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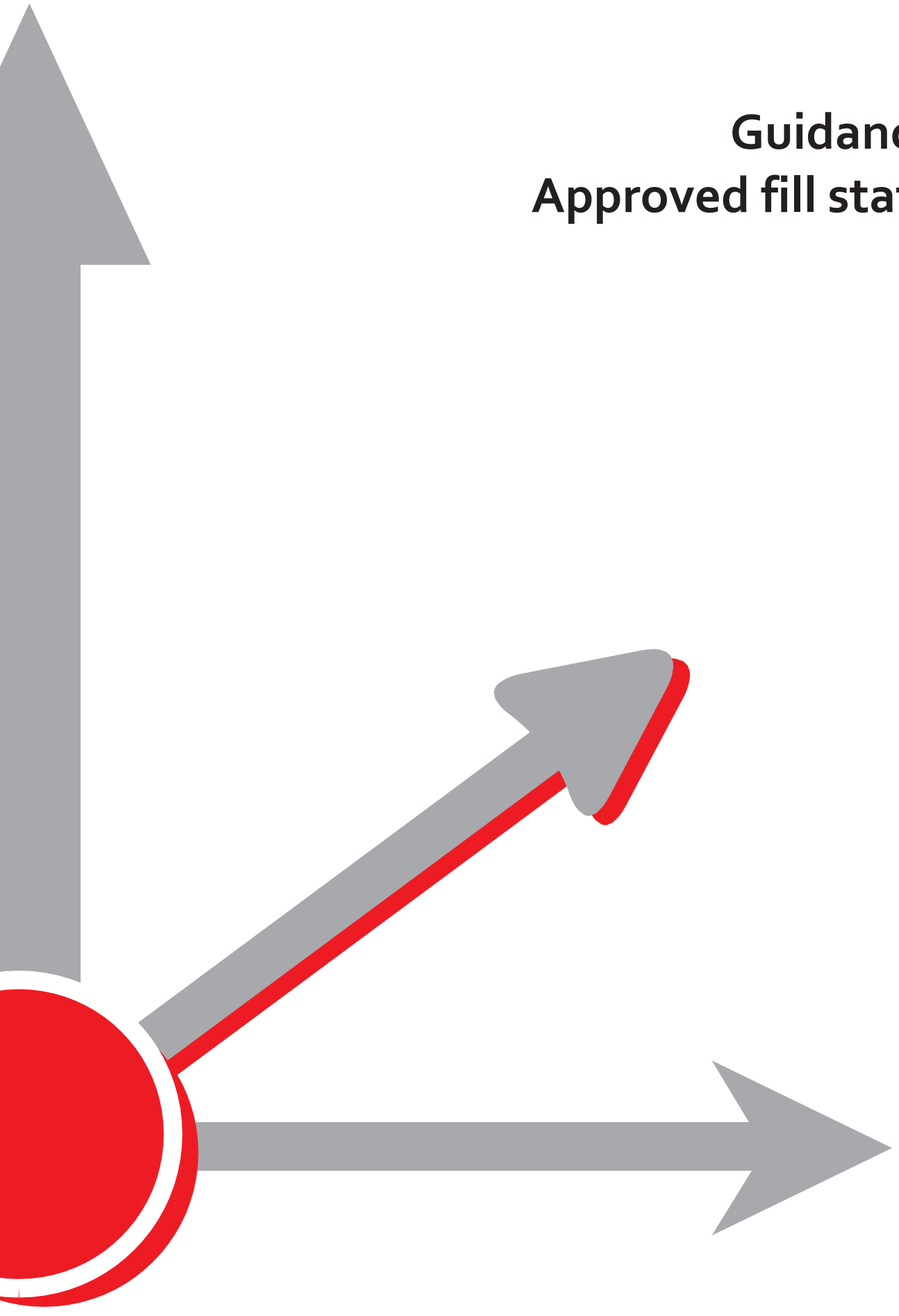
Guidance on Approved fill stations



Revision table

Date	Rev #	Paragraph / Page	Change
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FOREWORD

This Guidance Note is intended as a general guidance and is not a substitute for detailed advice in specific circumstances. Although great care has been taken in the compilation and preparation of this publication to ensure accuracy, Euralarm cannot in any circumstances accept responsibility for errors, omissions or advice given or for any losses arising from reliance upon information contained in this publication.

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Note: The English version of this document is the approved Euralarm reference document.

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Table of contents

1. SCOPE

Clean agent systems work with gases leaving no residue and acting against fires in the early stages of development.

Filling of containers, whether as an initial fill function or as result of a container discharging and needing to be refilled, is a vital part of the quality controls in place to ensure that systems work as intended. In order to maintain the functionality of the clean agent system as new, correct refilling is an important activity. For retesting of containers prior to refill refer to the Euralarm Guidance on the Periodic Testing of Transportable Gas Containers used in Fire Extinguishing Systems.

