



ENVIRONMENTAL IMPACTS OF ACETYLENE PLANTS

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Prepared by WG-5 Environment

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Amendments to 109/14

Section	Change
	Editorial to align style with EIGA Style Manual
	Update to current legislation
4.4.1	Added note on open generators
4.6	Removed chromic acid

NOTE Technical changes from the previous edition are underlined

1 Introduction

This publication details the environmental impacts of the management of acetylene plants and gives guidelines on how to reduce those impacts.

2 Scope and purpose

2.1 Scope

The publication concentrates on the environmental impacts of acetylene plants. This publication does not give specific advice on health and safety issues. On these issues, the relevant EIGA publications and / or national legislation should be consulted for advice and they shall be taken into account before undertaking any activity.

2.2 Purpose

This publication is intended to serve as a guide for acetylene plant operations to assist in putting in place a formal environmental management system that can be certified by an accredited third-party verifier. It aims to provide a guide for operations managers to identify and reduce the environmental impacts of these operations. It also provides the basis for establishing the Best Available Techniques for the purposes of the Industrial Emissions Directive (IED) 2010/75/EU on industrial emissions (integrated pollution prevention and control) [1]. ¹ This covers acetylene production in Annex I Section 4.1a, Production of organic chemicals, simple hydrocarbons and in the Common Waste Gas Treatment in the Chemical Sector (WGC).

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.

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

3.2 Technical definitions

3.2.1 Environmental aspect

Elements of an organisation's activities, products or services that can interact with the environment. For example, use of energy or transportation of products.

3.2.2 Environmental impact

Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's environmental aspects as per ISO 14001 *Environmental Management Systems – Guidance with Requirements for Use* [2]. For example, the contamination of water with hazardous substances, or the reduction of air emissions.

4 Acetylene plants environmental impacts

4.1 General environmental aspects and impacts and links to other EIGA documents

This publication covers the environmental impact of acetylene plants which are summarised in Appendix 2.

There are several linked EIGA publications that provide more details on general environmental issues, legislation for the gas industry and operational good environmental practices. A list of these linked publications and their links to ISO 14001 is provided in Appendix 1 [2]. Appendix 1 also shows which of these documents are relevant to acetylene plant operations.

4.2 Introduction

The basic philosophy is the minimisation of wastes, emissions and nuisances of any kind and their safe and clean disposal. By considering the potential wastes which a new process could generate when engineering a plant, future problems can be avoided. This analysis is a crucial element of environmental impact assessment and is strongly recommended before any decision on industrial plant investment.

Wastes should not be mixed but should be collected separately to aid further recycling, reuse or recovery.

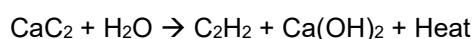
Safety data sheets for all chemical substances shall be held on site and used to determine the best way to handle the chemical substances.

Acetylene is produced by two different methods:

- reaction of calcium carbide with water in special generators, and
- as a gaseous by-product from cracking crude oils.

The main method of production for the gas industry is by the first method. This is due to the lack of availability of the by-product material where the acetylene is required and the economics of production. The second method is generally used for production of acetylene as a chemical intermediate.

Consequently, this publication describes only the first process mentioned, i.e. the exothermic reaction between calcium carbide and water:



Hydrated lime, Ca(OH)_2 , is also produced as a by-product. After separating from the carbide lime, excess water can be reused in the process and the lime can be recovered for use in various industrial or agricultural activities in accordance with applicable local legislation.