Operating Manual

Fire extinguishing system

SFFECO Prime 227

Target group of the document

This document is intended exclusively for the operator.
Take further personnel requirements into account!

This document is a mandatory component of the installation and should therefore always be freely accessible and retained for further usage.

Original document

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Table of contents

1 Legal note

Read this document before starting any work!

German:
Produkt nur bedienen, wenn die nachfolgende Anleitung klar verstanden wird.

Français:
N'utiliser le produit que si les instructions suivantes ont été clairement comprises.

Български:
Използвайте продукта само ако тази инструкция е ясно разбрана.

Eesti keel:
Kasutage toodet ainult siis, kui saate alljärgnevast juhendist selgelt aru.

Ελληνικά:
Μην λειτουργείτε το προϊόν εάν δεν έχετε κατανοήσει πλήρως τις παρακάτω οδηγίες.

Italiano:
Utilizzare il prodotto solo se si sono comprese appieno le seguenti istruzioni.

Latviešu:
Produktu lietot tikai tad, ja dotā instrukcija ir pilnībā saprasta.

Malti:
Toperax il-prodott biss jekk l-istruzzjonijiet li ġejjin jinftiehmu b'mod ċar.

Polski:
Produkt może być używany tylko wtedy, gdy poniższe instrukcje są w pełni zrozumiałe.

Română:
Utilizați produsul numai dacă instrucțiunea următoare este înțeleasă clar.

Slovenčina:
Obsluhujte výrobok iba vtedy, pokiaľ ste jasne pochopili tento návod.

Čeština:
Obsluhujte produkt pouze tehdy, když jste jasně pochopili následující návod.

English:
Do not operate the product unless you have clearly understood the instructions below.

Español:
Utilizar el producto solo cuando se hayan comprendido claramente las siguientes instrucciones.

Dansk:
Du må kun betjene produktet, hvis du har forstået denne vejledning til fulde.

Suomi:
Tuotetta saa käyttää vain, jos jäljempänä oleva ohje ymmärretään selvästi.

Gaeilge:
Ná oibrigh an táirge mura dtuigeann tú go soiléir na treoracha thíos.

Hrvatski:
Koristite proizvod samo ako su sljedeće upute jasno razumljive.

Lietuvių k.:
Produktą naudokite tik tuomet, jei aiškiai suprantate šią instrukciją.

Nederlands:
Product alleen bedienen, als de volgende instructies goed zijn begrepen.

Português:
Utilizar o produto somente se as instruções a seguir forem claramente compreendidas.

Svenska:
Betjäna produkten endast om du förstår den efterföljande instruktionen.

Slovenščina:
Izdelek upravljajte samo, če ste dobro razumeli navodila v nadaljevanju.

Magyar:
Csak akkor kezelje a terméket, ha a következő útmutatót egyértelműen megértette.

2 General

⚠ This document describes how to handle the fire extinguishing system SFFECO Prime 227 (hereinafter referred as the "system"). This document is an integral part of the system and must be kept in its immediate vicinity at all times. This document is intended for the owner of the system ↳ *Chapter 3.9 “Operator's obligations” on page 20*.

Before commencing any task personnel must have carefully read and understood this document. The prerequisite for safe operation of the system is compliance with all the specified safety instructions and handling instructions. In addition to the information provided in this document, all local accident prevention and general safety regulations applicable for the system’s area of implementation must also be complied with. The graphic illustrations in this document are provided for purposes of basic understanding and can deviate from the actual version of the system.

This operating manual contains neither detailed information concerning project planning of the system, nor detailed information concerning installation and maintenance. The product sheets of the system components are also contained in a separate document. For this, observe the applicable documents.

Applicable documents

Designation	Part no.	Edition	Revision
Design manual	4006649	10-2023	00
Installation and maintenance manual	4006650	10-2023	00
Product sheets	4006653	10-2023	00

Tab. 1: Documents "Fire extinguishing system SFFECO Prime 227"

These documents can be requested from our authorized sales partners or from the manufacturer (↳ page 2).

Use the system only as intended in order to ensure its proper and trouble-free operation ↳ *Chapter 3.3 “Intended use” on page 12*.

Limitations of liability

All specifications and information provided in this manual have been compiled in consideration of all applicable standards and regulations as well as the state of the art. The manufacturer shall not be liable for any damages caused by:

- Failure to follow the instructions provided in this manual
- Disregarding local, federal, and state provisions and any regulations regarding the installation, operation and maintenance of fire extinguishing systems
- Operating the system in environmental and usage conditions other than the ones for which the system has been designed
- Improper use

- Use of untrained personnel
- Technical modifications not authorized by the manufacturer
- Use of unapproved components
- Non-compliance with maintenance intervals

Fire extinguishing systems are engineered to meet the standards of NFPA 2001, ISO 14520, EN 15004, FM Global, UL, CEA 4045, VdS 2381 or other similar organizations, and will also need to comply with the provisions of governmental codes, ordinances, and technical standards where applicable.

The system must be designed by qualified design professionals in conjunction with insuring bodies. The Authorized Distributor and the user are responsible for the design and configuration of the system, its appropriateness for the use intended and its compliance with all standards, codes, ordinances and the use intended.

The manufacturer or private labeler of the products, described in this manual , does not design systems for specific installations and makes no representation or warranty concerning whether any specific system installation will be sufficient for the intended use or will comply with any standard, code or ordinance.

System depictions, calculations, graphs or reports provided by the manufacturer or private labeler of the products, described in this manual, are for illustrative purposes only, and are not warranted to be representative or descriptive of any specific system, installation or design, or of the performance of or results attainable through same. The manufacturer or private labeler and its representatives disclaim use of the accompanying system depictions, calculations, graphs and reports for any purpose other than illustration; any other application or usage is the responsibility of the Authorized Distributor and the user.

Customer service

Our customer service department will be happy to assist you with any technical question you may have regarding the system. For contact information and additional details, please log on to our website (page 2). The members of our staff are, furthermore, always interested in obtaining information and learning about the experiences our customers have made while using our products as these may contribute to their improvement.

2.1 Overview

Overview (sample)

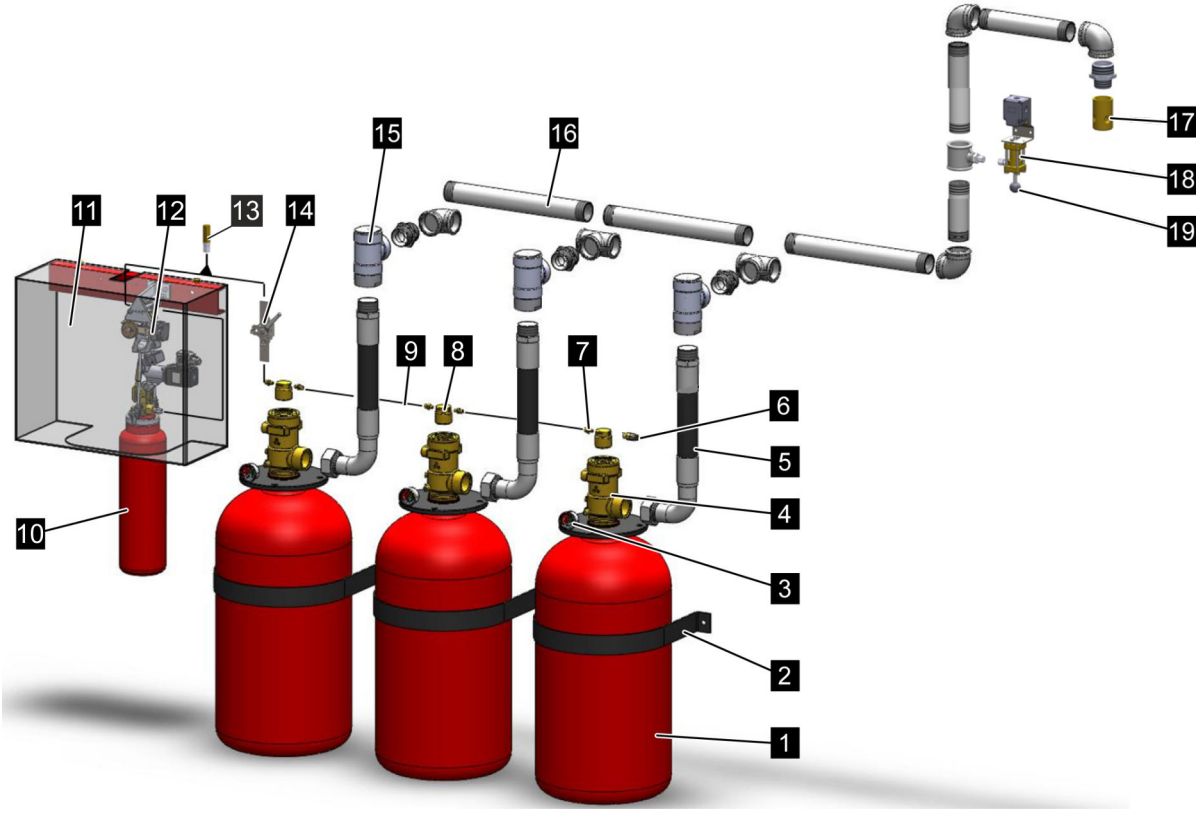


Fig. 1: Multi container system with pneumatic release device (PAE)

1 Extinguishing agent container
2 Clamp
3 Pressure gauge/Contact pressure gauge
4 Valve
5 DN40/DN50 hose (1 $^{1}/_{2}$ inch and 2 inch)
6 Manual pressure relief valve
7 Adapter
8 Release device, pneumatic
9 DN4 hose ($^{5}/_{32}$ inch) / pilot line
10 Pilot cylinder
11 Protective cover
12 Pneumatic release device (PAE), complete
13 Safety device malfunction pressure (safeguard against slow gas leaks)
14 Blocking device
15 Check valve
16 Pipeline
17 Discharge nozzle
18 Pneumatically actuated limit switch
19 Manual release of the limit switch

Abstract

The system works with HFC-227ea (hereinafter referred to as "extinguishing agent") as its extinguishing agent.

HFC-227ea is marketed by several manufacturers under different trade names:

- FM-200™ by Chemours™
- MH227® by Shanghai Waysmos
- Solkaflam® 227 by Solvay

This extinguishing agent is suitable for suppressing class A and class B fires and stored in the system's extinguishing agent containers. To create the pressure necessary for the agent to be released, the extinguishing agent containers are superpressurized with nitrogen at a pressure of 25 bar (360 psi), 42 bar (610 psi) or 50 bar (725 psi).

The system is activated by release devices located on the valves of the extinguishing agent containers or integrated in the valves. The valves open, and the extinguishing agent flows through the pipelines of the extinguishing agent containers to the discharge nozzles, where it vaporizes.

INFORMATION

HFC-227ea (heptafluoropropane) is a fluorinated greenhouse gas with a CO_2 equivalent (GWP) of 3500.

For more detailed brief descriptions of the different system models, please refer to the description of the system ↳ *Chapter 4 “Design and function” on page 28*.

2.2 Non-approved items

Please note, that some of the mentioned parts or system components in this document are not UL listed, not FM Approved or not VdS approved.

These parts or system components are distinguished with

- an asterisk combined with "not UL", for those parts or system components not UL listed, example: Component* $^{\text{not UL}}$.
- an asterisk combined with "not FM", for those parts or system components not FM Approved, example: Component* $^{\text{not FM}}$.
- an asterisk combined with "not VdS", for those parts or system components not VdS approved, example: Component* $^{\text{not VdS}}$.

You will find the distinguished marks at the headlines.

UL:	Underwriters Laboratories
FM:	FM Approvals
VdS:	VdS Schadenverhütung GmbH

3 Safety

This section provides an overview of all important aspects that are essential for the protection of personnel as well as safe and trouble-free operation. Additional task-specific safety instructions will be provided in the sections that refer to the individual life stages of the plant.

3.1 Safety and warning notices

Safety and warning notices are marked with symbols in this document. The introductory signal words express the extent of the danger in each case.

DANGER

This signal word describes a danger with a high risk level. If the danger is not avoided, it will result in death or serious injury.

WARNING

This signal word describes a danger with a medium risk level. If the danger is not avoided, it may result in death or serious injury.

CAUTION

This signal word describes a danger with a low risk level. If the danger is not avoided, it may result in minor or moderate injury.

NOTICE

This signal word describes a danger with a low risk level. If the danger is not avoided, it may result in property and environmental damage.

Further markings

INFORMATION

This marking emphasizes useful tips and recommendations as well as information for efficient and trouble-free operation.

In instructions, this marking starts with the symbol i.

3.2 Warnings in instructions and additional markings

Warnings in behavior guidelines

Warnings can refer to specific, individual behavior guidelines. Such warnings are embedded in behavior guidelines so that they do not interrupt the reading flow when executing the action. The signal words described above are used.

Example:

1. Unscrew screw.
2. ⚠ **CAUTION! Clamping danger on the cover.**

   Carefully close the cover.
3. Tighten screw.

Additional markings

This document uses the following markings to highlight instructions, results, references and lists:

Marking	Explanation
1.	Instructions (first procedural step)
⇨	Results of procedural steps
↳	References to sections in this manual and other applicable documents
•	Unordered lists
–	Unordered lists

3.3 Intended use

This system is intended to be used only for the proper purpose described herein.

The SFFECO Prime 227 fire extinguishing system is intended only for suppressing fires in enclosed rooms using HFC-227ea extinguishing agent.

Typical fire hazards for which the system is suitable include:

- Electric or electronic equipment
- Telecommunications equipment
- Flammable and combustible liquids
- Other goods of particularly high quality

The system may only be used in the environmental and usage conditions for which it has been designed.

Intended use also includes the adherence to all specifications regarding assembly, installation, maintenance, and inspection.

Incorrect use

Any other use exceeding or deviating from the scope of intended use is considered incorrect use.

⚠ WARNING

Risk from incorrect use!
If used incorrectly, the SFFECO Prime 227 fire extinguishing system may lead to personal injury and property damage.

- Do not perform any structural modifications on the protected enclosure or the system.
- Do not use the protected enclosure for any purpose other than the one designed by the Authorized Distributor.
- Do not block the discharge nozzles or the ventilation equipment.

Do *NOT* use the system in conjunction with the following fire hazards:

- Chemicals that release oxygen
- Mixtures containing oxidizing substances (e. g. sodium chlorate, sodium nitrate, explosives, gunpowder)
- Chemicals capable of thermally decomposing autonomously (e. g. certain organic peroxides)
- Reactive metals (e.g. sodium, potassium, magnesium, titanium or zirconium) and reactive hybrids or metal amides
- The effects of agent decomposition on fire protection effectiveness and equipment shall be considered where using clean agents in hazards with high ambient temperatures (e.g., furnaces and ovens)

INFORMATION

In some countries and regions the use of fluorinated greenhouse gases for extinguishing purposes is prohibited and subject to specific requirements.

3.4 Safe operation

If system components are used improperly or for purposes other than their intended use, they can pose hazards and may impair the system. Only use undamaged and fully functional products and machines. If safe operation can no longer be assured (e.g. visible damage), decommission the system without delay and secure it against accidental commissioning.

