into account when designing and operating an acetylene installation.

This publication has been prepared by the European Industrial Gases Association (EIGA) to provide guidance for the design and the safe operations of acetylene customers' installations.

Acknowledgement is given to the British Compressed Gases Association for using information from their publications BCGA Code of Practice 5 *The design and construction of manifolds using acetylene gas from 1.5 to 25 bar* and BCGA Code of Practice 6 *The safe distribution of acetylene in the pressure range 0 – 1.5 bar* [1,2]¹.

2 Scope and purpose

2.1 Scope

This publication details the best available current practices for the design of acetylene fixed and mobile supply systems, which generally include:

- high pressure manifold;
- low pressure distribution system; and
- point of use.

The publication also includes recommendations for the maintenance and operations of the equipment that are part of these installations.

The publication does not apply to acetylene plants and it is not intended to replace manufacturers and company instructions, but should be used in conjunction with such instructions.

Installations that use trailers or bundles of cylinders as the acetylene source and then compress this into cylinders are excluded from this publication.

2.2 Purpose

To give recommendations for the safe operation of acetylene supply systems on customers' premises.

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

Indicate that the procedure is optional.

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

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 Acetylene cylinder bundle**

Transportable unit consisting of two cylinders up to usually not more than 16 cylinders permanently manifolded together and contained within a rigid frame equipped with all necessary equipment for filling and use.

3.2.2 Acetylene system

Any equipment instrument, device from the cylinder valve or bundle outlet connection to the use point.

3.2.3 Automatic quick acting shutoff device

Self-acting device which closes quickly, for example when triggered by acetylene decomposition.

3.2.4 Deflagration

Explosion propagating at subsonic velocity.

3.2.5 Detonation

Explosion propagating at supersonic velocity.

3.2.6 Distributed system

Acetylene system with fixed or permanent piping.

3.2.7 Explosion

Abrupt oxidation or decomposition reaction producing an increase in temperature, pressure, or in both simultaneously.

3.2.8 Flame arrestor

Device that quenches a flame front.

3.2.9 Flashback arrestor

Device that stops a flame front and the flow of gas. This device can be activated either by a pressure shock wave or by a temperature sensing device.

This is also known as decomposition blocker, see EN ISO 14114 *Gas welding equipment -- Acetylene manifold systems for welding, cutting and allied processes -- General requirements* [3].

3.2.10 Localized system

Acetylene system without fixed or permanent piping, normally being just a flexible hose, for example a torch.

3.2.11 Manifold system

System of two or more cylinders connected on the high-pressure side for collective withdrawal.

3.2.12 Pressure range:

Acetylene systems in customer installations are divided into one of the following pressure ranges:

- Low pressure: Pressure not exceeding 1.5 bar (0.15 MPa)
- *High Pressure*: Pressure greater than 1.5 bar (0.15 MPa) but not exceeding 25 bar (2.5 MPa)

This publication uses bar as the unit of pressure, and if not stated otherwise, the pressure is stated as bar gauge.

3.2.13 Working range

Refer to EIGA Doc 123, *Code of Practice – Acetylene* [4].

4 Design of acetylene installations

4.1 Materials

All materials used shall be resistant to the action of the acetylene, its impurities and other substances, for example, acetone or dimethylformamide (DMF) carried over during use of acetylene, under the operating conditions. Where relevant, atmospheric corrosion shall be taken into account.

Equipment, including pipework, valves and fittings, shall withstand not only the stresses at maximum operating pressure but also the thermal and mechanical stresses resulting from acetylene explosion or decomposition.

4.1.1 Recommended materials

Seamless carbon steel or stainless steel is the recommended material for acetylene pipework.

For valves and fittings other materials such as brass are acceptable, based on Table 1.

For welded pipework, the materials chosen shall have suitable characteristics and the strength of the weld shall be not less than that of the material to be welded.

In some countries, regulatory requirements specify the welded materials to be certified.

4.1.2 Materials not allowed

Certain metals, such as copper, silver and mercury, can form very sensitive compounds with acetylene, which can easily explode. Other metals, such as aluminium, magnesium or zinc can suffer severe corrosion under the influence of the impurities that occur in acetylene.