General safety instructions

FIRE EATER

INMON001

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FIRE EATER

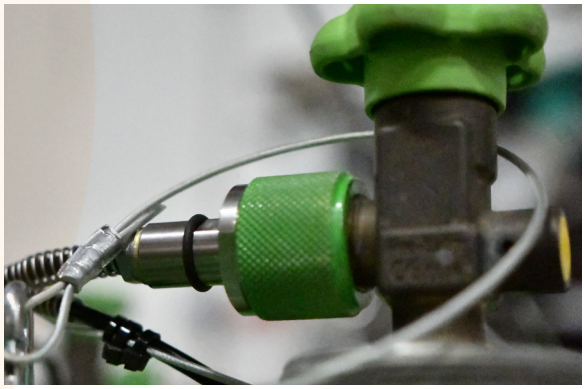
1. No handling of cylinders with pressure without cylinder cap

Pressurised cylinders must not be transported or handled without the cylinder cap screwed on. In all situations other than when the cylinder is installed in a system in a designated cylinder bracket, the cylinder cap must be screwed on. The cap type approved for the cylinder (Stamped on top of the hexagon) must be used so that the weight of the cylinder does not exceed the specified weight class.

a) If a cylinder overturns or the valve is subjected to mechanical overload, it could break off and this could lead to serious accidents. The cylinder cap is designed to protect against mechanical damage and to prevent accidents.
b) The Fire Eater cylinder valve is designed to withstand great mechanical impact, and cannot activate spontaneously. Both cylinder valve and cylinder cap comply with all safety requirements of ADR. When using Fire Eater original parts, and used according to these guidelines, safety is optimal.

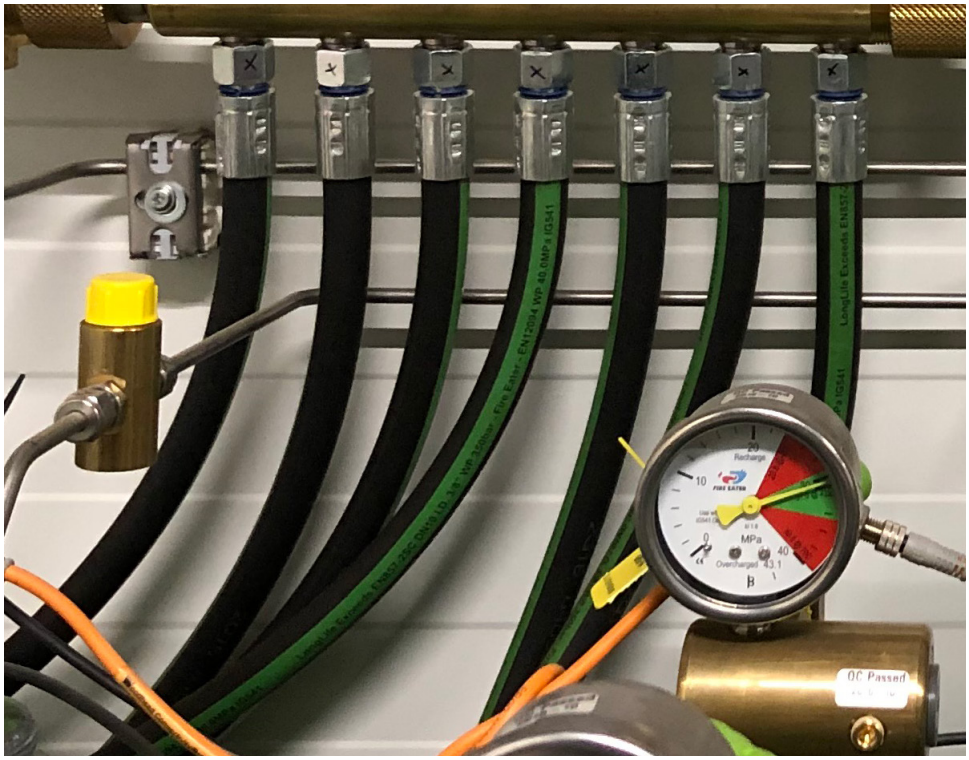
2. The cylinders must always be secured when opening the valve

When emptying, draining, or other handling that involves opening a cylinder valve that is not connected to the manifold and piping system, it is imperative that the cylinder is secured either in a cylinder cage or in a fastening device corresponding to cylinder brackets.
a) If a cylinder is opened when the cylinder is not properly secured, the reaction forces from the emptying can cause the cylinder to tip over with risk of damage or injury.