Furthermore, always adhere to the following points:

- Use only original spare and wear parts.
- Replace parts that are not in perfect condition immediately.
- Do not carry out any changes, extensions, or modifications.

Also observe the following fundamental information:

- National and locally applicable guidelines, standards, and regulations
- National and locally applicable safety regulations
- National and locally applicable accident prevention regulations
- National and locally applicable assembly and installation regulations
- Generally accepted technical principles

3.5 General dangers

The following section lists residual risks which could occur even from intended use of the system.

In order to reduce the risk of personal injury or property damage and to avoid hazardous situations, follow all safety and warning notices listed in this document.

3.5.1 General dangers associated with fire extinguishing systems

Electrical current

DANGER

Risk of death due to electric shock!
An imminent, risk of death due to electric shock exists if live components are touched. Damage to the wire insulation of individual components involves the risk of fatal injury.

- Allow only qualified electricians to work on electrical components and the electrical connection.
- Shut down the power supply immediately and consult the Authorized Distributor in the event of damage to the wire insulation.
- Keep moisture away from live components. This may lead to short circuits.

High extinguishing agent concentration

WARNING

There is a life-threatening danger if the extinguishing agent concentration is too high!
If the extinguishing agent concentration exceeds 9 % by vol. (NOAEL), the extinguishing agent can have a toxic effect. There is a danger of harming the heart and lungs, and danger of suffocating due to the reduced oxygen content in the air.

- When handling extinguishing agent, always ensure sufficient ventilation or extraction. If this cannot be ensured, use a self-contained breathing apparatus.
- Avoid inhaling vapors, aerosols, and atomized spray that exceed the recommended exposure limits per NFPA 2001.

Decomposition products

WARNING

Risk of injury from developing products of decomposition and fire smoke!
Fires generate products of decomposition which may lead to chronic damage to a person's health if inhaled or coming into contact with the skin.

- Leave the extinguishing zone without delay and within the pre-discharge timer when an alarm is given.
- Do not re-enter the extinguishing zone after a fire until the fire department has given the all-clear.

Pressurized extinguishing agent

WARNING

Danger of injury due to pressure in extinguishing agent containers!
If pressurized extinguishing agent containers are damaged and extinguishing agent escapes uncontrollably, there is a risk of death.

- Do not transport or store extinguishing agent containers unless they are sealed with a protective valve cap and an anti-recoil cap.
- Make sure the extinguishing agent container is adequately braced utilizing clamps.
- Have damaged extinguishing agent containers replaced immediately by the Authorized Distributor.

Tipping extinguishing agent containers

WARNING

Danger of injury due to tipping extinguishing agent containers!
Extinguishing agent containers are heave and may have a high center of gravity depending on the design. If extinguishing agent containers tip while being handled, this can lead to severe injuries.

- Allow only the Authorized Distributor or service personnel authorized by the Authorized Distributor to transport extinguishing agent containers.

3.5.2 Dangers when the system is activated

Cold extinguishing agent

WARNING

Risk of injury from cold extinguishing agent!
The extinguishing agent exiting at the discharge nozzles is very cold. Direct contact may result in injury.

- Leave the extinguishing zone without delay and within the pre-discharge timer when an alarm is given.
- Stay out of the direct flow area of a discharge nozzle.

Shock

WARNING

Risk of injury from shock!
The activation of the system involves noises from the discharged agent which may surprise persons to an extent that they suffer shock.

- Inform all persons staying inside or close to the protected enclosure about the existence of an automatic fire suppression system and the possibility of the system's activation.
- Make persons familiar with the procedures required in the event of an alarm, a fire or the activation of the fire suppression system.
- If in doubt, deny persons direct access to the protected enclosure.

Faulty activation

WARNING

Risk of injury from faulty activation!
A faulty activation of the system may cause severe injuries and property damage.

- Activate the system only in the event of a fire.
- Protect the manual release devices in the protected enclosure from inadvertent activation.
- Refrain from smoking inside the protected enclosure.
- Before performing any work generating heat and smoke, observe the following:
  - Isolate the system.
  - Switch off the fire alarm system.

Falling and flying objects

WARNING

Risk of injury from falling and flying objects!
The discharge velocity of the extinguishing agent may cause objects to tip over or become airborne. This may lead to severe injuries.

- Do not place any loose objects into the discharge area of the discharge nozzles.
- Leave the extinguishing zone without delay and within the pre-discharge timer when an alarm is given.

Noise

WARNING

Risk of injury from noise!
High sound pressure levels caused by discharged gas and acoustic alarm equipment (e. g. signal horns) may cause hearing damage.

- Leave the extinguishing zone without delay and within the pre-discharge timer when an alarm is given.
- Stay out from the immediate vicinity of acoustic alarm equipment and discharge nozzles.

Effects of cold

NOTICE

Property damage from cooling ambient air!
The discharged extinguishing agent extracts heat from the ambient air contained in the extinguishing zone in order to put out the flames. This cools down the extinguishing zone by as much as 20 °C (36 °F) when fighting a fire.

- Do not attach/store components that are sensitive to cold in the immediate vicinity of the discharge nozzles.

Overpressure/underpressure

NOTICE

Property damage from overpressure/underpressure!
Immediately after activated, the system briefly generates an underpressure which will then turn into an overpressure. This may cause damage to the walls of the protected enclosure.

- Ensure that pressure relief devices are installed in the protected enclosure and included in the design of the system, per NFPA 2001.
- Make sure that the function of the pressure relief is checked regularly.

3.6 Qualification of personnel

WARNING

Inadequately qualified persons pose a hazard!
Inadequately qualified persons cannot assess the risks involved in handling the system. They expose themselves and others to the risk of severe or fatal injuries.

- All work should be carried out only by persons qualified to do so.

Before starting any work, the following persons must be identified who have the knowledge required to operate the installation:

- A person to be responsible for the system
- An operator/person authorized by the operator

Tasks may only be performed by persons who can be reasonably expected to perform the tasks reliably. Persons whose reaction time is impaired (e.g. by drugs, alcohol, or medication) are not authorized.

All work must be carried out only by persons who meet the following prerequisites:

- They have read and understood this document, including the safety notices and warning notices.
- They are familiar with basic regulations on occupational safety and accident prevention.
- They have been given instruction on handling the system.

The various tasks described in this document require that the persons responsible for them have different qualifications. These qualifications, which are referred to again at the beginning of the respective section of this document, are specified below:

Authorized Distributor
The Authorized Distributor has verifiably undergone training provided by the manufacturer during which the company was made familiar with the knowledge and procedures necessary to install, commission and service fire suppression systems in a safe manner.

Person in charge of the system
The person in charge of the system has verifiably been given instructions by the company that installed the system as to the specifics of the tasks entrusted to him/her and all possible dangers that may arise from improper conduct.

The person in charge of the system has been appointed by the owner as the person who is responsible for the correct and proper completion of the work and inspections performed on the system.

Qualified electrician
The qualified electrician is capable of performing work on electrical systems and independently detecting and avoiding any possible risks due to his/her long years of expertise and experience and his/her familiarity with all applicable standards and regulations.

A qualified electrician must also provide proof of his/her professional qualification that confirms his/her capacity to perform work on electrical systems.

The qualified electrician must comply with the provisions of all applicable legal regulations regarding accident prevention.

Unauthorized persons

⚠ WARNING

Risk of injury for unauthorized persons!
Persons who do not meet the requirements described are not familiar with the hazards connected with the function (e.g. activation and/or isolation) of the system. This poses a risk of injury.

- Keep unauthorized persons away from control equipment.
- In case of doubt, instruct persons to move away from control equipment.

3.7 System-specific design specifications

The system is composed of several approved components. Please consult the Authorized Distributor when planning structural modifications to the system/the protected enclosure or any other kinds of use.

INFORMATION

Never perform any structural modifications or use the protected enclosure for other purposes.

3.8 Personal protective equipment

Personal protective equipment is designed to protect people from risks to their safety and health at the workplace.

Personnel must wear personal protective equipment, which is specially indicated in the individual sections of this document, when carrying out the various tasks.

Additional personal protective equipment may also be required due to local conditions, directives, company specifications, etc.

The following describes the required personal protective equipment, which is referred to again at the beginning of the respective sections of this document:

Extinguishing-agent-resistant safety gloves

Extinguishing-agent-resistant safety gloves protect the hands from contact with extinguishing agent.

Protective goggles

Protective goggles cover the entire area of the eyes (including the sides) and are used to protect the eyes from the extinguishing agent and from particles that are whirled up by the extinguishing agent.

Safety footwear

Safety footwear protects the feet from crushing injuries, falling parts, and slipping on slippery substrates.

Safety gloves

Safety gloves are used to protect the hands from friction, abrasions, puncture wounds or deeper wounds as well as coming into contact with hot surfaces.

3.9 Operator's obligations

Owner

The owner is the person or entity that operates the equipment himself/itself for commercial or economic purposes, or who transfers the device to a third person for use/application, and who bears the legal responsibility for protecting the user, personnel, or third parties.

Owner's obligations

- It is the owner's responsibility to ensure that the system complies with the provisions and regulations applying to the operation of fire suppression systems using the extinguishing agent HFC-227ea and verify the system's operability.
  In this regard the following particularly applies:
  - comply with the applicable NFPA 2001 regulations as well as all additional local regulations applying to the operation of the system.
  - always observe the inspection intervals specified in this document.
  - perform these inspections and operate the system following the operating instructions described throughout this document.
  - document the results of the inspections in the log book.
  - report any detected defects and/or damage to the Authorized Distributor.
  - document all shutdowns and faults the system experiences in the log book of the system.
- The "Occupational Safety and Health Act" of 1970 specifies that a safe workplace must be provided at all times for execution of tasks. To this end, the owner must ensure that the system is inspected and operated in accordance with all applicable commercial, industrial, local, federal and state laws, standards and regulations.
- The owner must ensure that the personnel performing the work have the qualifications necessary to complete the task.
- The owner must ensure that all employees working in the protected enclosure of the system have been informed of the existence of the system and know the risks involved and the steps necessary to handle the system (e.g. behavior in the event of a fire or inadvertent activation).
- The owner must appoint a person in charge of the system, who will be instructed by the Authorized Distributor about how the system operates and the sequence of operation. The owner will confirm in the documentation of the Authorized Distributor that these instructions have been given.

- The owner must confirm to the Authorized Distributor that the system's function and mode of operation have been understood and the system was ready for operation when accepted by the owner.
- The owner must ensure the availability of substitute extinguishing agents suitable for fire fighting in case the system is taken out of operation/disassembled.
- The owner must identify all extinguishing zones and specify that they are equipped with a fire suppression system.

3.10 Safety devices

WARNING

Risk of injury due to non-functioning safety devices!
If safety devices are not functioning or have been rendered inoperable there is danger of severe injuries and considerable material damage.
- Never render safety devices inoperable or bypass safety devices.
- Ensure that all system safety devices are always accessible.

The system has various safety devices that are described below.

Bursting disks

Bursting disks are safety devices that protect a container from excess pressure. If a critical pressure level is exceeded the disk bursts, the excess pressure is dissipated.

Bursting disks that have burst must be replaced.

Pressure relief dampers

Pressure relief dampers are installed in the exterior walls of buildings to dissipate the pressure increase or drop that occurs when the system is activated.

Pressure relief dampers are closed in idle position. If there is an increase or drop in pressure over or under a specified value the pressure relief dampers open and ensure that the pressure is relieved.

Pressure relief valves

Pressure relief valves are used to manually vent pilot lines. This ensures that the pilot lines can be depressurized without having to disconnect them.

Malfunction pressure safety device (SFD safeguard against slow gas leaks)

The “malfunction pressure safety device" dissipates a slow increase in pressure via a vent bore. Slow gas leaks can occur, for example, if there are leaks in the extinguishing agent container. The "malfunction pressure safety device" closes automatically if there is an abrupt pressure increase through an activation, so that the pilot line of the respective extinguishing zone is closed at flooding.

Safety valve

Safety valves are attached wherever dangers exist due to unreliably high pressure, e. g. at distributors for multi-zone systems.

In the event of impermissibly high pressure the safety valve ensures pressure compensation. The blow-off lines connected to the safety valve safely dissipate the medium.

Check valves

Check valves permit the flow of extinguishing agent in the flow direction and prevent it in the opposite direction. They are located at the transitions of hose to manifold.

Protective valve caps

Protective valve caps are used to protect sensitive components (e.g. valves) of the extinguishing agent containers. They prevent the valves from being damaged during transport. The protective valve caps must be attached before each transport.

Anti-recoil cap

The anti-recoil caps seal the valve outlets so that extinguishing agent does not escape in the event of unintentional release. They are provided with vent bores in order to enable a controlled release of pressure in case of unintentional activation.

The anti-recoil caps are secured with chains so that they are not lost.

3.11 Signage

The following symbols and information signs have been attached in the area of the system.

⚠ WARNING

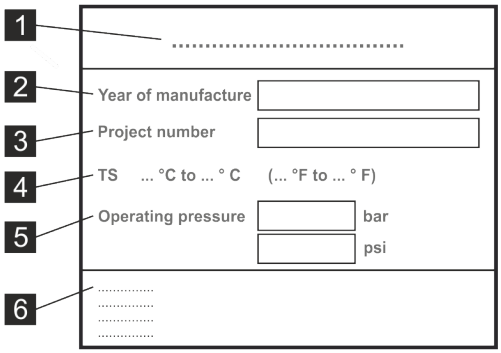
Risk from illegible or missing signs!
Over time, stickers and signs can become dirty or illegible for other reasons, so that risks can no longer be recognized and necessary operating instructions can no longer be adhered to. This will lead to risk of injury.

- Keep all safety, warning and operating instructions easily legible at all times.
- Immediately replace damaged signs or stickers.

System labeling

In addition to the information on the type plate attached to the extinguishing agent container, the system should be labeled with the following information.

Fig. 2 shows an example of a label. The actual layout depends on the local conditions.



1 System type*: SFFECO Prime 227 Fire Extinguishing System
2 Year of manufacture
3 Project number
4 Application temperature range*: 0 °C to 50 °C (32 °F to 122 °F)
5 Operating pressure of the extinguishing agent containers
6 Authorized Distributor*

* In the fig. shown as a placeholder

Fig. 2: System labeling (example)

Identification of the extinguishing zones

Fig. 3: Identification of the extinguishing zones (example)

The owner must attach a sign to the access doors to identify the extinguishing zone, warning of the existence of a fire extinguishing system and the risks involved.

The text marked in Fig. 3 states:

- This area is protected by a SFFECO Prime 227 fire extinguishing system.

Alternatively, there are two additional variants for the text, the use of which is regulated by NFPA 2001 or local provisions.

- Do NOT enter unless automatic release is isolated.
- Do NOT enter unless isolate valve is in the closed position.

Non-toxic, non-flammable gas under pressure

This hazard pictogram indicates containers with gases under pressure, which can explode if they are heated.

Inhaling high concentrations of these gases is hazardous to a person's health.

Protect the containers from tipping over and falling down as well as from heating, impact, and shock.