This guideline will outline the main important subjects detailing how to ensure filling stations can perform as expected by the end user.

> **NOTE:** The word 'container' is used extensively in the fire protection standards such as EN 15004, whereas the word 'cylinder' is often used in other European Standards. This guidance document uses 'container' throughout, but Euralarm recognizes that 'cylinder' is also commonly used in the industry. They should be interpreted as meaning the same.

2. TYPE OF FILL STATION OPERATIVES

OEM – Original Equipment Manufacturer: The manufacturer of the gaseous fire protection equipment who takes the responsibility of carrying out the first fill according to written procedures, in line with their third party approvals and limitations.

Recognized fill station: Entity that has a contract or agreement with the OEM to first fill or refill containers of the OEM, ensuring access to manuals and all relevant spare parts. They would be able to do the assembly of first fill of containers or the refill of discharged containers. Additionally they may hold third party approvals. Periodic testing of containers may be done with either, an external company, or in house in line with National and/or European requirements.

Industrial gases fill station: Entity not recognized by the OEM, but may have the capability to fill Inert-Gases, such as Argon, Nitrogen, CO_2 and Halocarbons. Additionally they may hold third party approvals and have access to manuals and spare parts for container valves. Periodic testing of containers may be done with either, an external company, or in house in line with National and/or European requirements.

Definitions

- First fill: Filling of a newly assembled container initially filled with the extinguishing agent and as applicable the super-pressurizing agent. Applicable labelling will be completed and attached, including those needed for transportation purposes.
- Refill: Filling of a container assembly that has previously been supplied and first filled at another location. Applicable labelling will be completed and attached, including those needed for transportation purposes. The refilling company should be identified with labelling or other markings.
- Periodic testing/recertification: A container that has become due for periodic testing/inspection, due to its age or condition.
- Service exchange containers: Containers that have already been refurbished, to be used as replacements for empty containers or those that need to be retested, often to avoid downtime.

3. REFILL OF SYSTEMS, WHO IS CAPABLE TO CARRY OUT THIS WORK

Any fill station recognized by the OEM, with audits carried out by the OEM or qualified third parties.

The recognized fill stations will carry out filling according to the manufacturers requirements and be able to provide fill reports and keep detailed records of the work carried out for a period of 20 years. The recognized fill station will carry the correct spare parts in sufficient quantities and will handle the container assemblies in strict accordance with the OEM instructions.

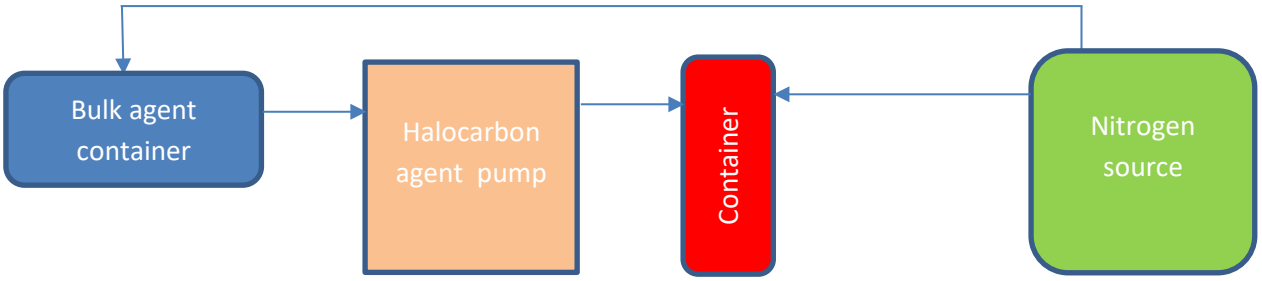
It is expected that the recognized fill station, will be able to provide corrective maintenance on the container assemblies, have access to the halocarbon agents* and carry out filling operations in a closed circuit.

Records should be kept to confirm the purity of the inert gases and certificates of conformity for the halocarbon agents and retain certificates of analysis for the agent.

Mixing of the same halogenated agents from different manufacturers is not recommended, as different manufacturing processes could lead to variations in the specification of the agent produced, resulting in an agent with a blended specification, being used. To ensure quality and traceability, records identifying the agent used are to be maintained.

* Those fill stations handling HFC agents, will be required to comply with the current version of the European/GB F-Gas regulations.

Example of closed cycle filling for halocarbon agents



More detailed information about closed cycle filing is to be obtained from the OEM.

Evidence shall be available to confirm the purity of the agents in accordance with the specifications in the relevant parts of EN 15004, ISO 14520 and ISO 6183.

4. EVIDENCE OF TRAINING BY A QUALIFIED THIRD PARTY OR OEM

The fill station should be able to demonstrate they have been successfully audited at least annually by the OEM or by a qualified third party, who will carry out periodic audits of both the process and record keeping. In case of any deviation during third party audits, the OEM will be notified immediately and record these deviations and the fill station shall ensure all non-compliances are closed out in a timely manner.

