



BEST AVAILABLE TECHNIQUES FOR ACETYLENE PRODUCTION

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Prepared by WG-5 Environment

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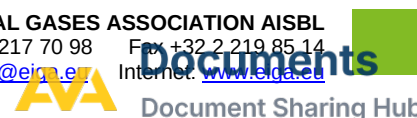
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Table of Contents

1. Introduction	1
2. Scope and purpose	1
3. Terminology and definitions	1
3.1 Publications terminology	1
3.2 Technical definitions	2
4. Acetylene production	2
4.1 Acetylene history and uses	2
4.2 Acetylene production process	2
4.3 Acetylene process	3
5. Existing Best Available Techniques (BAT)	3
5.1 Acetylene process – Generator	3
5.2 Lime	4
5.3 Generator water – Water reuse	4
5.4 Cooling water	5
5.5 Purification	5
5.6 Optimising cylinder filling	5
6. Additional BATs to address emissions to air	6
6.1 Sources of emission	6
6.2 Acetylene emissions – air	7
6.3 Process emissions	7
6.4 Compression	8
6.5 Calcium carbide dust	8
6.6 Cylinder filling	8
7. Noise abatement technology	8
8. Energy efficiency	9
9. Emissions to water	9
9.1 Solvents	9
9.2 Lime	9
9.3 Ethanol / glycol	9
9.4 Storage tanks	9
10. Other waste aspects	10
10.1 Calcium carbide residuals / waste	10
10.2 Calcium carbide drums	10
10.3 Generator cleaning residuals waste	11
10.4 Sulphuric acid	11
10.5 Sodium hydroxide (NaOH) and sodium carbonate (Na ₂ CO ₃)	11
10.6 Purifier materials	11
10.7 Silica gel / alumina gel	11
10.8 Calcium chloride	11
10.9 Packing materials	12
10.10 Cylinder maintenance	12
11. Environmental management systems	12
11.1 Description	12
11.2 Achieved environmental benefits	13
11.3 Emergency plan	13
12. Training documents	13

13. References 14

1. Introduction

This EIGA publication provides guidance to EIGA members specifically to site managers, technical managers, and company environmental specialists on some best available techniques for acetylene production by wet hydrolysis, which is the principal method used to produce acetylene for distribution in cylinders and packs for welding and other applications. It represents the EIGA contribution to the EU Best Available Technique Reference Document (BREF) [1] being organised by the European IPPC Bureau. Local legislation shall also be applied.¹

2. Scope and purpose

This publication provides guidance on compliance with the Industrial Emissions Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control) [2]. This covers acetylene production in Annex I Section 4.1a Production of organic chemicals, simple hydrocarbons and associated BREFs.

The main objectives are to:

- propose techniques deemed as best and available for acetylene production in the industrial gases industry;
- gather data to support conclusions on Best Available Techniques;
- encourage consistency with associated BREFs about acetylene production; and
- contribute to any aspects of the European IPPC Bureau's reference document on large volume organic chemical production.

3. Terminology and 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.

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 Best Available Technique (BAT)

The most effective and advanced stage in the development of activities and their methods of operation which indicates the practical suitability of particular techniques for providing the basis for emission limit values and other permit conditions designed to prevent and, where that is not practicable, to reduce emissions and the impact on the environment as a whole.

(a) 'Techniques' includes both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned.

(b) 'Available techniques' means those developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the costs and advantages, whether or not the techniques are used or produced inside the Member State in question, as long as they are reasonably accessible to the operator.

(c) 'Best' means most effective in achieving a high general level of protection of the environment as a whole.

3.2.2 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.

4. Acetylene production

4.1 Acetylene history and uses

Acetylene and products made by use of acetylene are broadly present in our daily life. In the past it was mainly used for lighting purposes (for example city illumination, vehicle illumination, lighthouses, lighting for mining companies), for anaesthetic treatment in hospitals and for cutting / welding of steel. Today acetylene is a base chemical for a wide range of different products such as coffee capsules, sport shoes and hair spray. Due to its unique properties it is still used for cutting / welding processes, or for pre-heating of metallic components before subsequent treatment. Further applications have been developed over the years, and therefore acetylene is used for premium products for example in the rubber industry as well as in the glass industry.

4.2 Acetylene production process

Acetylene is produced by two different methods:

- reaction of calcium carbide with water in special generators (wet hydrolysis); or
- as a gaseous by-product from cracking crude oils.

The generation of acetylene for compression into dissolved acetylene cylinders is normally carried out in "wet" generators in which carbide is added to an excess of water. The second method is generally used for production of acetylene as a chemical intermediate.

This publication seeks to focus solely on the reaction of calcium carbide with water in special generators. Specifically, it discusses its relative environmental impacts and advantages as a process choice and then describes some of the best available techniques (BAT) that may be used to improve its environmental performance.