Name plate - extinguishing agent container

There is a name plate on every container providing specific information about this container. It contains the specifications listed below.

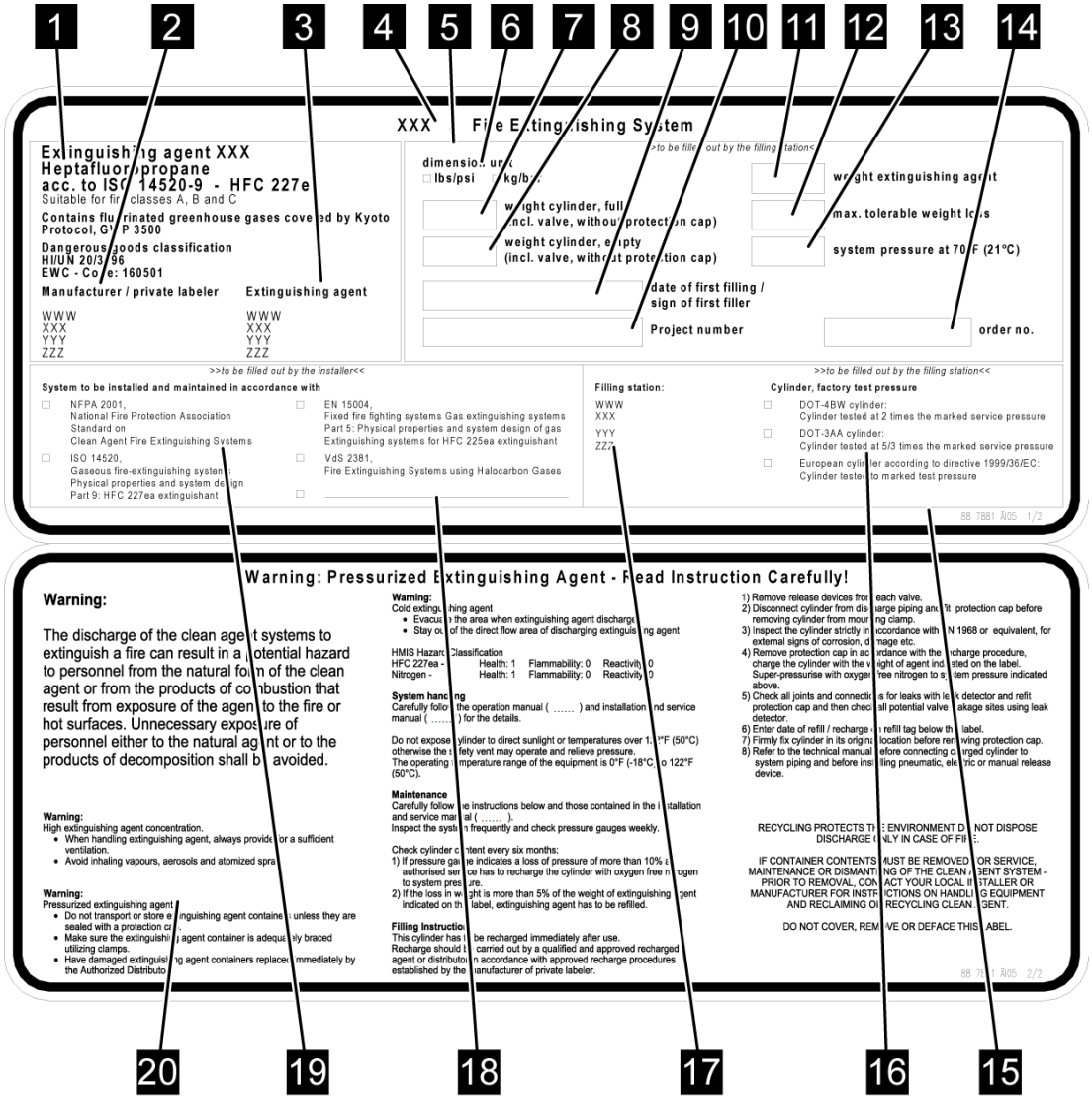


Fig. 4: Name plate - extinguishing agent container (example)

1 Filled extinguishing agent with specifications on environmental protection and transport (brand designation shown as placeholder)*
2 Manufacturer of the fire extinguishing system (name and address shown as placeholders)*
3 Manufacturer of the extinguishing agent (name and address shown as placeholders)*
4 Type of the fire extinguishing system (shown as placeholder)*
5 Field to be filled out by the filling company
6 Units, lbs/psi or kg/bar
7 Weight of the extinguishing agent container, full (including valve, without protective valve cap)
8 Weight of the extinguishing agent container, empty (including valve, without protective valve cap)

9 Date of first fill / Identification of the initial filling company
10 Project number
11 Weight of the extinguishing agent
12 Maximum permissible weight loss
13 System pressure at 21 °C (70 °F)
14 Part number of the extinguishing agent container
15 Field to be filled out by the filling company
16 Specification of the type of pressure test of the extinguishing agent container
17 Filling company (name and address shown as placeholders)
18 Field to be filled out by the Authorized Distributor
19 Specification of regulations with which the system complies
20 Warnings, system handling, maintenance and filling instructions

* Will be imprinted on the name plate by the manufacturer

Languages

Extinguishing agent containers are delivered with original name plates in German and English. Name plates in other languages have to be ordered separately.

INFORMATION

For name plates in all other languages — except German and English — all missing specifications have to be copied from the original name plate by the Authorized Distributor. This also applies to specifications of original name plates, that are printed by the manufacturer or completed by the filling company.

Marking extinguishing agent containers with the UL mark/FM mark

Extinguishing agent containers filled in accordance with UL requirements, are marked in the factory with a UL sticker. Retroactive marking of extinguishing agent containers with the UL mark that are not factory marked is not permitted.

Extinguishing agent containers filled in accordance with FM requirements, are marked in the factory with a FM sticker. Retroactive marking of extinguishing agent containers with the FM mark that are not factory marked is not permitted.

3.12 Environmental protection

NOTICE

Danger to the environment due to incorrect handling of materials that can harm the environment!
In case of incorrect handling of materials that can harm the environment, especially improper disposal, there can be significant damage to the environment.

- Always heed the notes below about the handling of materials that can harm the environment and their disposal.
- If materials that can harm the environment accidentally escape into the environment, take suitable measures immediately. In case of doubt, inform the responsible local authority about the damage and ask what suitable measures to take might be.

The following materials that might harm the environment are used:

Extinguishing agent HFC-227ea

The extinguishing agent must be disposed of in accordance with all applicable local waste disposal regulations. Follow the safety data sheet for the extinguishing agent.

INFORMATION

The safety data sheet can be requested from our authorized sales partners or from the manufacturer page 2.

HFC-227ea is marketed by several manufacturers under different trade names:

- FM-200™ from Chemours™
- MH227® by Shanghai Waysmos
- Solkaflam® 227 by Solvay

HFC-227ea has an ozone decomposition potential of zero. The GWP (Global Warming Potential) is 3500 (33 years). Consequently in some countries and regions the use of fluorinated greenhouse gases for extinguishing purposes is prohibited and subject to specific requirements.

3.13 Behavior in the case of fire

Preventive measures

- Always be prepared for fire and accidents.
- Keep first-aid supplies (first-aid kit, blankets, etc.) and replacement extinguishing equipment (e.g. fire extinguishers) in good working condition and within easy reach.
- Familiarize personnel with accident reporting, first-aid, and rescue equipment as well as the possibilities for manually actuating the system.
- Keep access roads for rescue vehicles clear.

Measures in the case of fire

⚠ WARNING

Danger to life due to fire!
When a fire breaks out and during extinguishing operations, severe fire smoke can build up. Being present in a flooding zone in the event of a fire may result in severe respiratory injury or even death by suffocation.

- Immediately leave the flooding zone affected by the fire.
- Only access the flooding zone again once this has been permitted by the fire department.

When the system alarm devices have been activated (main alarm), a pre-warning time (usually 10 seconds) starts to run down. After this pre-warning time elapses, the system actuates.

Take the following measures in fire breaks out:

- If there is no danger posed to your own health, actuate the system manually if there is evidence of a smoke/fire build-up.
- If there is no danger posed to your own health, rescue people from the danger zone.
- Immediately leave the extinguishing zone.
- Begin applying first-aid measures if required.
- Warn people who are in danger in adjacent areas.
- Alert the fire department and/or rescue service.
- Inform the person responsible on-site.

After the system is triggered

Certain rules of behavior apply for how to act after the system has been activated - these are explained in a separate section.

4 Design and function

4.1 Single zone systems

Single container systems

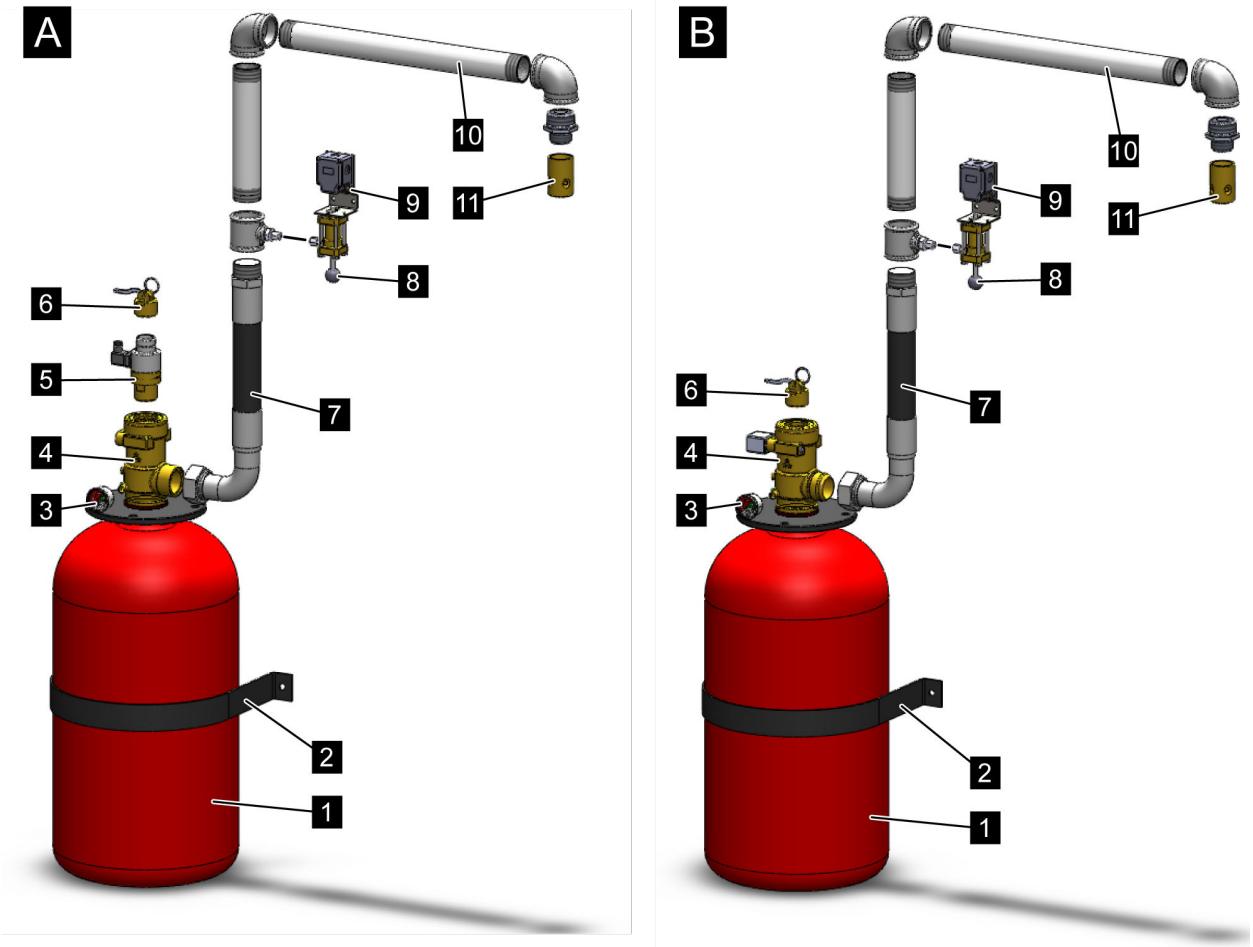


Fig. 5: Single container system

1 Extinguishing agent container
2 Clamp
3 Pressure gauge/contact pressure gauge
4A Valve
4B Valve with integrated electrical release
5 Release device, electric (also available with a mechanic blocking device)
6 Release device, manual or pneumatic/ manual
7 Hose DN40/DN50 (1 $^{1}/_{2}$" and 2")
8 Manual release of the limit switch
9 Pneumatically actuated limit switch
10 Pipeline
11 Discharge nozzle

Multi container system

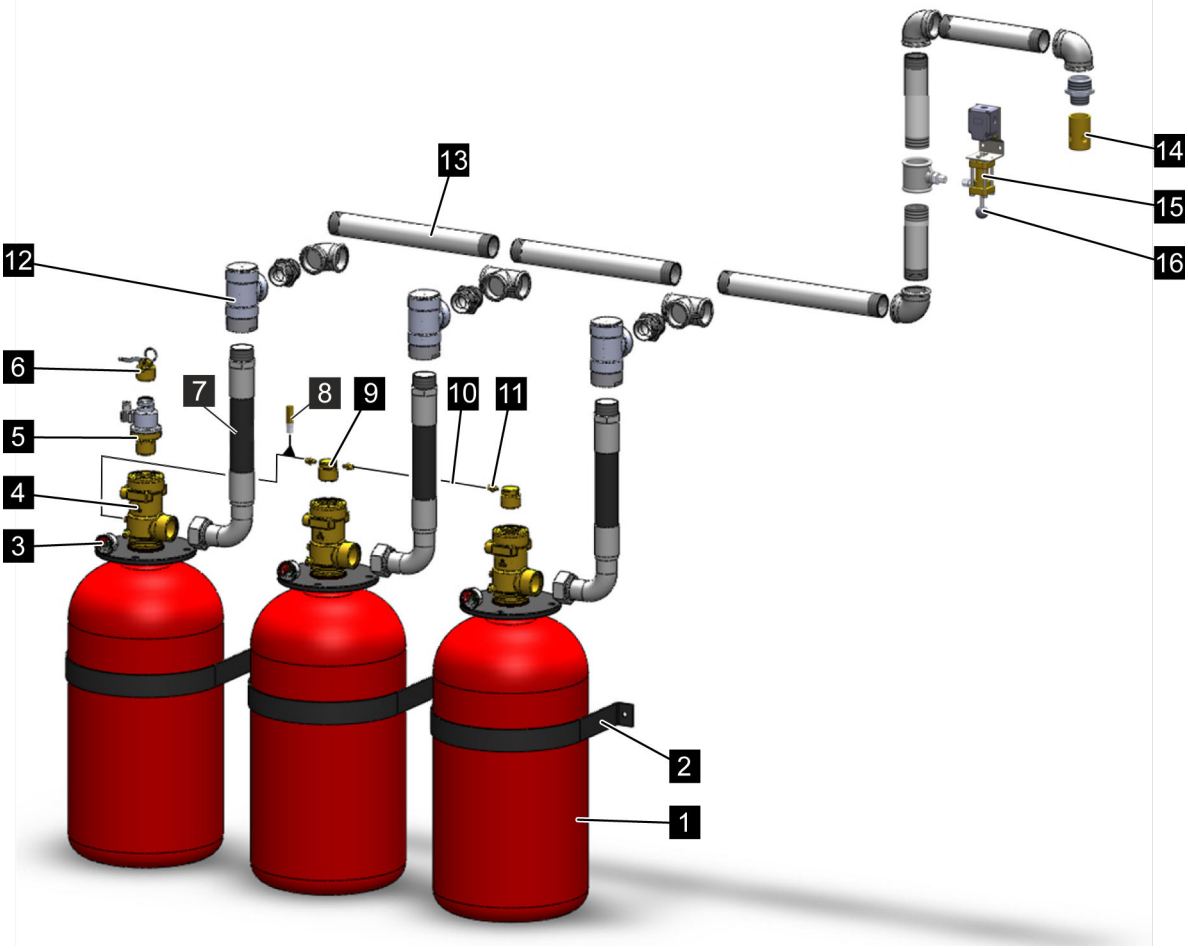


Fig. 6: Multi container system

1 Extinguishing agent container
2 Clamp
3 Pressure gauge/contact pressure gauge
4 Valve
5 Release device, electric (also available with a mechanic blocking device)
6 Release device, manual or pneumatic/ manual
7 Hose DN40/DN50 (1 $^{1}/_{2}$" and 2")
8 Safety device malfunction pressure (safe-guard against slow gas leaks)
9 Release device, pneumatic
10 Hose DN4 (pilot line; $^{5}/_{32}$")
11 Adapter
12 Check valve
13 Pipeline
14 Discharge nozzle
15 Pneumatically actuated limit switch
16 Manual release of the limit switch