3. The hoses must always be securely fastened

If hoses are used in connection with emptying, draining, and when connecting to a pipe system, it must be ensured that the hoses are securely fastened at both ends and secured with hose protection if the hose length exceeds 1 m.
a) A hose that is not attached at both ends poses a high risk of personal injury and material damage if the cylinder is opened or activated.



4. Use only registered and maintained hoses

Only registered and maintained hoses may be used for purposes that include production and frequent use (this does not include hoses in Inergen systems that are only used in rare cases during activation).
a) Worn or damaged hoses entail increased risk of accidents. Although hose fixations significantly reduce the risk of personal injury, a hose that fails under pressure is a violent and undesirable event.

5. How to relieve pressure on an activation valve

Pressure relief of the actuation valve is carried out by:
a) Closing the cylinder valve completely.
b) Loosening the actuator valve nut (max. 360 deg.)
1. If it is loosened more, it can be released, resulting in the risk of personal injury.
c) When the activation valve is depressurised (manometer = 0), remove it from the cylinder valve.
1. If it is completely dismantled before it is depressurised, it can be released with overpressure, resulting in the risk of personal injury.

6. Pressure relief of a cylinder in the open air

If a cylinder placed in the open is to be emptied, and a possible activation valve is removed (according to the previous paragraph) it must be securely clamped, and only then may the cylinder valve be opened carefully and gradually: Start with a maximum of a quarter turn, and then increase with another quarter turn at minute intervals. Hearing protection must be used.
1. If the valve is opened fully while the pressure in the cylinder is high, the mass flow can be so great that a cylinder securely clamped in the cylinder cage can cause the cylinder cage to tip over, resulting in the risk of damage or injury.
2. Sound pressures above 100 dB may occur, resulting in risk of hearing damage.

7. Pressure relief of cylinder in a ventilated room

If the cylinder to be emptied is located in a ventilated room, the volume must be at least the cylinder volume x 3 [m3]. E.g., 1 x 80 litre cylinder can be emptied in a room larger than 240 m3. The guidelines in the previous paragraph must be complied with. If several cylinders are emptied over time and there is doubt about the capacity/air exchange of the ventilation system, reliable Oxygen measurement must be used to ensure that regulatory requirements for oxygen concentration at a workplace are complied with.
1. If the cylinder is emptied in a poorly ventilated room that is too small, there is a risk of a low oxygen concentration that could endanger personal safety.

8. Pressure relief of cylinder in a ventilated room, which is not large enough

If a cylinder is in an enclosed space that does not meet the requirement in the previous paragraph, the cylinder must be connected to a hose that directs the gas out to the open air. The hose must be suitable for the maximum working pressure of the cylinder and be securely fastened at both ends. The hose must be fitted with hose fixation attached to robust anchorage points at both ends.
1. Long hoses that are not fastened properly at both ends are a major safety risk.

9. Always fasten cylinders securely - even when pressure testing

Cylinders that are not installed in facilities, but are used for e.g., pressure testing in connection with the installation must be securely fastened before the cylinder cap is removed. With regard to the use of hoses, the guidelines in the paragraph **"The hoses must always be securely fastened"** must be complied with.
a) Unsecured pressurised hoses are a safety hazard.

10. Important when using booster pumps

When using a booster pump, all hoses must be secured with hose fixation at both ends and at each joint, before they are pressurised. Cylinders that are boosted on and off must be attached or placed in a cylinder cage. When using booster pumps, the quality of the filling must be documented. Follow special instructions provided by Fire Eater for use of booster pump.

a) Unsecured pressurised hoses are a safety hazard.
b) If a cylinder is pressurised with moisture in the cylinder, corrosion can occur, resulting in serious safety risk.
c) If it is not ensured that the cylinder is filled with Inergen with the correct specification, the extinguishing system can in case of activation pose a safety risk if the oxygen concentration is lowered without the necessary compensation with CO2, or if there are impurities such as CO (carbon monoxide).

