Issued by: The Swedish Civil Contingencies Agency

General advice
MSBFS 2020:1 referral

The Swedish Civil Contingencies Agency's Regulations on the handling of flammable gases and flammable aerosols;

By virtue of § 25 of the Ordinance (2010:1075)[1] on flammable and explosive goods, the Swedish Civil Contingencies Agency hereby lays down[2] and adopts the following general advice[3], as well as, after consultation with Swedac, § 3 of the Ordinance (2011:811) on accreditation and conformity assessment.

Chapter 1. Introductory provisions

This statute contains the following chapters.

- Chapter 1. Introductory provisions
- Chapter 2. General handling requirements
- Chapter 3. Loose containers
- Chapter 4. Gas tanks and gasholder works
- Chapter 5. Mobile gas storage
- Chapter 6. Pipelines
- Chapter 7. Hose lines
- Chapter 8. Special requirements for the handling of acetylene
- Chapter 9. Exemptions in individual cases

[1] These regulations have been notified in accordance with Directive (EU) 2015/1535 of the European Parliament and of the Council of 9 September 2015 laying down a procedure for the provision of information in the field of technical regulations and of rules on Information Society services (codification) (OJ L 241, 17.9.2015, p. 1,-15 Celex 32015L1535).
[2] The Ordinance was last amended by SFS 2024:1266.
[3] The legal status of general advice is different to that for Regulations. General advice is not mandatory. Its function is to clarify the meaning of laws, ordinances, and regulations and to provide general recommendations on their application.

Scope

§ 1 This statute contains provisions on the handling of flammable gas and aerosol dispensers with flammable contents.

For gas mixtures with hydrogen where the risk of fire and explosion increases due to the proportion of hydrogen, X Chapter 2, §§ A, B, C, D, E, F, Chapter 2 §§ 4, 9, 13, and 17; X Chapter 3, § A; Chapter 4 § 3; X Chapter 5 § D; and Chapter 6, § 5, shall also apply.

General advice

The assessment of whether the risk of fire and explosion, due to the proportion of hydrogen present in a gas mixture, increases, should be based, inter alia, on the characteristics of the flammability range and ignition energy, as well as explosion group.

2 § 2 The provisions do not apply to

- gas installations and the handling on ships covered by other regulations;
- ammonia;
- pipelines for natural gas in the gas phase, with an operating pressure exceeding 4 bar (0.4 MPa) of overpressure, covered by MSBFS 2009:7, or other statutes replacing or amending MSBFS 2009:7;
- pipelines for hydrogen in the gas phase, and associated stations and equipment, from the last shut-off device within an installation, until the first shut-off device
  within another facility. In addition, the pipelines shall be partly located outside the premises of the installations;
- hydrogen in the liquid phase;
- handling regulated by regulations of the Swedish Armed Forces.

3 § 3 The provisions are addressed to those who will handle, or are handling, flammable gas or aerosol dispensers with flammable contents.

Definitions

§ 4 The volumes stated in these regulations refer to the internal volumes of the containers, irrespective of the amount of flammable gas contained therein. In the case of aerosol dispensers, they refer to the nominal volume, which is marked on the dispenser.

§ 5 The terms used in the Act (2010:1011) and the Ordinance (2010:1075) on flammable and explosive goods shall have the same meaning as those in this statute.

For the purposes of this statute:

ADR-S	the Swedish Civil Contingencies Agency's regulations (MSBFS 2024:10) on the transport of dangerous goods by on- and off-road, or other statutes that have replaced or amended MSBFS 2024:10;
Aerosol dispensers with flammable contents	dispensers containing flammable or extremely flammable aerosol in accordance with the Swedish Civil Contingencies Agency's Regulations (MSBFS 2018:1) on aerosol dispensers, or other statutes that have replaced or amended MSBFS 2018:1;
Aggregates	several pressure equipment assembled by a manufacturer to form an integrated and functional unit (pursuant to AFS 2023:5);
Device	equipment, loose container, ~~storage vessels,~~ gas tank, pipeline~~s~~, hose line~~s~~ and the like, intended to contain flammable gas;
Non-return valve	valve that permits flow of gas in one direction only;
Flashback arrestor	equipment whose function is to protect against continuous flashback, back flow and fire during the use of acetylene;
Battery vehicle	a vehicle containing elements which are connected by a manifold and permanently attached to that vehicle, defined according to ADR-S or RID-S. The elements of a battery vehicle include cylinders, tubes, pressure drums and bundles of cylinders, as well as tanks for gas, as defined in 2(2)(2)(1)(1), with a capacity exceeding 450 litres;
Flammable gas	a gas that is flammable according to the Swedish Civil Contingencies Agency's Regulations (MSBFS 2010:4) concerning which goods are to be regarded as flammable

	or explosive goods, or other statutes that have replaced or amended MSBFS 2010:4;
Detection	method for detecting the presence or release of a substance, with equipment that detects and registers the substance or release;
EI XX	fire-resistance class designation of building structures where ‘E’ stands for integrity, ‘I’ stands for insulation and ‘XX’ refers to the time in minutes at which the functional requirements are met in a standardised test (according to SS-EN 13501);
Multi-dwelling building	residential building with at least three residential apartments;
Gas tank	containers for flammable gas, excluding gasholder works, with associated safety devices and intended to be used in the same location at which it is filled;
Underground gas tank	a gas tank that is entirely or partially covered with filler such as sand or earth;
Gas-free declaration	written statement that a device has been emptied, cleaned and that no flammable vapours remain;
Gas installation	one or more composite aggregates or equipment intended to contain flammable gas;
Gasholder works	containers for flammable gas, the volume of which changes along with the quantity of gas;
Loose container	one or more interconnected containers with flammable gas, with the exception of mobile gas storage, intended to be used in a location other than where it is filled (also refers to aerosol dispensers with flammable contents);
MEG container	(Multiple-Element Gas), transport equipment consisting of elements connected to each other by a manifold and mounted in a frame, defined in accordance with ADR-S or RID-S. Elements include cylinders, tubes, pressure drums and bundles of cylinders, as well as

	tanks for gas;
Mechanical ventilation	ventilation flow that is created mechanically with, e.g., a fan;
Mobile gas storage	movable gas stores used for the purpose of storing and supplying a facility with gas and manufactured, controlled, and approved in accordance with ADR-S or RID-S, e.g. MEG container or battery vehicle (see definition);
Natural ventilation	ventilation flow driven by pressure differences due to wind, temperature, or concentration through openings to the surroundings;
Utility company	companies responsible for the distribution of flammable gas via pipelines to a total of more than 10 establishments or households;
Permeation	the ability of a gas, liquid, or vapour to penetrate a solid substance of any kind, such as the wall of a gas container, pipeline or packing material;
Reaction force	the force that resists when a gas in a pipeline exerts a force on the pipeline, e.g. when it is subjected to an internal pressure that causes the pipeline to want to straighten out;
RID-S	the Swedish Civil Contingencies Agency's Regulations (MSBFS 2024:11) on the transport of dangerous goods by rail, or other statutes that have replaced or amended MSBFS 2024:11;
Pipeline	fixed line for flammable gas, which is designed to take up the relevant internal pressure, external pressure, as well as reaction forces, and which, in addition to pipes, also includes couplings, valves and other components;
Hose line	flexible line for flammable gas which, in addition to hoses, also includes connections and other components;
Small dwelling	residential building containing a maximum of

	two residential apartments, which can be either a one- or two-dwelling building, which is detached or connected as a semi-detached house, a terraced house or a linked house;
Safety valve	a spring-loaded valve that is activated automatically by pressure and is intended to protect equipment from excessive internal overpressure;
Space	a defined room volume indoors or outdoors;
Ventilation area	the total area of the air supply and exhaust openings in the event of natural ventilation;
Hydrogen installation	one or more composite aggregates or equipment intended to contain hydrogen;

Chapter 2 General handling requirements

Devices

§ 1 Flammable gas may only be handled in equipment that is:

- sealed in order to counteract leakage;
- resistant to the gas, additives and pollutants that could be present; and
- suitable for the pressure and temperatures to which it could be exposed.