The fill station should be aware of and have knowledge of valve standards ISO 17871, ISO 22434, agent purity requirements in EN 15004 / ISO 14520, ISO 6183 and labelling according to ISO 7225.

5. CHECKING OF CONTAINERS BEFORE REFILL

Before any refill is conducted the recognized refill company has the obligation to check the condition of the container assembly. In case of deep corrosion of the container, they can either refuse the refill or request a retest of the container, according to EN ISO 10460 for welded containers or EN ISO 18119 for seamless containers. In case of marks on the paint or coating, the recognized refill company is permitted, according to the manufacturer specification, to repair them to avoid future corrosion.

Container must be purged with nitrogen or brought to a vacuum, to ensure the remaining humidity is below the agent manufacturers recommendation. The remaining humidity shall be noted in the fill report. In case of container valve assemblies using self-closing valves, having residual pressure and intact tamper proof seal, purging is not mandatory.

In all cases the refill station should follow the OEM requirements for refilling and ensure they have followed the steps outlined in the latest instructions of the OEM.

6. PROCESS DOCUMENTATION

For each first fill or refill, every container should have a certificate or appropriate records with the following details recorded.

This list shall include:

- System type.
- Container size (litres).
- Container serial number.
- Valve batch/serial number.
- Container approval.
- Empty weight (tare w/o protection cap).
- Agent with batch number (not applicable for Inert Gases & CO_2).
- Working pressure of the container.
- Humidity after purging (see chapter 5).
- Agent quantity filled.
- Filled weight of container.
- Nitrogen weight (halocarbon agents only).
- Labels applied.
- Date of filling.
- Leak check done, according to OEM procedures.
- Label of the company doing refills (where applicable).

7. PERSONAL SAFETY

Filling companies have to comply with local requirements for handling of pressurized containers. This includes as a minimum:

- Safe container handling, packaging, transportation.
- Personnel safety equipment.
- Use of any special tools.
- Refill process available.

8. IMPORTANT ADDITIONAL STEPS FOR CORRECT FILLING PROCESS

In case of hydrostatic testing that has been carried out, the containers shall be thoroughly dried prior to refilling. Failure to ensure that containers are thoroughly dried can result in stress corrosion cracking and possible agent contamination. A moisture content of maximum 12 PPM, and/ or a dew-point 20°C under the container temperature marking (whatever is driest) will render moisture related corrosion impossible. The moisture content identified within the relevant part of EN 15004, ISO 14520, ISO 6183 may under no circumstances be exceeded.

For further information on periodic testing refer to the latest Euralarm Guidance Note on "Periodic Testing for Transportable Gas Containers used in Fire Extinguishing Systems".

The gas filling process must be controlled to ensure the dryness of the gas and where applicable such as in the case of inert gas mixtures certified by gas chromatography analysis after filling to confirm the correct gas composition.

For halocarbons agent a closed circuit for the filling process is necessary, to ensure no unwanted moisture will enter the container and long-term corrosion effects excluded. Closed circuits ensure that the agents will not be exposed to the atmosphere at any stage of the refill process. Where a fill station is used to fill/refill more than one halocarbon type, mixing of different halogenated agents shall be avoided by flushing the agent lines with nitrogen before filling.

Different valve types are used for clean agent systems:

a) Valves which stay open after release.
b) Valves which closes at residual pressure of about 1 bar.

In case of a) the container must be purged with nitrogen to ensure the residual humidity is below the manufacturer requirement. Valve threads and syphon tube need to be checked before reassembly. For further information on valve threads refer to the latest Euralarm Guidance Note on "Periodic Testing for Transportable Gas Containers used in Fire Extinguishing Systems".

For valves according type b) refer to chapter 5, and latest Euralarm Guidance Note on the "Periodic Testing of Transportable Gas Containers used in Fire Extinguishing Systems".

9. EQUIPMENT REQUIRED

- Bulk container for halocarbon agents and inert gases.
- Connecting hoses.
- Pump/Compressor for the gas.
- Humidity detectors/measuring devices.
- Leak sensor.
- Shaker or agitation unit (halocarbon agents).

10. BIBLIOGRAPHY

- EN 15004 series - Fixed firefighting systems – Gas extinguishing systems.
- ISO 14520 series - Gaseous fire-extinguishing systems —Physical properties and system design.
- ISO 6183 - Fire protection equipment — Carbon dioxide extinguishing systems for use on premises — Design and installation.
- EN ISO 10460 - Gas cylinders — Welded aluminium-alloy, carbon and stainless steel gas cylinders — Periodic inspection and testing.
- EN 18119 - Gas cylinders — Seamless steel and seamless aluminium-alloy gas cylinders and tubes — Periodic inspection and testing.
- Euralarm Guidance Note on the Periodic Testing of Transportable Gas Containers used in Fire Extinguishing Systems.

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