11. Damaged cylinders/cylinder valves must be depressurised as soon as possible

Damaged (rusty or dented/bent) cylinders/cylinder valves must be depressurised as soon as possible, however, safety instructions in the previous paragraphs **"Pressure relief of a cylinder ..."** must be observed and it must also be ensured that the cylinder is not exposed to unnecessary stress (transport, cold, shock, etc.) before pressure relief has taken place. Before attempting pressure relief, the area around the cylinders must be shut off immediately. Unauthorised access to the site must be prevented, and
Fire Eater must be contacted for a risk assessment and decision on measures/procedures. Depending on the situation, it may be necessary to submit the planned measures to a working environment authority.

a) A significantly weakened cylinder poses a very serious safety risk.

12. Cylinders must always be labelled with clear precautions/warnings

Cylinders must be labelled with clear precautions/warnings so that inappropriate conduct and work on the plant without the necessary skills is avoided. Label "Label Fill Inergen" can be ordered for old systems using item number 801140.

a) Lack of skills is the decisive factor in almost all accidents.

13. Important when opening the cylinder valve

Before opening any cylinder valve, hose(s) must be connected and clamped to valve(s) and manifold(s) located on the same pipe system. If hoses that can be pressurised are not connected, the cylinder valve(s) can be opened without the risk of loose hoses being mistakenly supplied with pressure.
a) A hose that is put under pressure without being fastened is a high risk of accidents/injuries.

14. Do not spray liquid into a cylinder valve

Do not spray liquid (e.g., leakage spray) into the outlet of the cylinder valve (or other pressurised cavities).
a) Liquid in a pressurised cavity can lead to stress corrosion and risk of leakage or risk of the valve top (screw handle) breaking off.

15. When filling a cylinder with Inergen

When filling a cylinder, the filling must be verified (gas chromatography) and certified. The filling station must be authorised by Fire Eater A/S. At the latest when commissioning a system, it must be checked that filling certificates are present on all cylinders.
a) Improperly filled cylinders that do not meet Fire Eater specifications can pose a very serious safety risk.

16. Working with items under pressure

Working with items under pressure: Two people are recommended so that one is not alone if something should happen (This requirement applies generally internally in Fire Eater. In special cases, a dispensation can be granted if a secure procedure with notification and cancellation is used).
a) If one makes a mistake and gets injured while performing the work, the presence of a colleague or another person can reduce the consequences.

17. Always high level of security

Through compliance with and understanding of the previous paragraphs, work can be performed with a very high level of safety.
But the most important thing is that in addition to using one's common sense, one does not carry out work which one does not have knowledge about/competence to. It is important to think ahead and always consider the risk that one may impose on oneself or others.
a) Be aware that there may be additional local regulatory requirements that need to be complied with and that will take precedence over any other instructions or guidelines. If there are conflicting requirements between regulatory requirements and e.g., this or other instructions, the activity should not be carried out until an in-depth risk analysis has been undertaken, which has been submitted to the relevant authority. Fire Eater must be involved in such a process if it occurs.

18. Handling and transport of cylinders

Cylinder handling: Local rules for heavy lifting must be observed. It is recommended that two people are present when handling.
a) Repeated heavy lifting can lead to wear and tear and work injuries.

19. Avoid unnecessary movements - store in suitably secured cylinder cage

Cylinders fitted with cylinder caps may only be moved without being secured in connection with what is necessary for transport and handling. When not in use, store in a cage with a safety chain or other device to prevent it from tipping over.
a) Most cylinders weigh over 100 kg. If they topple over, it could obviously pose a risk of injury.

20. Use the correct tools when moving cylinders

Use appropriate tools for handling cylinders, such as a trolley with support device that ensures safe balance. Cylinders larger than 80 L should not be handled manually. Contact Fire Eater for suggestions on tools and procedures (facility design) to avoid heavy lifting.
a) When handling a cylinder weighing more than 100 kg, using e.g., ordinary sack trolley, imbalance can easily occur, which leads to cylinder/person falling over, with associated high risk of personal injury/damage to property.