§ 2 Appliances shall be of non-combustible material, or otherwise protected against fire. The provisions do not apply to

- hose lines;
- loose containers;
- gasholder works and digesters with overpressure up to 0.5 bar;
- landfill gas extraction systems;
- polyethylene pipelines for flammable gas with a maximum external diameter of 32 mm (d_e 32) that are connected from the ground directly to a substation.

General advice

Pipelines should be made of steel or copper or be protected from fire by being buried at a depth of at least 0.6 metres.

§ 3 Devices with flammable gas with a pressure below atmospheric pressure must be protected against leakage of air or other damage caused by negative pressure.

General advice

In the case of landfill gas extraction systems, the requirement should be met by oxygen metering which shuts off a pressurisation device before the oxygen content on the vacuum side exceeds 9 % by volume.

§ 4 Devices that are permanently attached shall be installed, repaired, and maintained in a professional manner and by persons with competence for the gas in question.

General advice

Standards and established industry standards should be used in the parts that may affect fire and explosion risks.

Competences for the gas in question should include at least what is shown in Annex 4. An accredited personal certification (according to EN ISO 17024) for the tasks, where available on the market or equivalent completed education from higher education or industry institutes, should be seen as a way to demonstrate that competence exists.

§ 5 Devices with flammable gas shall be protected against corrosion.

General advice

Devices in harsh environments, e.g. buried, should be protected via the selection of materials or by cathodic corrosion protection.

Pipe penetrations from the exterior to the interior of a building should be protected by sealing the penetrations on the exterior side.

§ 6 Devices with flammable gas shall be protected against harmful vibrations.

§ 7 Where flammable gas is consumed in a professional context, it shall be possible to manually shut off the gas flow when the gas is not being used, and to shut it off quickly in the event of an emergency.

When filling loose containers, mobile gas storage, or gas tanks, it shall be possible to quickly shut off the gas flow in the event of an emergency.

Placement

§ 8 Devices with flammable liquids shall be protected by their location or by physical protection against damage caused by impacts, falling objects, and other similar actions. The design of physical impact protection shall take into account the traffic circumstances of the site.

General advice

Physical impact barriers for a gas tank should be placed at least 2 metres from the tank and designed as at least capacity class N2 according to EN 1317-2.

§ 9 Loose containers, mobile gas storage, gas tanks, gasholder works, digesters, and other devices shall be adequately positioned taking into account:

- the risk from fire and other harmful heating from the surroundings;
- the risk of damage to the surroundings by fire or explosion caused by leakage and ignition of the flammable gas; and

- the possibilities of evacuating the area around the devices in case of fire.

General advice

The location of loose containers with flammable gas, excluding hydrogen, LPG gas tanks above ground, and gasholder works and digesters should follow Annex 1.

The location of loose containers, and mobile hydrogen gas storages, as well as outdoor hydrogen installations above ground should comply with the safety distances resulting from the designed damage cases and damage criteria in Annex 3.

The location of loose containers and gas tanks with hydrogen indoors should be protected against fire from the environment based on the damage criteria in Annex 2, Table 3.

Risks of fire and explosion caused by leakage and ignition of hydrogen indoors are primarily dealt with in Chapter 2, §§ 13, A, B, C, and E of the Regulations. The risk of jet flames from indoor connection points should be based on the design damage cases and damage criteria for the protective objects in accordance with Annex 3.

