



ENVIRONMENTAL IMPACTS OF TRANSPORTATION OF GASES

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Prepared by WG-5 Environment

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Amendments to 113/11

Section	Change
All	Editorial to align style with IHC associations
4.2	Listing of main environmental impacts from transportation added
4.4	Section on electric vehicles added

Note: Technical changes from the previous edition are underlined

1 Introduction

This publication details the environmental impacts of the transportation of gases and gives guidelines on how to reduce the impacts.

2 Scope and purpose

2.1 Scope

This publication concentrates on the environmental impacts of the main distribution method for gases – road transportation. This publication does not give specific advice on health and safety issues, which shall be taken into account before undertaking any activity. On these issues the relevant EIGA publications, and / or national legislation should be consulted for advice.

2.2 Purpose

This publication is intended to serve as a guide for Industrial and Medical Gases transportation operations to assist in putting in place a formal environmental management system that can be certified by an accredited 3rd party verifier. It also aims to provide a guide for operating managers for identifying and reducing the environmental impacts of these operations.

3 Definitions

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 and need not

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.

3.2 Technical definitions

3.2.1 Environmental aspect

These are 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. (Source: ISO 14001 *Environmental management systems* --

Requirements with guidance for use [1]¹). For example, the contamination of water with hazardous substances or the reduction of air emissions.

4 Transportation of gases

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

This document covers the environmental impacts of product transportation 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 good environmental operational practices e.g. EIGA Doc. 88 *Good Environmental Management Practices for the Industrial Gas Industry* [2] (GEMPs). A list of these linked documents and their links to the ISO 14001 environmental management systems standard is provided in Appendix 1. Appendix 1 also shows which of these documents are relevant to transportation operations.

4.2 Background

The transportation of gases from the gas industry's production and filling sites to cylinder distribution centres, external depots and customers is usually considered to be one of the major environmental impacts of the gas industry.

Typically, to produce one cubic metre of nitrogen or oxygen in a cryogenic air separation unit requires approx. 1 kWh/m³ while in a non-cryogenic on-site unit it requires approx. 0.5 kWh/m³. The same gas delivered in a 50 litre cylinder requires approx. 2.5 kWh/m³ of gas including production, filling and transportation, which indicates that the transportation of gas cylinders uses more energy than the actual production.

This publication includes all the transportation activities carried out for industrial and medical gases including bulk vehicles, cylinder trucks and vans for local distribution of gases or for customer engineering.

Main environmental impacts from transportation are:

- Resource use
 - o Large amounts of oil-based resources used for transport
 - o Extraction of infrastructure construction materials
- Climate change
 - o Emissions of carbon dioxide and other global warming gases
- Air pollution
 - o Local emissions of carbon monoxide, PM, lead, VOCs, hydrocarbons and NOx
- Waste
 - o Vehicles, fluids, tyres
- Noise and related vibration
 - o Quality of life for those living nearby roads, airports, stations, ports
- Land impacts
 - o Land used for infrastructure
 - o Habitat fragmentation
- Water impacts
 - o Pollution from spillage
 - o Pollution from runoff

4.2.1 Methods of transportation

Industrial and medical gases are generally produced as close as technically and economically possible to the customer. This helps to minimize the impacts of transportation. Gas (in liquid or gaseous form) can be transported by pipeline, road, rail or sea. Pipeline transportation from on or off-site gas generators avoid many of the environmental impacts, though the pipeline occupies land resources and

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