21. No lifting of cylinder when using cylinder cap

It is not permitted to lift a cylinder using the cylinder cap. A cylinder cap in accordance with EN/ISO 11117 does not necessarily imply the suitability of the cylinder cap to bear the weight of the cylinder. The cylinder cap and the cylinder neck ring are not designed to lift the cylinder, and are for the protection of the cylinder valve only.
a) If the cylinder is lifted by the cylinder cap and a failure occurs while lifting, there is a risk of serious damage to both the cylinder and the environment.

22. The ADR regulations must be strictly observed when transporting cylinders

When transporting cylinders, ADR regulations must be strictly observed. This also applies if pressure cylinders are sent to Fire Eater. Pressure cylinders that are transported in a filled state are "dangerous goods" and must be treated as such. Only transport companies/drivers with a valid permit may be used. The cylinders must be secured to pallets or in cages using non-elastic methods so that the cylinders do not move and tip over during transport and loading/unloading. Contact Fire Eater if instructions are required.
a) Failure to comply with ADR rules and requirements, including the way the cylinders are loaded, will result in very large fines at roadside checks in addition to hazardous situations. Even though the sender has handed over the shipment to the carrier, the sender still has responsibility in relation to ADR.

23. Always use a cylinder cap when transporting

Before detaching/removing cylinder fittings from any cylinder, the activation valve must be removed and the cylinder cap fitted. It is recommended that cylinders that are transported empty are also fitted with cylinder caps so that the valves are protected against damage during handling/transport.
a) Cylinder caps protect against damage/accidents during transport and handling.

24. When unpacking cylinders delivered on pallets

When unpacking cylinders delivered on pallets, a suitable method must be used to ensure that the cylinders do not fall off the pallet when the steel strips are cut. When cutting steel strips, this must be done so that there is no risk of being hit by the strip when it breaks.
a) The steel bands are very sharp at the cutting point and can flick with great force. If cylinders should fall off the pallets, there is a high risk of accidents.

25. Use hose fixation for manual operation

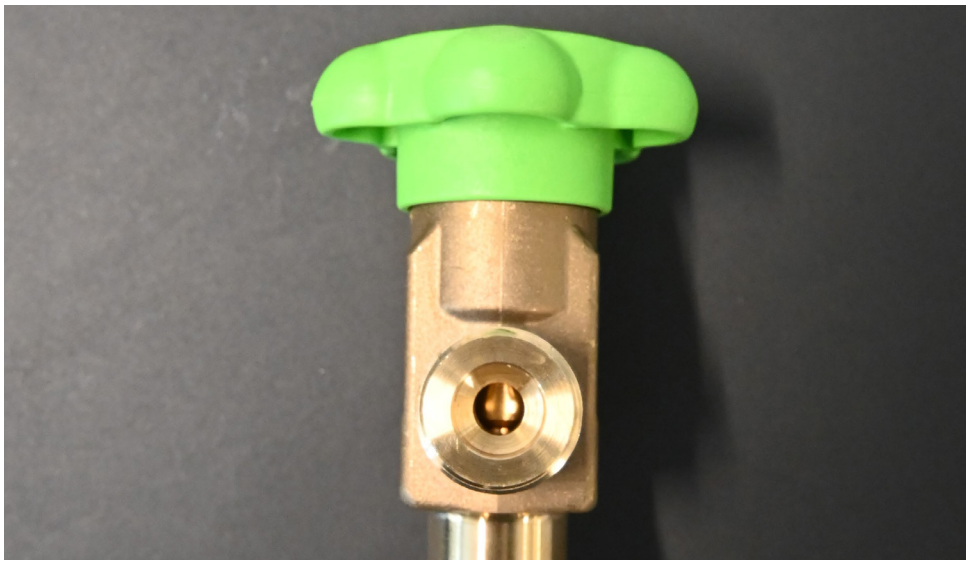
For manual operating devices on a cylinder battery, use hose fixations on the pilot cylinder (the one with mechanical activation) and on cylinders closer than 1 m from the pilot cylinder if the hose is longer than 50 cm.
a) The operating location of a pilot cylinder is particularly critical, as activation presupposes that one is in immediate vicinity of the hose at the moment of activation. Mandatory use of hose fixation here, must eliminate the risk of personal injury in the event of installation errors or damage to the hose