Loose containers in and at shops should instead be located in accordance with the descriptions in Chapter 2 of the Swedish Civil Contingencies Agency's Handbook on flammable gases and liquids and gas appliances in shops.

Signage

§ 10 Signs informing about the prohibition of smoking and open fire and about the presence of flammable goods and flammable gas under pressure shall be provided in areas, enclosures, premises and other spaces where flammable gas is stored, if the total quantity exceeds 30 litres. The requirement for signage also applies to other handling where there is a risk of leakage of flammable gas to a more than negligible extent.

For private individuals, this requirement applies only to the storage or other handling of more than 60 litres of LPG or more than 10 litres of other flammable gas.

§ 11 The signs shall be in accordance with Annex 2. The signs shall be made of impact-resistant materials having a proper level of weather resistance. They shall be positioned and adapted to the surrounding environment such that they are easy to see even under varying light conditions.

§ 12 Signs shall be removed if the circumstances to which they refer no longer apply or exist.

Ventilation and risk of accumulation of gas

§ 13 A space where flammable gas is stored, or where there is a risk of leakage of flammable gas to a more than negligible degree, shall be sufficiently ventilated to prevent the propagation of a combustible gas mixture.

The supply air and exhaust air of the ventilation shall be located at suitable locations. The ventilation shall be designed so that the extracted air cannot enter through other openings in buildings.

Basements, conduits and other areas where natural ventilation cannot provide a sufficient flow of ventilation shall have a mechanical ventilation system.

The functionality of the ventilation shall be ensured on an ongoing basis.

General advice

In the case of natural ventilation in spaces with loose containers larger than 5 litres, the ventilation openings for gases other than hydrogen should have a total area of at least 1 % of the floor area of the space.

In the case of mechanical ventilation in a space for loose containers, the specific air flow (air renewal) of gases other than hydrogen should not be less than 0.5 room volumes per hour (rv/h).

When positioning supply and exhaust devices, the density of the handled gas should be taken into account. The openings should be evenly distributed at the top of the roof and at the bottom of the floor, as well as on opposite sides. In spaces smaller than 1 m^3, or in spaces where the distance from the door to the opposite wall is at most half of the door width (e.g. a cabinet), the ventilation openings can be on the same side. For hydrogen, unventilated parts should not exceed 5 % of the total volume of the space.

The ventilation should be designed so that there is a distance of at least 1 metre between the extracted air openings and other openings in buildings.

Hydrogen should primarily be handled outdoors.

In the case of natural ventilation indoors in a facility as referred to in X Chapter 2, § B, where detection for hydrogen is required, the ventilation openings should at least have a total area in accordance with the table below.

In the case of mechanical ventilation in a facility referred to in X Chapter 2, § B, where detection for hydrogen is required, the specific air flow (air renewal) should have at least a capacity as shown in the table below. The ventilation should be able to be activated when detecting a hydrogen emission, or be operated continuously.

Tabell 1. Ventilation area for natural ventilation and ventilation flow for mechanical ventilation during hydrogen handling in enclosed spaces calculated for a hole size of 0.1 mm^2 for different pressures and floor area.

Pressure in the pipeline (bar)	Natural ventilation (m^2 + m^2/m^2 floor area)	Mechanical ventilation (l/s per m^2 floor area)
< 10	0.40 + 0.004 m^2/m^2	9 + 0.5 l/s per m^2
>10 – 50	0.46 + 0.004 m^2/m^2	42 + 0.5 l/s per m^2
> 50 - 100	0.56 + 0.004 m^2/m^2	82 + 0.5 l/s per m^2
> 100 - 300	0.88 + 0.004 m^2/m^2	229 + 0.5 l/s per m^2
> 300 - 500	1.36 + 0.004 m^2/m^2	357 + 0.5 l/s per m^2
> 500 - 1000	2.18 + 0.004 m^2/m^2	614 + 0.5 l/s per m^2

X Chapter 2, § A Collection of hydrogen from a leak or discharge into both outdoor and indoor spaces shall be limited by the design of the space and the location of ventilation openings.