Multi container system with redundant electrical release

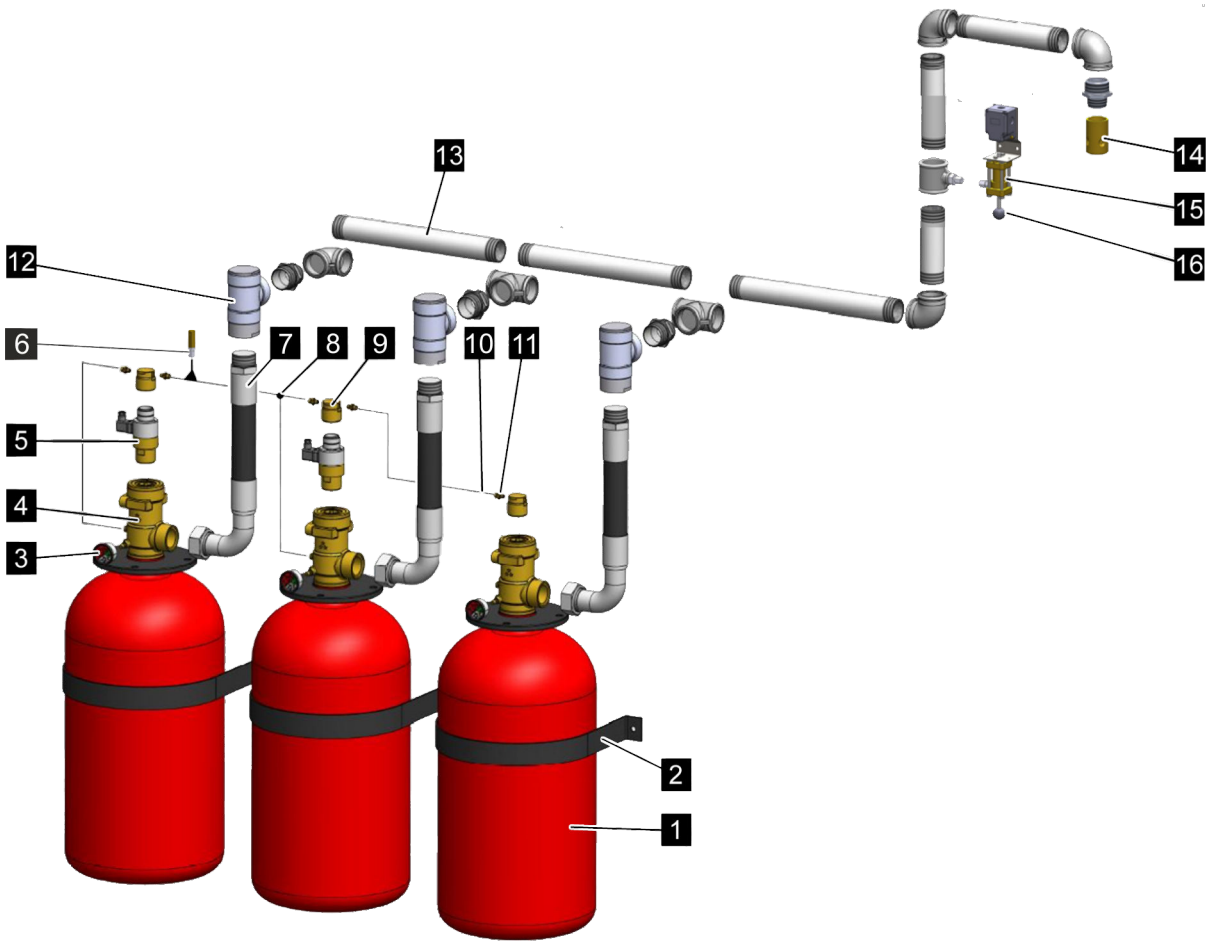


Fig. 7: Multi container system with redundant electrical release

1 Extinguishing agent container
2 Clamp
3 Pressure gauge/contact pressure gauge
4 Valve
5 Release device, electric (also available with a mechanic blocking device)
6 Safety device malfunction pressure (safe-guard against slow gas leaks)
7 Hose DN40/DN50 (1 $^{1}/_{2}$" and 2")
8 Threaded union T 6-PL (part number 125633)
9 Release device, pneumatic
10 Hose DN4 (pilot line; $^{5}/_{32}$")
11 Adapter
12 Check valve
13 Pipeline
14 Discharge nozzle
15 Pneumatically actuated limit switch
16 Manual release of the limit switch

Multi container system with pneumatic release device (PAE)

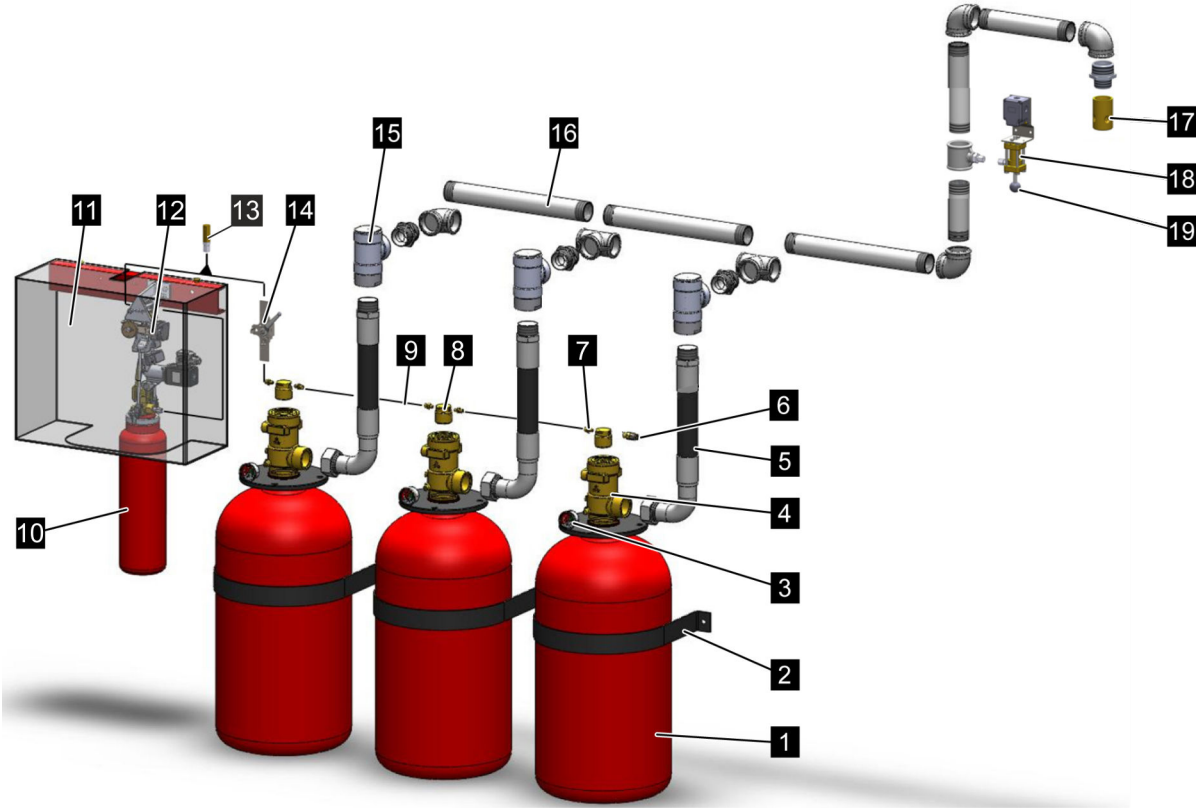


Fig. 8: Multi container system with pneumatic release device (PAE)

1 Extinguishing agent container
2 Clamp
3 Pressure gauge/contact pressure gauge
4 Valve
5 Hose DN40/DN50 (1 $^{1}/_{2}$" and 2")
6 Manual pressure relief valve
7 Adapter
8 Release device, pneumatic
9 Hose DN4 (pilot line; $^{5}/_{32}$")
10 Pilot cylinder
11 Protective cover
12 Pneumatic release device (PAE), complete including weighing device
13 Safety device malfunction pressure (safeguard against slow gas leaks)
14 Blocking device
15 Check valve
16 Pipeline
17 Discharge nozzle
18 Pneumatically actuated limit switch
19 Manual release of the limit switch

Abstract

Single zone systems safeguard one protected enclosure and can be composed of one or several extinguishing agent containers.

Single zone systems equipped with only one extinguishing agent container (single container systems) have an electric release device (also available with a mechanic blocking device). The device is fitted on the valve of the extinguishing agent container and activated by the fire suppression detection system. There is also the option of fitting a manual release device on the electric release device in order to allow the system to be activated manually.

Multi container systems are equipped with several extinguishing agent containers which are connected by a pilot line. These are required, for instance, if you wish to safeguard an extensive protected enclosure. The first extinguishing agent container ("control cylinder") of a multi container system lacking a pneumatic release device (PAE) is activated electrically (and, as an option, manually as well) just as the extinguishing agent container of a single container system. All other extinguishing agent containers ("Slave") are activated pneumatically via a pilot line.

Multi container systems equipped with a pneumatic release device (PAE) have a pilot cylinder that is activated electrically. The CO_2 contained in the pilot cylinder flows through the pilot line to the pneumatic release devices, mounted on the extinguishing agent containers, and opens them.

In contrast to single container systems, the extinguishing agent released in a multi container system first flows from the hose via check valves to a manifold. The extinguishing agent flows from there through the nozzle pipeline to the discharge nozzles where it evaporates and exits into the extinguishing zone.

4.2 Multi zone systems* not UL

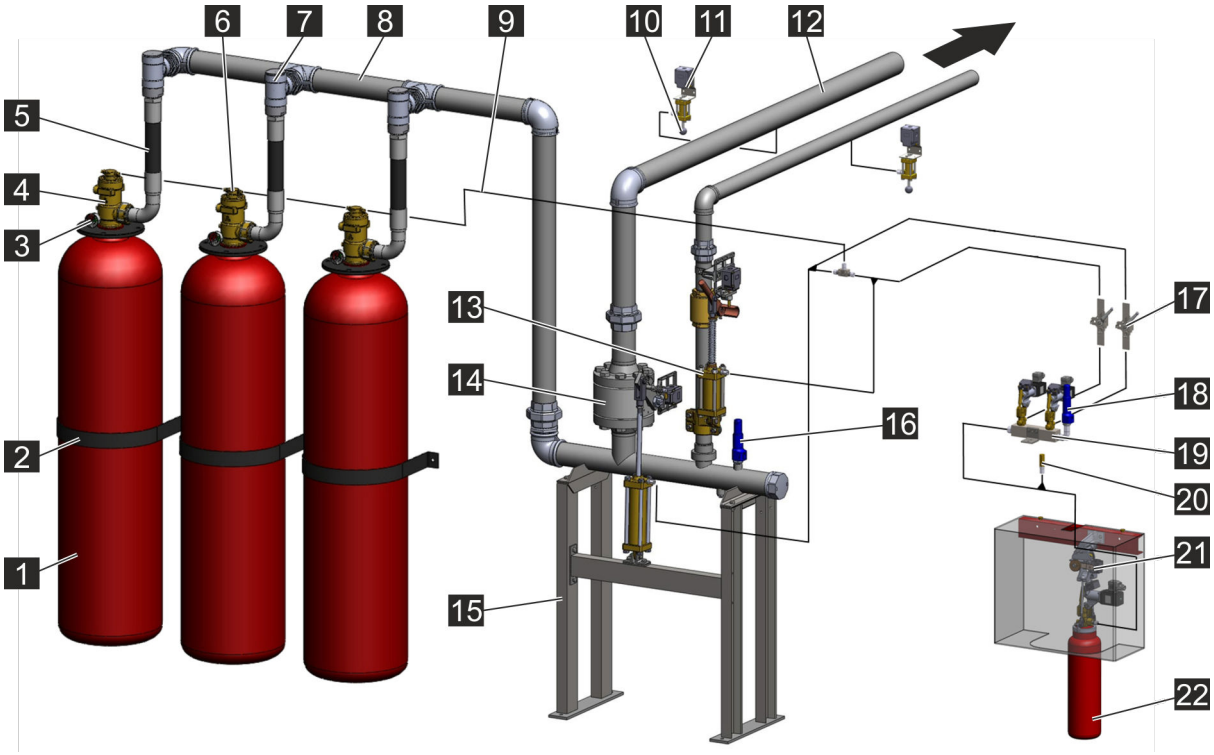


Fig. 9: Multi zone system

1 Extinguishing agent container
2 Clamp
3 Pressure gauge/contact pressure gauge
4 Valve
5 DN40/DN50 (1 $^{1}/_{2}$ in. and 2 in.) hose
6 Release device, pneumatic
7 Check valve
8 Manifold
9 DN4 ($^{5}/_{32}$ in.) hose (pilot line)
10 Manual release of the limit switch
11 Pneumatically actuated limit switch
12 Nozzle pipeline
13 Selector valve
14 Selector valve
15 Bracket
16 Safety valve 66 bar (957 psi)
17 Blocking device
18 Safety valve 140 bar (2031 psi)
19 DN15 ($^{1}/_{2}$ in.) pilot distributor
20 Safety device malfunction pressure (safeguard against slow gas leaks)
21 Pneumatic release device (PAE), complete including protective cover and weighing device
22 Pilot cylinder

➡ To the discharge nozzles

Abstract

Multi zone systems safeguard several extinguishing zones. If the extinguishing zones are of different sizes, multi zone systems will be equipped with several extinguishing agent containers. The extinguishing agent supply and, thus, the number of extinguishing agent containers always follow the largest extinguishing zone. When activated, the system will only flood one extinguishing zone.

