MEDICAL GASES

GUIDELINES FOR CLEANING EXTERNALLY CONTAMINATED MEDICAL GAS CONTAINERS

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GUIDELINES FOR CLEANING EXTERNALLY CONTAMINATED MEDICAL GAS CONTAINERS

As part of a programme of harmonisation of industry standards, the European Industrial Gases Association (EIGA) has published EIGA Doc 222, *Guidelines for Cleaning Externally Contaminated Medical Gas Containers*. This publication was jointly produced by members of the International Harmonisation Council.

This publication is intended as an international harmonised publication for the worldwide use and application by all members of the International Harmonisation Council whose members include the Asia Industrial Gases Association (AIGA), Compressed Gas Association (CGA), European Industrial Gases Association (EIGA), and Japan Industrial and Medical Gases Association (JIMGA). Regional editions have the same technical content as the EIGA edition, however, there are editorial changes primarily in formatting, units used and spelling. Regional regulatory requirements are those that apply to Europe.

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1 Introduction

Medical gas containers can become externally contaminated due to their use in healthcare facilities and homecare settings. They can also become contaminated as a result of natural disasters such as floods, hurricanes, fires, or earthquakes.

It is important that these containers are cleaned in a manner that removes the contaminants, does not cause damage to the container and its accessories, and does not lead to a hazardous situation during the use of the container's contents.

2 Scope and purpose

2.1 Scope

This publication addresses the handling and external condition of medical gas containers and the removal of contaminants from these containers.

The internal condition or product quality of the container is not addressed in this publication.

2.2 Purpose

The purpose of this publication is to ensure that external contamination is removed from medical gas containers so that the process does not damage the container or its accessories and protects personnel handling medical gas containers.

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.

3.2 Technical definitions

3.2.1 Cleaning

Removal of contaminants to the extent necessary for further processing or for intended use.

3.2.2 Disinfection

Process to destroy viable microorganisms.

3.2.3 External contaminant

Foreign matter not intentionally added that is capable of producing an adverse effect on the medical gas container or human health.

NOTE Examples of foreign matter include lubricants, body fluids, and other chemical, physical, and biological contaminants.

3.2.4 Healthcare facility

Hospital, clinic, or similar facility that provides patients with their healthcare needs.

NOTE—Healthcare facility can include emergency services such as ambulance companies.

3.2.5 Medical gas container

Gas cylinder, bundle of cylinders, or a cryogenic container including their accessories.

4 Principles for safe handling of externally contaminated medical gas containers

4.1 General

Medical gas containers that could have external contaminants are likely to be first handled at the customer premises. As this is the first point of contact, gas suppliers shall have a procedure in place for the handling of externally contaminated medical gas containers. This procedure shall address the requirements for personal protective equipment (PPE) and other regulatory requirements. See EIGA Doc 136, *Selection of Personal Protective Equipment*, for information on PPE requirements [1][1].

Personnel involved in handling medical gas containers shall be trained in this procedure, see Section 6.

Medical gas containers that are externally contaminated shall be quarantined until cleaned.

4.2 Customer guidance

The gas supplier shall advise their customers that:

- They have a duty to return medical gas containers that are free from contamination to the gas supplier; and
- When contamination by infectious pathogens is suspected, they shall take measures to reduce the risks to themselves and to gas supplier employees.

The customer shall review the guidelines provided by the gas supplier for cleaning medical gas containers. If additional information is needed, the customer shall contact the gas supplier.

5 Recommended cleaning and disinfection methods

5.1 General

The cleaning and disinfection procedure should be performed at sites in designated areas with appropriate equipment and facilities and using a safe and efficient waste disposal system in accordance with local regulations.

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

Cleaning normally is accomplished manually or mechanically using potable water with detergents or enzymatic products. Thorough cleaning is essential before disinfection because inorganic and organic materials that remain on the surface of the container interfere with the effectiveness of this process.

The cleaning method shall not have a detrimental effect on the medical gas container, valve, and other accessories such as regulators and flowmeters. Cleaning materials shall be approved by the gas supplier prior to use.

When cleaning untreated metallic parts of a medical gas container, avoid using cleaning agents that contain ammonia, amine-based compounds, or chlorine-based compounds (such as bleach) as they can cause corrosion of steel or aluminium-alloy components or stress corrosion cracking (SCC) of brass including copper-alloy components.

For additional information regarding the effects of ammonia and SCC, see EIGA Doc 78, *Leak Detection Fluids Cylinder Packages* [2].

When cleaning is performed at locations other than the gas supplier, labels on the medical gas container shall not be damaged or removed during the cleaning process.

The healthcare facility should contact the gas supplier if there is any doubt concerning the method to be used to clean the container. They should report whether they have cleaned the medical gas container so that the gas supplier can verify the removal of any external contamination prior to refilling.

If the container has been contaminated or is suspected to have been contaminated, the following options are available to the healthcare facility:

- clean it prior to returning to the gas supplier, see 5.2 and 5.3; or
- if cleaning at the healthcare facility is not possible, at a minimum, contaminated medical gas containers should be identified and segregated, for example, by covering with a plastic bag that is labelled with the nature of the hazard and noting that it requires cleaning.

In the second case, the healthcare facility shall contact the gas supplier for further guidance.

5.2 Initial cleaning

For the initial cleaning, the preferred method is to use potable hot water not exceeding 50 °C (122 °F) to first remove foreign matter. Valve outlets and inlets shall be closed and covered to prevent ingress of water. The valves shall be protected unless they are externally contaminated.

The medical gas container shall not be immersed in water.

5.3 Disinfection

Factors that affect the efficacy of disinfection include:

- prior cleaning of the medical gas container;
- type and level of microbial contamination;
- concentration of and exposure time to the disinfection agent;
- physical nature of the object (for example, crevices); and
- temperature and pH of the disinfection process.

After the contamination has been removed, the medical gas container shall be disinfected by using, for example, isopropyl alcohol (IPA) or equivalent disinfectant wipes. Disinfection agents shall be approved by the gas supplier and used in accordance with the manufacturer’s recommendations.

The application of alcohol-based disinfectants shall be limited to prevent excessive amounts on the valve and/or cylinder that could cause a potential fire risk.

Ensure that all residual disinfection agents are removed from the medical gas container.

6 Procedures and training

Healthcare facility, gas supplier, and third-party personnel who handle medical gas containers shall receive training and instructions on how to handle contaminated medical gas containers. This shall include using the appropriate PPE, possibly covering the container with a plastic bag, and adding a warning label. Whenever handling contaminated medical gas containers, personnel shall dispose of gloves, contaminated clothing, and any other contaminated materials as hazardous waste in accordance with local regulations. Personnel shall wash their hands after handling contaminated medical gas containers.

Operational management shall define specific written instructions for their personnel.

7 References

Unless otherwise specified, the latest edition shall apply.

[1] EIGA Doc 136, *Selection of Personal Protective Equipment*, European Industrial Gases Association. www.eiga.eu

NOTE—This publication is part of an international programme for industry standards. The technical content of each regional document is identical, except for regional regulatory requirements. See the referenced document preface for a list of harmonised regional references.

[2] EIGA Doc 78, *Leak Detection Fluids Cylinder Packages*, European Industrial Gases Association. www.eiga.eu

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