General advice

The volume of an unventilated space should not exceed 5 % of the total volume of the space.

More than two continuous walls should be avoided outdoors.

Hydrogen emission detection and response

X Chapter 2, § B For indoor hydrogen installations where there is a risk of gas accumulation, there shall be detectors and alarm devices to the extent necessary to quickly and reliably detect and alert about a hydrogen emission, in order to counteract damage caused by fire and explosion.

General advice

Detectors and alarm devices should be provided if the stored quantity that might escape exceeds 0.3 g per m^3 room volume.

The type, number and location of detectors should be adapted in order to quickly and reliably detect and alert of hydrogen discharges. The time from the accumulation of 1 % hydrogen at the detector, to the alarm emitted, should not exceed 5 seconds. Equivalent performance should be achieved for acoustic detectors. For the safety functions, SIL class 2 or equivalent should be considered acceptable.

X Chapter 2, § C In the event of the detection of an unwanted emission of hydrogen, indicating that a dangerous situation is likely to arise in an installation as referred to in X Chapter 2, § B, the gas flow shall be automatically, quickly and reliably shut off. Similarly, the installation shall be placed in a position which cannot aggravate the consequences and damage reduction measures shall be activated to the extent necessary to reduce the concentration of hydrogen, in order to prevent damage caused by fire and explosion. Uncoupled loose containers are not subject to this requirement.

General advice

A hazardous situation should be considered to be at risk of arising at the latest when 1 % hydrogen is exceeded.

The time between the detector activating, and the security function stopping the gas flow should not exceed 5 seconds. The remaining uninsulated pipe section should not exceed 50 metres. For the safety functions, SIL class 2 or equivalent should be considered acceptable.

X Chapter 2, § D Upon detection of an unwanted emission of hydrogen in a facility as referred to in X Chapter 2, § B, it shall be possible to assess, if necessary, when safe conditions prevail, from a location that is not affected by an explosion.

X Chapter 2 § E Spaces where hydrogen is handled shall be provided with pressure relief in a safe direction if an explosion in the space could seriously harm people or buildings.

General advice

Pressure relief should be used if the hydrogen concentration exceeds 0.3 g per m^3 room volume after 10 seconds from the onset of a leak according to the design damage cases in Annex 3; and

- where the building consists of several floors, or
- when people are present in or in neighbouring premises; or in close proximity to the building or space.

Unauthorised procedures

§ 14 Manoeuvrable components for devices and spaces where flammable gas is handled shall be protected against unauthorised procedure or unauthorised access.

For private individuals, this requirement applies only to the handling of more than 60 litres of LPG or more than 10 litres of other flammable gas.

General advice

Unattended operable components should be protected by being in locked spaces, equipped with locking devices or protected by a minimum of 2 metres high fencing.

Fire extinguishing equipment

§ 15 Where flammable gas is stored in gas tanks or loose containers, fire extinguishing equipment shall be available to the extent necessary to enable, at an early stage, the extinguishing of a fire that could potentially cause hazardous heating of the gas tank or the loose containers.

For private individuals, this requirement applies only to the storage of more than 60 litres of LPG, or more than 10 litres of other flammable gas.

Instructions and leak testing

§ 16 With the exception of loose containers, devices shall be tested for leaks before they are put into operation for the first time, and periodically as necessary to prevent leakage. The same applies when such a device has been moved and is to be put into service at a new location.

General advice

Devices should be periodically tested for leaks, primarily at frequencies according to the manufacturer's instructions and, alternatively, according to standards or established industry standards, or every other year.

Hose lines made of plastic or rubber should be tested for leaks after connection and subsequently once per year.