Multi zone systems are equipped with a pneumatic release device (PAE). The pilot cylinder of these systems is activated electrically when a fire is detected. The CO_2 contained in the pilot cylinder flows through the pilot line to the pneumatic release devices, mounted on the extinguishing agent containers, and opens them.

Pilot distributors and selector valves ensure that the extinguishing agent containers assigned to the associated extinguishing zone open and the corresponding pipings are released. This prevents the extinguishing agent from flowing into extinguishing zones that are not affected by fire.

Just as the extinguishing agent of single zone systems equipped with several extinguishing agent containers, the extinguishing agent of multi zone systems first flows, when the system is activated, from the hose via check valves to a manifold. The extinguishing agent flows from there via the selector valves and the nozzle pipe to the discharge nozzles (Fig. 9/arrow) where it exits and vaporizes into the extinguishing zone.

4.3 Functional description

As soon as the detection system installed in the protected enclosure detects a fire, an alarm will be triggered by the fire suppression detection system. A pulse is transmitted to the electric release devices after the specified pre-discharge timer has expired. Afterwards, the quick release valves of the pressurized extinguishing agent containers open.

The liquid extinguishing agent flows into the pipeline system. The check valves installed in the pipeline system prevent the extinguishing agent from flowing back into the container. The extinguishing agent flows to the discharge nozzle(s) of the system which are installed in the protected enclosure.

The extinguishing agent vaporizes at the discharge nozzles and is dispersed across the extinguishing zone as a gaseous mix made up of extinguishing agent and air. This suppresses the fire by extracting heat energy from the flames. Throughout the extinguishing process, the oxygen concentration in the extinguishing zone is slightly reduced. The retention time (hold time) of the extinguishing zone must comply with NFPA 2001.

In addition to the automatic, electric release, electric manual releases can be used to activate the system manually. These releases are installed at the extinguishing zone.

4.4 Description of important components

4.4.1 Extinguishing agent container with valve

Extinguishing agent container

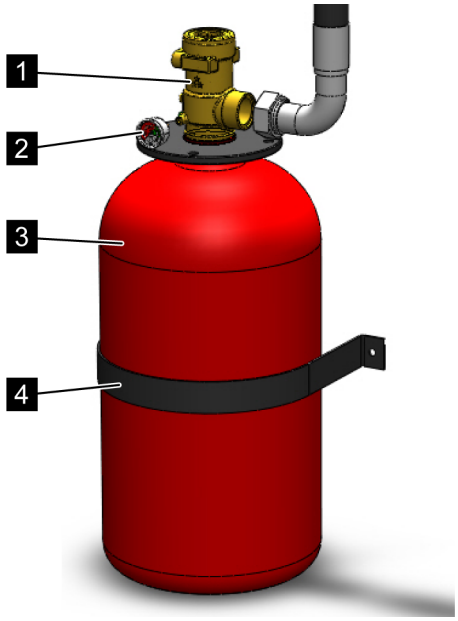


Fig. 10: Extinguishing agent container

The extinguishing agent is stored in extinguishing agent containers (Fig. 10/3). These containers are designed, manufactured and labeled in accordance with European directives, the standard of the US Department of Transportation (D.O.T), or in accordance with the country-specific pressure equipment directives.

The extinguishing agent containers have a siphon tube and are, thus, only suitable for upright operation. Attached to the extinguishing agent container is a type plate which contains, among other things, maintenance and filling instructions as well as information about the fill quantity. By default, the containers are painted red and must be secured (Fig. 10/4).

Containers must not be moved and transported unless fitted with the protective valve cap (Fig. 11/1) and the anti-recoil cap (Fig. 12/1). When filled, the containers must be labeled and transported as hazardous goods in accordance with all applicable local regulations.

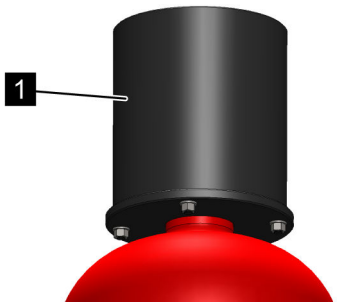


Fig. 11: Protective valve cap

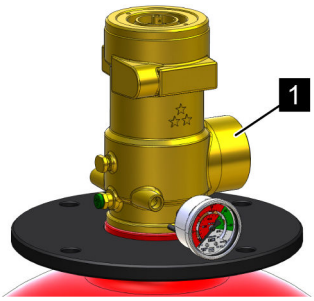
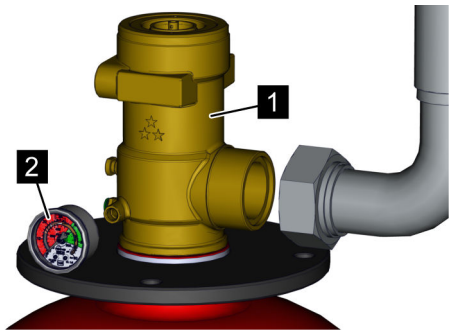


Fig. 12: Anti-recoil cap with vent bores and chain (not shown)

Valve



The valve (Fig. 13/1) is on the extinguishing agent container. This makes it possible to discharge the extinguishing agent within 10 s.

Fig. 13: Valve

Pressure gauge/contact pressure gauge

A pressure gauge or contact pressure gauge (Fig. 13/2) is on the valve, it indicates the fill pressure of the container, there is also a bursting disk that is used to protect against overpressure. Contact pressure gauges enable additional monitoring of the fill pressure.

There is also an option of connecting an additional pressure switch to the valve or the pipeline, which will switch a potential-free electrical contact when the system is activated. The switching status of this contact can be monitored by the fire detection and suppression control panel (FACP) and, thus, indicate an activation of the system.

INFORMATION

For better readability in this manual, instead of the term “pressure gauge/contact pressure gauge” only the term “contact pressure gauge” is used below.

Multi container systems

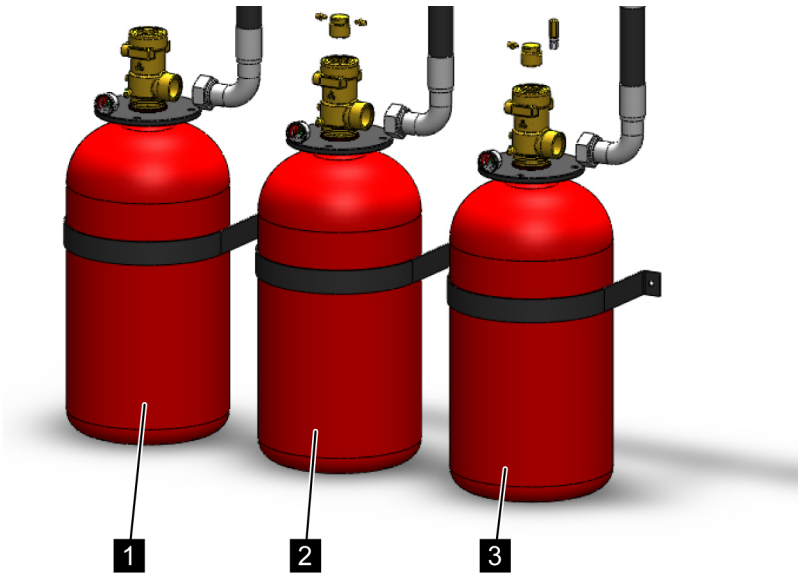


Fig. 14: Multi container system

Multi container systems are always equipped with a “master” extinguishing agent container (Fig. 14/1) or a pilot cylinder combined with a varying number of “slave” extinguishing agent containers (Fig. 14/2+3). The number of “slave” extinguishing agent containers varies with the number and size of the extinguishing zones and is determined when the system is designed. The number of “slave” extinguishing agent containers is not optional.

While the “master” extinguishing agent container is released electrically, pneumatically, pneumatically/manually or manually, the “slave” extinguishing agent containers are always released and opened by the “master” extinguishing agent container or the pilot cylinder pneumatically via a pilot line. The length of the pilot line is not optional.

4.4.2 Weighing device

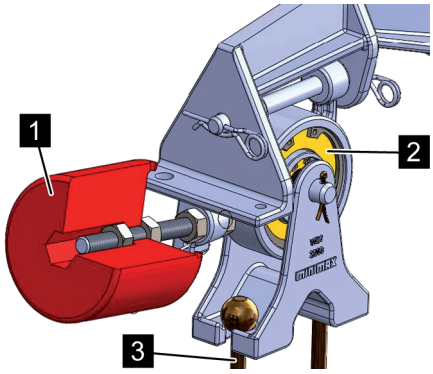


Fig. 15: Weighing device

The weighing device (Fig. 15/2) is part of the pneumatic release device (PAE). It is used to detect and indicate any leakage at the pneumatic release device (PAE). If leakage is detected, the counterweight will tilt down to make the leakage instantly visible.

A leakage is indicated by the specified difference between the weight of the container and a counterweight (Fig. 15/1). The pilot cylinder is hooked into the weighing device by means of holding rods (Fig. 15/3).

4.4.3 Liquid level indicator

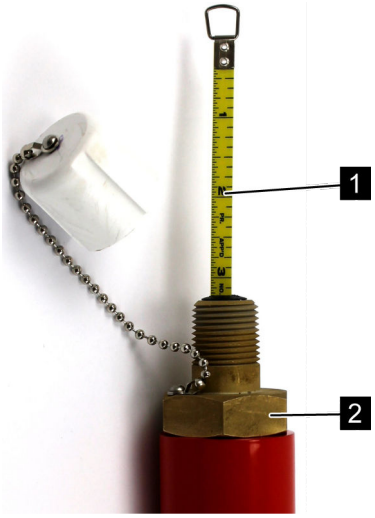


Fig. 16: Liquid level indicator

Some extinguishing agent containers are equipped with a liquid level indicator (Fig. 16/2). The level indicator is non-electrical and enables manual read-out of the fill level on an integrated tape measure (Fig. 16/1). Inside the extinguishing agent container a float equipped with a magnet moves on the stem of the liquid level indicator.

Liquid level indicators have been designed to resist shock and vibration. However, shock and vibration should be avoided.

5 Transport and storage

5.1 Transport

INFORMATION

System components may only be transported by an Authorized Distributor or service personnel authorized by the Authorized Distributor. Contact can be established through the manufacturer (see page 2).

⚠ WARNING

Danger to life from faulty transport!
Errors occurring during transport may lead to life-threatening situations and cause significant property damage.

- Allow only the Authorized Distributor or service personnel authorized by the Authorized Distributor to transport the components of the system.
- Avoid unauthorized transport and location changes - including transporting and moving the extinguishing agent containers.

Pressurized extinguishing agent

⚠ WARNING

Danger of injury due to pressure in extinguishing agent containers!
If pressurized extinguishing agent containers are damaged and extinguishing agent escapes uncontrollably, there is a risk of severe injuries or even death.

- Do not transport or store extinguishing agent containers unless they are sealed with a protective valve cap and an anti-recoil cap.
- Have damaged extinguishing agent containers replaced immediately by the Authorized Distributor.

5.2 Storing extinguishing agent containers

Storing extinguishing agent containers

Store reserve extinguishing agent cylinders under the following conditions:

- Do not store outdoors.
- Store in a dry, dust-free environment.
- Do not expose to aggressive media.
- Protect against direct exposure to sunlight.
- Avoid mechanical vibrations/shocks.
- Avoid condensation moisture.
- Storage temperature: -18 to +50 °C (0 to +122 °F).
- Store with the valve protection cap in place.
- Always store in the supplied transport frame or lying on the supplied pallet.

- Observe national regulations on the storage of extinguishing agent cylinders.
- If stored for more than 3 months, regularly check the general condition of all extinguishing agent cylinders. If necessary, contact an authorized distributor or service personnel authorized by the authorized distributor and have damaged or corroded extinguishing agent containers replaced. Contact via the manufacturer possible, see Page 2.

WARNING

Risk of injury from illegible symbols!
Over the course of the storage period, labels and signs can become soiled or illegible in some other way, which may result in risks no longer being detected and the necessary operating instructions no longer being followed. This will lead to a risk of injury.

- Keep all safety, warning and operating instructions easily legible at all times.
- Replace any damaged signs or labels immediately (or have them replaced).

INFORMATION

There might be notices on storage on the packaging items that go beyond the requirements stipulated here. Observe them accordingly.

6 Installation and commissioning

INFORMATION

The system may be installed and put into operation only by the Authorized Distributor or service personnel authorized by the Authorized Distributor.

⚠ WARNING

Danger to life from faulty installation and commissioning!
Errors occurring while the system is being installed or put into operation may lead to life-threatening situations and cause significant property damage.

- Allow only the Authorized Distributor or service personnel authorized by the Authorized Distributor to install and commission the system.
- Avoid any unauthorized assembly and installation - including subsequent assembly and installation (also of subcomponents).

⚠ DANGER

Danger of injury due to pressure in extinguishing agent containers!
If pressurized extinguishing agent containers are damaged and extinguishing agent escapes uncontrollably, there is a risk of death.

- Allow only the Authorized Distributor or service personnel authorized by the Authorized Distributor to transport extinguishing agent containers.
- Make sure the extinguishing agent container is adequately braced utilizing clamps.
- Have damaged extinguishing agent containers replaced immediately by the Authorized Distributor.
- Ensure that the valve outlet is always closed with an anti-recoil cap and connected to a pipeline.

7 Operation

7.1 Required tools

The following tools are required to operate the system:

Screw reset tool (887645)
The screw reset tool is used to reset a previously activated electric release device.

Wrench
Wrenches of different sizes

7.2 Isolating the system

If the work performed inside the protected enclosure makes it difficult to leave the protected enclosure within the pre-discharge timer, the system must be isolated for safety reasons.

This is also necessary in cases where work is performed on the fire suppression detection system or if the work may set off the system inadvertently - for instance, during welding operations. Isolating the system prevents the extinguishing agent from being released accidentally.

Multi zone and single zone systems equipped with a pneumatic release device (PAE) are fitted with blocking devices that are installed in the pneumatic pilot line and can be used to isolate the system. Single container and multi container systems that lack a pneumatic release device (PAE) are equipped with an electric release device that comes with an integrated blocking device.

7.2.1 Warnings regarding the isolation of the system

Fire hazard when system is isolated

⚠ WARNING

Danger to life from fire!
When work is performed on the system or inside the protected enclosure and the system is shut down for this purpose, no fire protection will be in place. Fires that cannot be controlled during this time may cause severe injuries including death and result in significant property damage.

- Keep potential fire loads and sources of ignition away from the protected enclosure.
- Maintain fire protection by, for example, keeping fire extinguishers readily available.
- Do not shut down the system longer than necessary.