26. Only remove the cylinder cap when the cylinder is secured

When carrying out installation work where the cylinders are set up in the firefighting system, the cylinder cap may only be removed when the cylinder is secured with a loose cylinder bracket, where the bolt and nut are securely engaged, or otherwise securely secured against tipping over. After the cylinder has been correctly oriented for mounting the activation valve, the cylinder bracket(s) must be tightened.
a) When moving/handling the cylinders, the risk of them tipping over is greatest, and without a cylinder cap, there is increased risk of serious accidents.

27. Important when opening the cylinder valve

When opening the cylinder valve, do not leave it tightly tensioned in the open position. Turn 1/4-1/2 a turn back from fully open position.
a) If the valve is left tight for a long time (days), it may be exposed to overload with a risk of leakage or risk of the valve top (screw handle) breaking off.



28. Use stopper when removing a cylinder from a system

If a cylinder is to be removed from a system, all cylinder valves must, as a general rule, be closed before any hose (connected to the same pipe system) is loosened. All valves do not need to be closed if the cylinder to be removed is closed. The activation valve is depressurised and the hose disconnected from the manifold first. If the system is to be commissioned without cylinder(s), the manifold must be fitted with blind stopper(s) or fitted with a non-return valve before the cylinder valve(s) are reopened.
a) A hose that is accidentally put under pressure without being fastened is a high risk of accidents/injuries.

29. Safe procedure during commissioning

When commissioning cylinders in an installation, a safe procedure must be followed so that the cylinder valves are sealed in the open position. Contact Fire Eater for current procedure.
a) If cylinder valves are left under pressure in the closed state, the system will not work as intended.

30. Control measurement of the volume of the room

No later than at the start of the installation, it must be ensured by control measurement that the volume of the room exactly corresponds to that used in the calculation of the amount of extinguishing agent (number of cylinders). System calculation performed on the basis of drawing material must be followed up with an independent physical survey. Any survey carried out by one person should be followed up by a survey of another person so that a simple survey error does not lead to incorrect dimensioning.
a) If the system is incorrectly dimensioned, it may mean that it does not extinguish the fire effectively or that recognised limits for personal safety are exceeded.

31. Ensuring relief of overpressure before commissioning

Before commissioning the system, it must be ensured that the calculated openings for relieving overpressure are present.
a) If the necessary overpressure relief is not present, it can cause damage to the room when the system is activated.

32. Pressure test of pipe system during installation

During installation, the system's pipe system must be pressure tested according to the guidelines in the PED before the system is commissioned.
It is recommended that pressure testing be performed using dry gas (Nitrogen/Inergen), observing stricter safety procedures accepted by the relevant authority.
a) A pressure test as required in accordance with PED ensures that the pipe system as a whole is tight and will not fail in a fire situation.
b) When using water as a pressure test medium, it can be very difficult to ensure that no residual water remains in the pipe after the pressure test. Stagnant water in the pipe system causes harmful bacterial growth, risk of corrosion, and risk of damage when the dirty bacteria-filled water is blown out of the pipe by activating the system.

33. At annual service inspection

At annual service inspections, specific procedures and instructions must be followed. In addition, it must be emphasised:

a) Fire Eater test tools must be used and a test protocol must be kept for the results:
1. Activation force for IV8 valve on pilot cylinder(s).
2. Activation force for IS8b solenoid valve(s).
3. Electrical energy available upon activation of IS8b
By carrying out these tests regularly, it will be documented that the system is always in working order.
b) During the service inspection, it must be checked that the volume of the room has not changed so that it deviates from the calculation basis.

1. Changes in the volume of the room may mean that the system is not functionally safe and that the system must be adapted to ensure its correct and safe function.
c) Check that pressure relief is still present and that pressure relief devices are working properly.
1. If a pressure relief opening is blocked, activating the system can cause building damage.