X Chapter 2, § FA tank station for CNG and hydrogen on may not be put into service or operated without having undergone an installation check or periodic inspection and, where appropriate, an extraordinary check, and has been found to protect against the possibility that vehicle tanks may be subjected to unauthorised pressure both during refuelling and during normal operation. The checks shall be carried out by an accredited third-party inspection body. The period between checks shall not exceed three years.

A revision inspection shall be performed after a repair, conversion, accident, or if the equipment has been placed on a standstill for longer than one year.

The requirement also applies to filling stations when filling mobile gas storages for CNG and hydrogen.

Installation checks shall include:

- scheduling reviews with regard to safety equipment;
- functional tests of temperature compensation, protection against excessive refuelling pressure and other safety equipment related to refuelling pressure; and
- issuance of certificate of verification.

Periodic inspections and audit checks shall include

- functional tests of temperature compensation, protection against excessive refuelling pressure and other safety equipment related to refuelling pressure; and
- issuance of certificate of verification.

General advice

Periodic checks should be carried out primarily at intervals according to the manufacturer's instructions and secondarily according to standards or established industry standards.

When carrying out a schedule review, at least the following should be checked:

- functional description of the temperature compensation system;
- methodological description of how the temperature compensation system with its safety-related functions can be controlled.

The following should be checked during installation checks, periodic checks, and exceptional checks:

- that the temperature compensation system has the correct pressure and temperature curve for the gas quality in question.

The certificate of verification should contain the protocol of verification of the temperature compensation and protection against excessive tank pressure.

§ 17 There shall be written instructions for the commissioning, operation, and maintenance of devices, unless the device only involves basic handling for which the entirety of the risks is easily foreseeable. There shall be instructions to the extent necessary to mitigate fire and explosion risks.

For private individuals, this requirement applies only to the handling of more than 60 litres of LPG or more than 10 litres of other flammable gas.

General advice

For hydrogen installations, the maintenance instructions should in particular describe how risks related to material and strength properties that may be

affected by hydrogen deformation, hydrogen attack and permeation are managed.

The maintenance instructions for hydrogen installations should identify the type of handling that may have harmful effects to the material and lead to damage caused by hydrogen, and how such effects can be prevented.

Verification and calibration of detectors should be carried out primarily according to the manufacturer's instructions and secondarily according to standards or established industry standards.

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§ 18 A utility company may only distribute flammable gas with an overpressure not exceeding 4 bar in the pipeline to another customer if the utility company is satisfied that the user's equipment for flammable gas has been satisfactorily set up with regard to the risk of fire and explosion. In the case of a supply to an activity subject to authorisation, the supplier does not need to ascertain in particular that the consumer's device is properly installed.

General advice

The requirement should be met by inspecting the device in accordance with standards or established industry standards.

Loaded vehicles

§ 19 A tanker whose transport tank for flammable gas is not emptied, cleaned and declared gas-free shall not be parked or placed in a garage or other indoor space. The same applies to vehicles that are loaded for the transport of loose containers with more than 60 litres of flammable gas.

Chapter 3 Loose containers

§ 1 A loose container larger than 5 litres shall be prevented from overturning by means of either fastening devices or its placement.

§ 2 A loose container that contains liquefied gas, and which has a safety valve, shall stand upright.

This requirement does not apply if the safety valve is intended to function even if the container is lying down.

Chapter 3, § A A loose container shall be protected against fire in a leaking hydrogen coupling causing harmful temperature effects on the container. A shut-off valve mounted directly on the loose container shall not be regarded as a coupling.

General advice

The requirement should be ensured by shielding, flange protection or placement.

Specific requirements for residential buildings and storage for households

§ 3 In small dwellings and multi-dwelling buildings, loose containers up to and including 30 litres may be handled.

§ 4 In multi-dwelling buildings with more than one storey, loose containers up to 5 litres may be handled. However, loose gas containing containers up to 30 litres may be stored outdoors in direct proximity to the dwelling, or in a special space in the dwelling which constitutes a separate fire compartment with a fire resistance class equivalent to at least EI 60 and which is ventilated directly to the outdoors.