Inappropriate isolation

WARNING

Danger to life from inappropriate isolation!
When isolated, the system does not provide any fire protection. The suppression system is out of service.

- Do not isolate the system unless necessary.
- Ensure that the system cannot be isolated by an unauthorized person.

Improper isolation

WARNING

Risk of injury from improper isolation!
If isolated improperly, the system may be activated inadvertently. This may lead to severe injuries and significant property damage caused by discharged extinguishing agent.

- Allow only the person in charge of the system to isolate the system.
- Make sure the isolation of the system cannot be reset by third parties in an unregulated manner.
- When isolating the system, follow the specifications and instructions contained in this document.

7.2.2 Isolating a single zone system equipped with an electric release device

Without mechanical blocking device

Personnel:
- Person in charge of the system

Protective equipment:
- Safety gloves
- Protective goggles

1. Maintain fire safety by, for example, keeping fire extinguishers readily available.

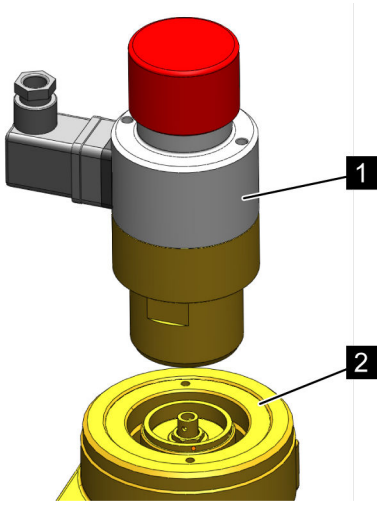


Fig. 17: Unscrewing the release device

2. Unscrew the electric release device (Fig. 17/1) fitted on the “pilot cylinder" extinguishing agent container from the valve (Fig. 17/2).
3. If the status of the release devices (installed/removed) is monitored by additional limit switches, make sure the deactivation of the system is indicated on the fire detection and extinguishing control panel.

With mechanic blocking device* not UL

Personnel:	■ Person in charge of the system
Protective equipment:	■ Safety gloves
	■ Protective goggles
Tool:	■ Wrench

1. Maintain fire safety by, for example, keeping fire extinguishers readily available.

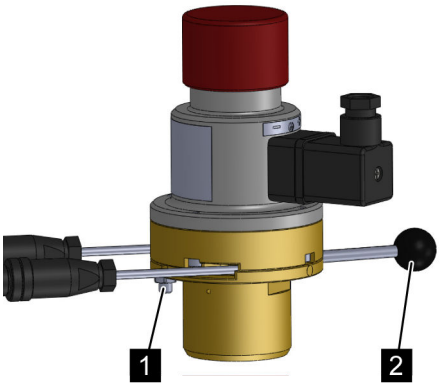


Fig. 18: Isolating the release device

2. Undo the hexagon nut (Fig. 18/1) on the electric release device using a wrench.
3. Turn the manual lever (Fig. 18/2) on the electric release device to the "blocked" position.
4. Use a wrench to tighten the hexagon nut (10 Nm ± 2 Nm (7.38 ± 1.48 lb•ft)) as the isolation will otherwise not take effect.

   ⇨ The system has been isolated.
5. Make sure the isolation is indicated on the fire detection and extinguishing control panel.

7.2.3 Isolating a single zone system equipped with a pneumatic release device (PAE)

Personnel:
- Person in charge of the system

Protective equipment:
- Safety gloves
- Protective goggles

Single zone systems equipped with a pneumatic release device (PAE) are used whenever more than one extinguishing agent container is needed to safeguard the protected enclosure. The blocking device used by these systems is a ball valve.

1. Maintain fire safety by, for example, keeping fire extinguishers readily available.

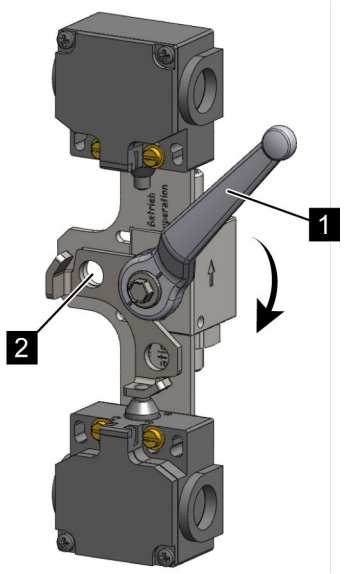


Fig. 19: Blocking device (optionally with 1 or 2 limit switches)

2. Open and remove the padlock on the blocking device.
3. Turn the ball valve (Fig. 19/1) of the blocking device as far as it will go in clockwise direction (Fig. 19/arrow).
   ⇨ The "isolation" labeling on the ball valve becomes visible, indicating the system has been isolated.
4. Hook the padlock into the locking eye (Fig. 19/2) of the blocking device and lock it.
5. Pull the key from the padlock and store it in a safe place to prevent unauthorized personnel from resetting the isolation.
6. Make sure the isolation is indicated on the fire detection and suppression control panel.

7.2.4 Isolating a multi zone system* not UL

Personnel:
- Person in charge of the system

Protective equipment:
- Protective goggles
- Safety gloves

Multi zone systems are equipped with blocking devices for each individual extinguishing zone. This makes it possible to isolate each extinguishing zone individually without the need to shut down the entire system.

1. Maintain fire safety by, for example, keeping fire extinguishers readily available.
2. Open and remove the padlock on the blocking device.

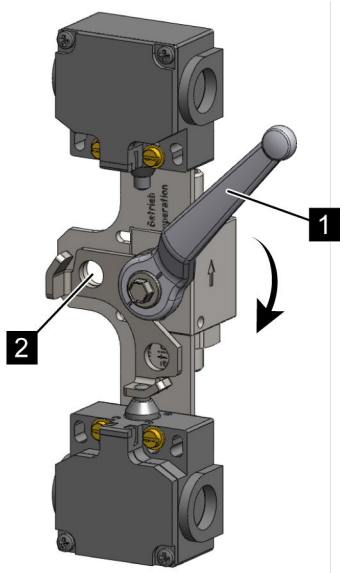


Fig. 20: Blocking device (optionally with 1 or 2 limit switches)

3. Turn the ball valve (Fig. 20/1) of the blocking device as far as it will go in clockwise direction (Fig. 20/arrow).
   ⇨ The "isolation" labeling on the ball valve becomes visible, indicating the corresponding extinguishing zone has been isolated.
4. Hook the padlock into the locking eye (Fig. 20/2) of the blocking device and lock it.
5. Store the key of the padlock in a safe place to prevent unauthorized personnel from resetting the isolation.
6. Make sure the isolation is indicated on the fire detection and extinguishing control panel.

7.3 Resetting the isolation

7.3.1 Warnings regarding the resetting of the blocking

Failure to reset

WARNING

Danger to life from failure to reset the isolation!
When isolated, the system does not provide any fire protection in the assigned extinguishing zone. There is danger to life and a risk of significant property damage in case a fire erupts.

- Do not shut down the system longer than necessary.
- Reset the isolation without delay when all work is complete.

Early resetting

WARNING

Danger of injury from resetting the isolation prematurely!
If the isolation of the system is reset while work is still being performed in the extinguishing zone, the system may be activated inadvertently. This may lead to injury and significant property damage caused by discharged extinguishing agent.

- Do not reset the isolation until all work that may cause inadvertent activation is complete.
- Allow only the person in charge of the system to reset the isolation.
- Make sure the isolating of the system cannot be reset by third parties in an unregulated manner.

Reset on activation

WARNING

Risk of injury from resetting the isolation during an activation!
If the isolation is reset while a pneumatic or electric release device is being actuated, the system will be activated instantaneously.

- Do not reset the isolation until no release device is being actuated.

7.3.2 Resetting the isolation of a single zone system equipped with an electric release device

Without mechanical blocking device

Personnel:
- Person in charge of the system

Protective equipment:
- Safety gloves
- Protective goggles

Tool:
- Screw reset tool (887645)

1. Ensure that the fire detection and extinguishing control panel do not indicate an alarm and that the system is not currently activated.

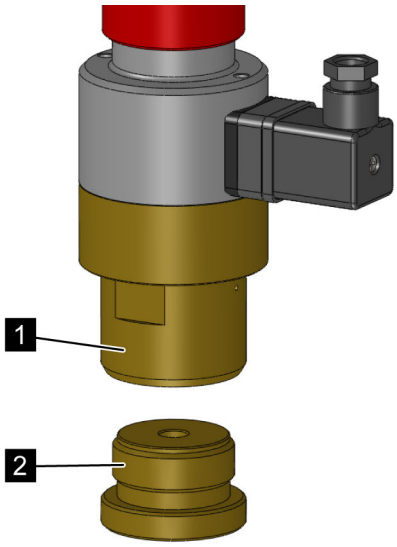


Fig. 21: Resetting the isolation

2. Screw the screw reset tool (Fig. 21/2) into the electric release device (Fig. 21/1).
   ⇨ Press the release pin into the inactive position to hide the red color marking on the release pin.
3. Unscrew the screw reset tool (Fig. 21/2) out of the electric release device.

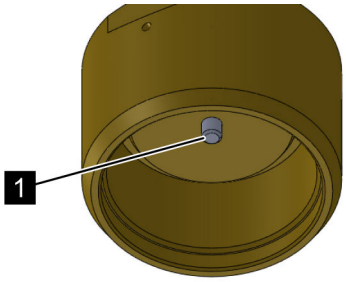


Fig. 22: Release pin

4. Ensure that the release pin (Fig. 22/1) of the electric release device is not active.

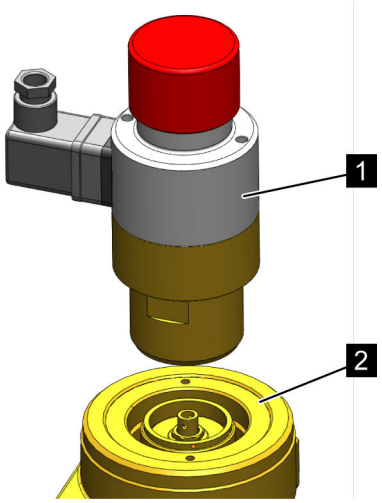


Fig. 23: Screwing on the release device

5. Screw the electric release device (Fig. 23/1) onto the valve (Fig. 23/2) of the associated extinguishing agent container and tighten with 50 +0/-15Nm (36.878 +0/-11.063 lb•ft) until it metallically rests on the valve.

   Just before the release device rests on the valve (approximately the last 10mm (0.4 inches)), the resistance when screwing on will increase.

6. Check whether the release device is firmly seated on the extinguishing agent container.

   ⇨ The deactivation has been reset.

7. If the status of the release devices (installed/removed) is monitored by additional limit switches, make sure the deactivation of the system is no longer indicated on the fire detection and extinguishing control panel.

With mechanical blocking device

Personnel:
- Person in charge of the system

Protective equipment:
- Safety gloves
- Protective goggles

Tool:
- Wrench

1. Ensure that the fire detection and extinguishing control panel do not indicate an alarm and that the system is not currently activated.

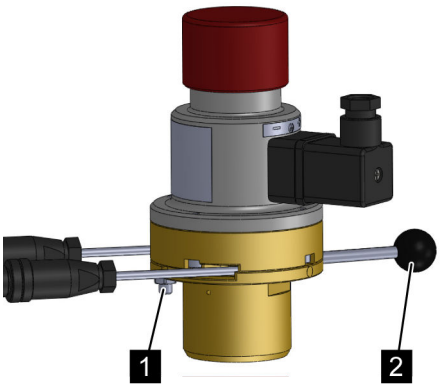


Fig. 24: Resetting the isolation

2. Undo the hexagon nut (Fig. 24/1) on the electric release device using a wrench.
3. Turn the manual lever (Fig. 24/2) on the electric release device to the "Operation" position.
4. Use a wrench to tighten the hexagon nut (10 Nm ± 2 Nm (7.38 ± 1.48 lb•ft)).
5. Ensure that the fire detection and extinguishing control panel signal the operational readiness of the electric release device and the electric release device is not blocked.

   ⇨ The isolation has been reset.

7.3.3 Resetting the isolation of a single zone system equipped with a pneumatic release device (PAE)

Personnel:
- Person in charge of the system

Protective equipment:
- Safety gloves
- Safety footwear
- Protective goggles

1. Ensure that the fire detection and extinguishing control panel do not indicate an alarm and that the system is not currently activated.

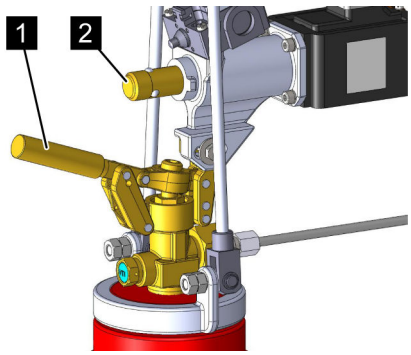


Fig. 25: Opened pilot cylinder

2. Ensure that the pilot cylinder of the pneumatic release device (PAE) is not open and that no pressure is applied to the pilot line.

   If the valve lever (Fig. 25/1) is thrown and the release pin (Fig. 25/2) is protruding, the pilot cylinder is open. Do not reset the isolation in this case and consult the Authorized Distributor.

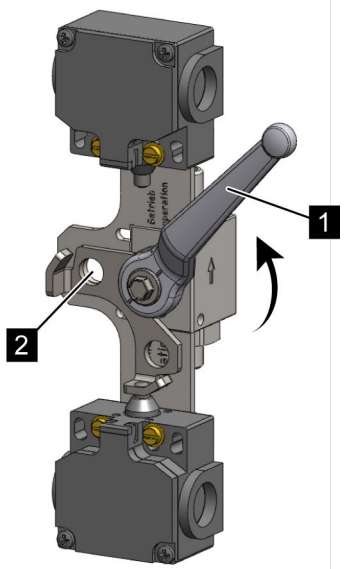


Fig. 26: Resetting the isolation (optionally with 1 or 2 limit switches)

3. Open and remove the padlock at the locking eye (Fig. 26/2) of the blocking device.

4. Turn the ball valve (Fig. 26/1) of the blocking device as far as it will go in counterclockwise direction (Fig. 26/arrow).

   ⇨ The "Operation" labeling on the ball valve is visible, indicating that the isolation of the release device has been reset.

5. Hook the padlock into the locking eye (Fig. 26/2) of the blocking device and lock it.

6. Pull the key from the padlock and store it in a safe place to prevent unauthorized personnel from isolating the system or parts thereof.

7. Make sure the isolation is no longer indicated on the fire detection and extinguishing control panel.

7.3.4 Resetting the isolation of a multi zone system* not UL

Personnel:
- Person in charge of the system

Protective equipment:
- Safety gloves
- Safety footwear
- Protective goggles

1. Ensure that the fire detection and extinguishing control panel do not indicate an alarm and that the system is not currently activated.

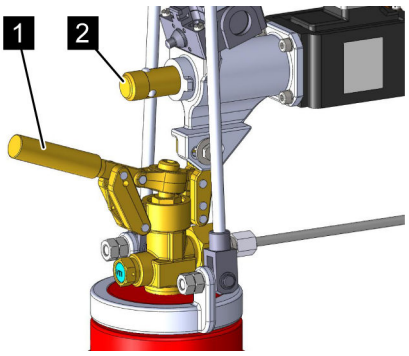


Fig. 27: Opened pilot cylinder

2. Ensure that the pilot cylinder of the pneumatic release device (PAE) is not open and that no pressure is applied to the pilot line.

   If the valve lever (Fig. 27/1) is thrown and the release bolt (Fig. 27/2) is protruding, the pilot cylinder is open. Do not reset the isolation in this case and consult the Authorized Distributor.

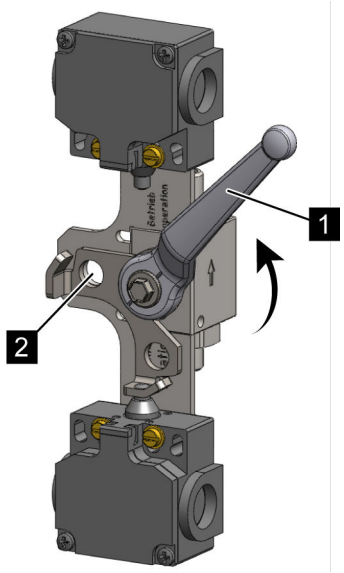


Fig. 28: Resetting the isolation (optionally with 1 or 2 limit switches)

3. Open and remove the padlock at the locking eye (Fig. 28/2) of the blocking device.
4. Turn the ball valve (Fig. 28/1) of the blocking device as far as it will go in counterclockwise direction (Fig. 28/arrow).
   ⇨ The "Operation" labeling on the ball valve is visible, indicating that the isolation of the release device has been reset.
5. Hook the padlock into the locking eye (Fig. 28/2) of the blocking device and lock it.
6. Pull the key from the padlock and store it in a safe place to prevent unauthorized personnel from isolating the system or parts thereof.
7. Make sure the isolation is no longer indicated on the fire detection and extinguishing control panel.

7.4 Resetting the isolation in the event of fire

Personnel:
- Person in charge of the system

Protective equipment:
- Safety gloves
- Safety footwear

If the system is isolated when activated in the event of a fire, the isolation can be reset retroactively.

INFORMATION

The isolation cannot be reset retroactively unless the control voltage is still supplied to the fire suppression detection system. As some fire suppression detection systems send only a single pulse, releasing the system retroactively is not possible with these types of control panels.

1. Make sure no one is still inside the extinguishing zone.
2. To reset the isolation, set the blocking device to the Operation position.

   If the system was isolated by removing the release devices because it is not equipped with a blocking device, it must not be put back into operation immediately by refitting the release devices.

   ⇨ The extinguishing agent containers open instantaneously.
3. Leave the extinguishing zone immediately.

7.5 Activating the system

WARNING

Danger of injury due to escape of gas under pressure!
When triggered, pressurized gas briefly escapes from the area between the valve of the extinguishing agent container and the release device. If the gas directly contacts unprotected body parts, and in particular the face, there is a risk of severe or even fatal injuries.

- Wear protective goggles and safety gloves.
- When triggered, maintain some distance to the release device and turn your face away from the release device.

The system is activated automatically by fire alarm systems installed in the protected enclosure. Other options to activate the system manually vary with the design of the system.

- Electric manual release at the extinguishing zone
- Manual activation at the "master" extinguishing agent container or the pilot cylinder

INFORMATION

If a release device has been activated, the activation of the system can no longer be stopped or interrupted.

This will happen after an activation

1 - If one or several fire alarm systems (depending on the system design), the fire detection system or a manual release are activated, the alarm will be transmitted to the fire detection and extinguishing control panel.

2 - A buzzer will sound on the fire detection and extinguishing control panel.

3 - All connected, central ventilation and air conditioning units as well as any other devices, for example the power supply, will be switched off. Fireproof doors and windows equipped with automatic locking mechanisms will be locked.

Air conditioning units in recirculation mode, if available, may continue to be operated in order to cool sensitive electrical components. This also promotes the mixing of the gaseous extinguishing agent in the enclosure.

4 - The alarm devices will be activated.

5 - The selector valves of the corresponding extinguishing zone (only for multi zone systems) will open.

6 - The set pre-warning time will start counting down.

7 - When the pre-warning time has elapsed, the valves of the extinguishing agent containers will open and the extinguishing agent will flow through the pipeline system to the discharge nozzles within the set flooding time.

8 - The extinguishing agent will evaporate at the discharge nozzles and be spread across the extinguishing zone.

9 - The hold time of the extinguishing agent, during which its effective concentration for suppressing fires is retained, will start counting down.

INFORMATION

If the system is activated by pneumatic/manual release devices or manual release devices, the activation will be immediate without any visual or acoustic alarm device.

Pre-discharge timer

The pre-discharge timer is the time between the release of the main alarm and the beginning of the fire extinguishing process. It is usually set to 10 s.

All persons within the affected extinguishing zone must leave within this period and lock all access doors and windows in the extinguishing zone that are not equipped with automatic locking devices.

INFORMATION

Fireproof doors that have already been closed can be opened at any time to provide an exit from the extinguishing zone.

7.5.1 Actuating the system with electrical manual release

⚠ CAUTION

Danger of injury from broken glass!
Smashing the pane of an electrical manual release may cause cutting injuries.

- If available, use a suitable break-proof object (e.g. a shoe) to smash the pane in order to protect your hands.
- If no suitable objects are available, protect your hand by wrapping a rag or similar material around it when smashing the pane.
- Turn your face away from the electrical manual release when smashing the pane to protect your eyes from any broken glass that may be flying around.

1. Carefully break the glass of the electrical manual release and turn your head away while doing so.
2. Press the release button.
   ⇨ The system has been actuated and the electrical alarm devices (e.g. signal horn, signal lamps) of the system actuate without delay.
3. Immediately leave the protection zone.

   i After the pre-warning time has elapsed, the system actuates and flooding commences.

7.5.2 Activation by pneumatic/manual release device

Protective equipment:
- Safety gloves
- Protective goggles

1. **⚠ WARNING! Danger of injury due to escaping extinguishing agent!**

   Make sure no one is still inside the extinguishing zone.
2. With multi zone systems, open the selector valve of the affected extinguishing zone.

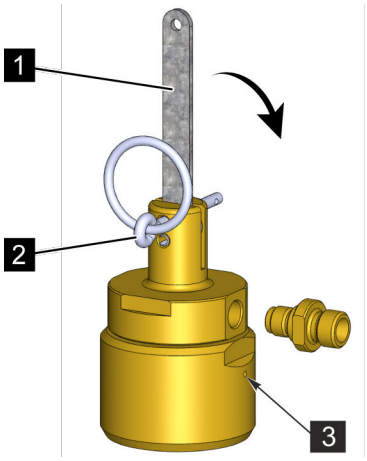


Fig. 29: Activating

3. Pull the safety pin (Fig. 29/2) out of the pneumatic/manual release device on the “pilot cylinder" extinguishing agent container.

4. *When the release lever is operated, the upper valve chamber in the valve is vented. Pressurized gas flows through it through a pressure relief hole in the cap nut of the release device (Fig. 29/3).*

   WARNING! Danger of injury due to escape of gas under pressure!

   When triggering this, maintain your distance to the release device, turn away from the pressure relief hole and wear protective equipment.

5. Press the release lever (Fig. 29/1) of the pneumatic/manual release device as far as it will go clockwise or counterclockwise (Fig. 29/arrow) and hold it down for 5 s.

   ⇨ The system will be activated immediately.

6. Leave the extinguishing zone immediately.

7.5.3 Activation by manual release device* not VdS

Protective equipment:
- Safety gloves
- Protective goggles

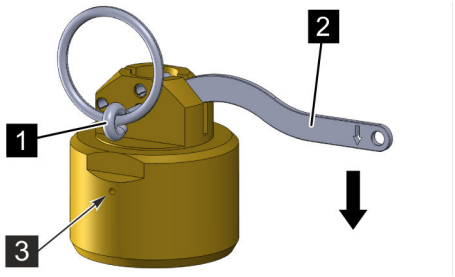


Fig. 30: Activating

1. Pull the safety pin (Fig. 30/1) out of the manual release device.

2. *When the release lever is operated, the upper valve chamber in the valve is vented. Pressurized gas flows through it through a pressure relief hole in the cap nut of the release device (Fig. 30/3).*

   WARNING! Danger of injury due to escape of gas under pressure!

   When triggering this, maintain your distance to the release device, turn away from the pressure relief hole and wear protective equipment.

3. Press down the release lever (Fig. 30/2) of the manual release device as far as it will go (Fig. 30/arrow) and hold it down for 5 s.

   ⇨ The system will be activated immediately.

4. Leave the extinguishing zone immediately.

7.6 Actions after the system is activated

Steps to be taken after a fire
Personnel: ■ Person in charge of the system

WARNING

Life-threatening danger through the occurrence of decomposition products and fire smoke!
If the fire energy is high, hydrogen fluoride as a product of thermal decomposition will form during the extinguishing process alongside the toxic smoke gases produced by the process. This substance is extremely caustic and will cause significant long-term and chronic harm to a person's health merely upon contact with the skin.

- Never enter the extinguishing zone without a self-contained breathing apparatus.
- Do not re-enter the affected rooms until the fire department has given the all-clear.
- Follow the instructions given by the rescue workers.

WARNING

Danger to life from re-ignition!
When the effective concentration of the extinguishing agent drops due to the ventilation of the extinguishing zone , the fire may be reignited by any sources of ignition that may still exist. There is a risk of sustaining severe or fatal injuries.

- Do not re-enter the affected rooms until the fire department has given the all-clear.
- Be prepared for re-ignition at all times. Keep suitable extinguishing agents (e. g. fire extinguishers) on hand when ventilating the extinguishing zone .

1. Do not re-enter the affected rooms until the fire department has given the all-clear.
2. Enter the extinguishing zone under the supervision of the fire department and open windows and doors.
3. Keep an eye on the fire sources that have been put out.

4. Do not clear the extinguishing zone for access until it has been sufficiently ventilated and there are no remnants of extinguishing agent left.
5. Notify the Authorized Distributor or service personnel authorized by the Authorized Distributor so that the operational readiness of the system can be restored.

   Do not replace extinguishing agent containers without authorization even if they are empty.
6. Perform function checks *Chapter 8 “Inspections” on page 61*.

Steps after faulty activation

Personnel: ■ Person in charge of the system

If no fire has occurred, the all-clear from the fire department is not necessary in case of a faulty activation of the system.

INFORMATION

In addition to the instructions specified below, all applicable local regulations regarding the behavior in the event of an activation of automatic fire suppression systems must be observed.

1. Make sure that no unauthorized persons can enter the affected premises before they have been cleared for access by the person in charge of the system.
2. Enter the extinguishing zone carrying substitute extinguishing agents (e. g. fire extinguisher) and open windows and doors to ventilate the area.

   Have the extinguishing agent extracted by the fire department in lower situated premises where sufficient ventilation cannot be achieved.
3. Do not clear the extinguishing zone for access until it has been sufficiently ventilated and there are no residues of extinguishing agent remaining.
4. Notify the Authorized Distributor or service personnel authorized by the Authorized Distributor so that the operational readiness of the system can be restored.

   Do not replace extinguishing agent containers without authorization even if they are empty.
5. Perform function checks *Chapter 8 “Inspections” on page 61*.

7.7 Reading the fill level

Personnel:
- Person in charge of the system

Protective equipment:
- Protective goggles
- Extinguishing-agent-resistant safety gloves

WARNING

Danger of injury due to extinguishing agent escaping under pressure!
If the liquid level indicator has been unscrewed from the extinguishing agent container, there is danger of severe or fatal injury.
- Do not unscrew the brass hexagon (Fig. 31/3) of the liquid level indicator.

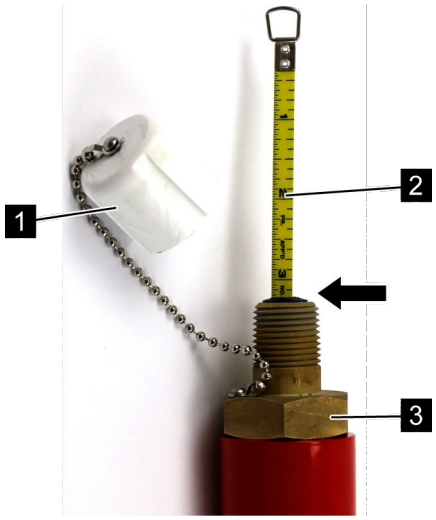


Fig. 31: Reading the fill level

1. Unscrew the plastic protective cap (Fig. 31/1).
2. Pull tape measure (Fig. 31/2) out of the liquid level indicator to the stop.
3. Slowly lower the tape measure into the liquid level indicator until a slight pull is felt.

   ⇨ The measuring tape is arrested magnetically on the float.
4. Read the fill level on the measuring tape above the threaded union (Fig. 31/ arrow).
5. Detach the measuring tape (Fig. 31/2) from the float with rapid hand movement, and lower it completely into the liquid level indicator.
6. Screw on the plastic protective cap (Fig. 31/1).

INFORMATION

A detailed description for checking the amount of extinguishing agent by means of the liquid level indicator can be found in the installation and maintenance manual.

8 Inspections

Interval

Listed below are important inspections necessary to ensure that the system functions properly, at its best efficiency and without failure. Perform these inspections on a **weekly** basis and record the performance in the log book.

Contact an Authorized Distributor if you have any questions concerning the inspections that need to be performed. Contact can be established through the manufacturer, see page 2.

INFORMATION

A master copy containing all mentioned inspection questions is included as a checklist in the Appendix to this document.

Inspections

Personnel:
- Person in charge of the system

Protective equipment:
- Safety gloves
- Protective goggles

WARNING

Danger of injury from faulty release!
A faulty release of the system may cause severe injuries and property damage.
- Activate the system only in the event of a fire.
- Protect the manual release devices in the protected enclosure from faulty release.
- Refrain from smoking inside the protected enclosure.
- Before performing any work generating heat and smoke, block the system.

1. Clean the system *Chapter 9 “Cleaning” on page 64*.
2. Check the operability of the system **weekly** based on the following questions.
   - Does the contact pressure gauge show system pressure? The pressure varies with the system design and amounts to 25 bar (360 psi), 42 bar (610 psi) or 50 bar (725 psi) at 21 °C (70 °F).
   - Have all extinguishing agent containers been fitted with release devices?
   - Have all extinguishing agent containers been sufficiently fastened with a clamp?
   - Do the extinguishing agent containers contain the required quantity – including any potential reserve quantities in accordance with the installation attest?
   - Are the extinguishing agent containers, valves, release devices, hoses, selector valves, non-return valves, and pneumatic pilot lines in sound condition?
   - Are the electrical pilot lines leading to the fire detection and extinguishing control panel and the equipotential bonding connected properly and in sound condition?
   - Are the pipe system, the pipe clips and the discharge nozzles intact?
   - Are the alarm devices intact?
   - Are the manual release elements accessible and in sound condition?
   - Are the automatic fire detectors intact?
   - Are the discharge zones of the discharge nozzles unobstructed?
   - Are all wall breakthroughs sealed off to the adjoining areas?
   - Are the pressure relief dampers closed?
   - Are the flow openings of the pressure relief dampers unobstructed?
   - Are all structural openings (windows, doors) closed or fitted with operational automatic locking devices?
   - Are the escape routes of the protected enclosure unobstructed?
   - Are additional fire loads (e.g. boxes, packaging material) removed from the protected enclosure?
   - Have all information signs of the system been attached and is the information they contain easily legible?

- Does the fire detection and extinguishing control panel show line voltage?
- Is no fault displayed on the fire detection and extinguishing control panel?

INFORMATION

If one or several of these inspection questions cannot be answered with "Yes" or if you are uncertain as to the correct answer, please contact an Authorized Distributor immediately. Contact can be established through the manufacturer, see page 2.

9 Cleaning

9.1 Warnings regarding the cleaning of the system

Faulty activation

WARNING

Risk of injury from faulty activation!
Cleaning the surfaces of the system components may set off the system if too much dust is stirred up, too much manual pressure is exerted or the release devices are activated by accident. This may result in injury and significant property damage.

- Always use caution when cleaning the component surfaces of the system.
- Clean the fire detection and release devices (e. g. electric manual releases, smoke detectors) as specified by their respective manufacturers.
- Avoid stirring up dust.

Cleaning agents

NOTICE

Property damage from abrasive cleaning agents!
Acids and bases may cause significant property damage to the system and its components.

- Use only water (a damp cloth) to clean the surfaces of the components.
- Never clean the system using acids, bases or other cleaning agents containing acid.

Cleaning equipment

NOTICE

Property damage from wrong cleaning equipment!
Wrong cleaning equipment may cause significant property damage to the system.

- Use only a damp cloth to clean the surfaces of the components.
- Never use files, grinders or similar cleaning equipment that abrade material to remove residue and/or corrosive residue from the component surfaces.

9.2 Cleaning the system

Personnel:
- Person in charge of the system

Protective equipment:
- Safety gloves
- Protective goggles

Material:
- Damp cloth

The component surfaces of the system must be cleaned prior to every function check of the system (weekly) in order to, in particular, allow for visual inspections.

1. Use a damp cloth to carefully remove dust and dirt deposits from all surfaces of the components.
2. Report any corrosion damage and/or coating stuck on the component surfaces to the Authorized Distributor.

10 Servicing

INFORMATION

Allow only an Authorized Distributor or service personnel authorized by the Authorized Distributor to perform any servicing and repairs on the system. Contact can be established through the manufacturer (see page 2).

11 Malfunctions

The following section describes possible causes for faults and the work required to correct these faults.

If faults occur frequently or cannot be remedied by following the instructions listed below, contact a company approved to install the system. Contact can be established through the manufacturer (see page 2).

11.1 Warnings regarding troubleshooting

Non-operational system

⚠ WARNING

Risk of death when system is not ready for operation!
If the system experiences malfunctions, it may not be operational. Fires cannot be fought effectively and may lead to severe injuries including death as well as significant property damage.

- Correct malfunctions (or have malfunctions corrected) immediately.
- Check the system for proper operation before putting it back into service *Chapter 8 “Inspections” on page 61*.

Improperly performed troubleshooting operations

⚠ WARNING

Risk of injury from improper troubleshooting!
Improperly performed troubleshooting operations may cause severe injuries and significant property damage.

- Have faults that cannot be remedied by following the instructions specified in this section corrected only by the Authorized Distributor or service personnel authorized by the Authorized Distributor.

Behavior if there is a fault
The following always applies:

1. Determine cause of fault using the following fault table.
2. If a fault cannot be remedied by following the instructions specified therein, consult the Authorized Distributor or the service personnel authorized by the Authorized Distributor and have them correct the fault.
3. Notify the owner of all detected faults.

INFORMATION

The fault table provided below specifies who is authorized to correct a fault.

11.2 Fault indicators

Possible faults are indicated on the fire detection and suppression control panel.

INFORMATION

This document does not include a description of the fire detection and suppression control panel. Follow the separate operation manual of the fire detection and suppression control panel.

Other indications of faults such as leakage of extinguishing agent are provided by the contact pressure gauge fitted on the extinguishing agent containers, the liquid level indicators (if present), and the weighing device of the pneumatic release device (PAE).

11.3 Fault table

Fault description	Cause	Remedy	Personnel
The contact pressure gauge installed on the extinguishing agent container indicates leakage of extinguishing agent.	The temperature has dropped below the minimum operating temperature of the contact pressure gauge	Increase the temperature in the cylinder storage room to more than 5 °C (41 °F). Contact the manufacturer if this is not possible.	Person in charge of the system
	Leakage	Have the extinguishing agent containers replaced.	Authorized Distributor
Leakage of extinguishing agent is indicated on the fire suppression detection system.	The temperature has dropped below the minimum operating temperature of the contact pressure gauge	Increase the temperature in the cylinder storage room to more than 5 °C (41 °F). Contact the manufacturer if this is not possible.	Person in charge of the system
	Leakage	Have the extinguishing agent containers replaced.	Authorized Distributor
The weighing device indicates leakage.	Weighing device set incorrectly	Have the weighing device adjusted.	Authorized Distributor
	Leakage of the pilot cylinder	Check the filling quantity of the pilot cylinder (if present) and have it replaced if necessary.	Authorized Distributor
Leakage of extinguishing agent is determined via the liquid level indicator.	Reading error	Repeat reading ↪ *Chapter 7.7 “Reading the fill level” on page 60*.	Person in charge of the system
	Liquid level indicator is defective	Have extinguishing agent quantity checked .through weighing.	Authorized Distributor
	Leakage	Have the extinguishing agent containers replaced.	Authorized Distributor
The fire suppression detection system displays a short circuit or an interrupted electrical transmission line.	Short circuit or wire break	Check the cable and the connection and have them repaired.	Qualified electrician

Tab. 2

11.4 Correcting leakage of extinguishing agent

Personnel: ■ Person in charge of the system

NOTICE

Material damage due to excessive enclosure temperature!
Excessive enclosure temperature (e. g. inside PC or server rooms) may cause electrical equipment to overheat and lead to significant property damage.

- Do not increase the enclosure temperature unless all electrical equipment is safeguarded against overheating.
- Comply with the specifications provided by the manufacturer of the electrical devices. Consult with the manufacturer if in doubt.

1. Use the installed heating equipment to increase the enclosure temperature to at least 5 °C (41 °F).

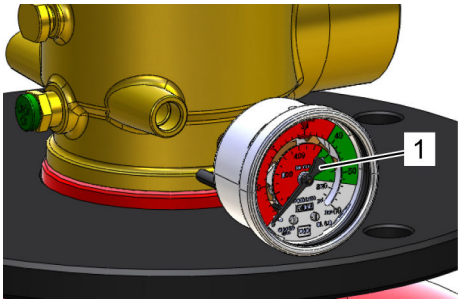


Fig. 32: Indicator position

2. Check the indicator position on the contact pressure gauge (Fig. 32/1).
   ⇨ The indicator of the contact pressure gauge must return to the green area.

INFORMATION

If the indicator is not in the green area despite the enclosure temperature being above 5 °C (41 °F), either leakage of extinguishing agent has occurred or the contact pressure gauge is defective. Contact the Authorized Distributor of the system.

11.5 Putting the system back into operation after a corrected malfunction

INFORMATION

Allow only an Authorized Distributor or service personnel authorized by the Authorized Distributor to perform the work necessary to put the system back into operation after the correction of a fault. Contact can be established through the manufacturer (see page 2).

12 Final shutdown, disassembly, and disposal

After the end of the system's useful life has been reached, the system must be disassembled and disposed of in an environmentally appropriate manner.

12.1 Final shutdown and disassembly

INFORMATION

The final shutdown and disassembly of the system must be entrusted to an Authorized Distributor or service personnel authorized by the Authorized Distributor. Contact can be established through the manufacturer (see page 2).

⚠ WARNING

Danger to life from faulty shutdown and disassembly!
Errors occurring while the system is being shut down and disassembled may lead to life-threatening situations and cause significant property damage.

- Allow only the Authorized Distributor or service personnel authorized by the Authorized Distributor to perform the final shutdown and disassembly of the system.
- Do not allow the final shutdown and disassembly to be performed without authorization.

12.2 Disposal

INFORMATION

The components of the system may be disposed of only by the Authorized Distributor or service personnel authorized by the Authorized Distributor. The manufacturer of the extinguishing agent is responsible for its disposal. Contact can be established through the manufacturer (see page 2).

NOTICE

Danger to the environment from improper disposal!
Improper disposal may result in danger to the environment.

- Entrust only the Authorized Distributor or service personnel authorized by the Authorized Distributor with the disposal of the system and its components.
- Allow only certified hazardous waste disposal companies or the manufacturer of the extinguishing agent the disposal of the extinguishing agent.
- Avoid unauthorized disposal.

13 Technical data

Specification	Value	Unit
Pre-discharge timer (recommended)	10	s
Flooding time, maximum	10	s
Hold time (recommended)	10	min
System pressure 21 °C (70 °F)[1)]	25/42/50	bar
	360/610/725	psi

[1)] depending on the design

INFORMATION

For more technical specifications, please refer to the installation and maintenance manual. Contact an Authorized Distributor if necessary. Contact can be established through the manufacturer (see page 2).

14 Glossary

Approved	Approved by an Authority Having Jurisdiction (ADJ) / competent authority.
Blocking device	Mechanical device used to prevent the extinguishing agent from flowing into the extinguishing zone, e. g. during maintenance, inspections, and repairs inside the extinguishing zone.
Check valves	The check valve allows the extinguishing agent to flow only in the designated direction of flow (towards the extinguishing zone). It is installed in the inlets of the manifold (multi-container system) and prevents extinguishing agent originating from other extinguishing agent cylinders to exit the manifold into the open when the system is activated or extinguishing agent cylinders have been removed.
Discharge nozzle	Last component in the pipe system of a fire extinguishing system from which extinguishing agent flows into the extinguishing zone. The orifice cross section of the discharge nozzle opening(s) has an overall or partial effect (depending on the extinguishing agent) on essential parameters including flooding time and extinguishing agent distribution.
Enclosure temperature	The usually prevalent temperature in the protected room. The calculation of the extinguishing agent quantity must be made based on the enclosure temperature that is to be expected.
Extinguishing zone	Total of all areas that will be flooded with extinguishing agent simultaneously in the event of fire.
Flooding	Outflow of the extinguishing agent into the extinguishing zone.
Flooding time	Period during which the required quantity of extinguishing agent flows out.
GWP (Global Warming Potential)	The potential of a substance, measured in CO_2 equivalents, to contribute to global warming (global warming potential). HFC-227ea has a GWP of 3500 (33 years).
Hold time	Period during which a concentration of the extinguishing agent is present inside the extinguishing zone which is higher than the specified minimum concentration.
Manifold	Manifolds connect several extinguishing agent cylinders with one another and merge them into a single unit. Each manifold is fitted with a check valve.
Multi-zone system	Multi-zone systems are equipped with central extinguishing agent stockpiling, which is intended for several extinguishing zones. Selector valves are used to discharge the quantity of extinguishing agent into the respective extinguishing zone (single zone system).

Operating pressure	Pressure inside a container at the maximum permitted operating temperature.
Pilot cylinder	Compressed gas cylinder, the contents of which is used for control purposes.
Pre-discharge timer	Period between the time when the alarm signal is issued as a warning to evacuate persons and the release of the extinguishing agent.
Pressure relief device	Preventing damage to the containment components caused by excessive overpressures (required for extinguishing gases as they must be introduced at high concentrations and rates) requires a mechanical pressure relief device which will limit the increase or drop of pressure inside the extinguishing zone to a specified value.
Protected enclosure	Total of all extinguishing zones connected to a fire extinguishing system.
Release	Automatic or manual activation of the fire extinguishing system for the purpose of flooding the extinguishing zone by opening the container valves and – if present – the selector valves.
Release device	Device integrated into the container valve or screwed on to the container valve. It opens the cylinder valve to allow the extinguishing agent to flow out. There are the following different types of release devices: **Manual release device**: It can/may only be fitted on top of the "Master" extinguishing agent container and, if applicable, also on top of an electrical release device already mounted on the container. **Electrical release device**: It is used to electrically release the container. The electrical release device receives its triggering signal from the fire extinguishing detection system. **Pneumatic release device**: It is used to pneumatically release additional containers in multi-container systems. It is screwed onto the extinguishing agent container instead of the electric release device and connected to a pneumatic pilot line that is located at the side release outlet of the electrically activated "master" extinguishing agent container. **Pneumatic/manual release device**: The pneumatic/manual release device also makes it possible to release a container manually on location.
Safety device malfunction pressure	↳ Safeguard against slow gas leaks
Selector valve	A valve installed in the main supply line which will, when activated, release the extinguishing agent into the respective zone to be flooded.

SFD safeguard against slow gas leaks	Device ensuring that slow gas leaks cannot release the fire extinguishing system unintentionally. Safeguards are also necessary in cases where discharging pilot gas is not always possible due to the design of the system.
System pressure	Pressure for which the fire extinguishing system has been designed and tested.

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Appendix

A Inspections

Inspection	Yes	No
Does the contact pressure gauge show system pressure? The pressure varies with the system design and amounts to 25 bar (360 psi), 42 bar (610 psi) or 50 bar (725 psi) at 21 °C (70 °F).		
Have all containers been fitted with release devices?		
Have all extinguishing agent containers been sufficiently fastened with a clamp?		
Do the extinguishing agent containers contain the required quantity – including any potential reserve quantities in accordance with the installation attest?		
Are the extinguishing agent containers, valves, release devices, hoses, selector valves, check valves, and pneumatic pilot lines in sound condition?		
Are the electrical pilot lines leading to the fire detection and extinguishing control panel and the equipotential bonding connected properly and in sound condition?		
Are the pipeline, the pipe clips and the discharge nozzles intact?		
Are the alarm devices intact?		
Are the manual releases accessible and in sound condition?		
Are the automatic fire detectors intact?		
Are the discharge areas of the discharge nozzles unobstructed?		
Are all wall breakthroughs sealed off to the adjoining areas?		
Are the pressure relief flaps closed?		
Are the flow openings of the pressure relief flaps unobstructed?		
Are all structural openings (windows, doors) closed or fitted with operational automatic locking devices?		
Are the escape routes of the protected enclosure unobstructed?		
Are additional fire loads (e.g. boxes, packaging material) removed from the protected enclosure?		
Are all information signs present and easily legible?		
Does the fire suppression detection system show line voltage?		
Is no fault displayed on the fire suppression detection system?		

INFORMATION

If one or several of these inspection questions cannot be answered with "Yes" or if you are uncertain as to the correct answer, please contact an Authorized Distributor immediately. Contact can be established through the manufacturer (see page 2).


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