§ 5 In attics, garages, basements or similar storage spaces in multi-dwelling buildings, no loose containers may be stored, except for single aerosol dispensers.

§ 6 If several households have storage spaces or garages in a building separate from the dwellings, loose containers, with the exception of single aerosol dispensers, shall be stored in a separate fire compartment with a fire resistance class equivalent to at least EI 60.

Marketing

§ 7 When marketing flammable gas to the public, loose containers larger than 5 litres shall be accessible to staff members only.

Chapter 4 – Gas tanks and gasholder works

§ 1 Above-ground gas tanks and gasholder works shall be placed on a stable, load-bearing, and non-combustible surface.

§ 2 An above-ground gas tank for liquefied gas shall be located in a place designed in such a way that any leaking gas cannot accumulate under or around the gas tank.

§ 3 Gas tanks and gasholder works shall be protected against fire in a leaking coupling causing harmful temperature effects on the container.

General advice

The requirement should be ensured by making sure that;

- the connection is located at an appropriate distance with regard to the gas and pressure in question;
- the connection is placed in such a way that the leak is not directed at the gas tank or gasholder works;
- its seal is constructed so that a leak is not directed at the gas tank or gasholder works; or
- there is a fire protection separation of at least E 60 for steel containers, or EI 60 for composite containers, between the coupling and the gas tank or gasholder works.

Underground gas tanks

§ 4 An underground gas tank shall be:

- anchored if there is a flood risk or if the groundwater can lead to movement of the gas tank;
- placed in such a way that it is protected from the harmful effects of ground movements, erosion, and other external stresses; and
- surrounded by material that cannot damage it.

§ 5 An underground gas tank shall be protected against traffic loads by:

- being located away from the road surface;
- having mechanical protection against traffic loads; or
- being structurally designed for traffic loads.

Loading and unloading

§ 6A gas tank shall have a connection for equipotential earth bonding for tank vehicles.

§ 7 A site for tank vehicles to park to connect to a gas tank shall be designed such that, in the event of an emergency, tanker vehicles can leave without the need to reverse.

§ 8 A gas tank for liquefied flammable gas may not be filled to a level that may cause it to fill completely from thermal expansion.

Decommissioned gas tanks and gasholder works

§ 9 Permanently decommissioned gas tanks and gasholder works shall be emptied and declared gas-free. Connections for flammable gas shall be removed or measures taken so that they cannot be used.

Chapter 5 Mobile gas storage facilities

X Chapter 5, § A Mobile gas storage facilities shall be located on a stable, load-bearing and non-combustible surface.

X Chapter 5, § B The connection point of a mobile gas storage facility shall be grounded. The mobile gas storage facility shall be grounded against this point before and during interconnection.

X Chapter 5, § C A site for the installation of mobile gas storage facilities shall be designed so that, in the event of an emergency, the transport vehicle can leave the site without having to reverse.

X Chapter 5, § D Mobile gas storage facilities for hydrogen shall be protected against a fire in a leaking hydrogen coupling causing harmful temperature effects on the mobile gas storage facility. Couplings included in ADR-approved mobile gas storage facilities are excluded.

General advice

The requirement should be ensured by shielding, flange protection or placement.

Chapter 6 Pipelines

§ 1 Above-ground pipelines shall be securely fixed in place.

§ 2 Measures shall be in place to ensure there are no discharges from open-ended pipe lines if valves are accidentally opened.

§ 3 Connections on pipelines that may be confused with other connections shall be designed, or marked to prevent any risk of confusion with regard to different gases and different pressures.

Connections at refuelling and filling stations, for mobile gas storage devices, shall be both designed and labelled to avoid any risk of confusion between different gases and different pressures.

§ 4 Piping that runs inside or through walls, ceilings, roofs or floors, or that is otherwise concealed in a building, shall have either have welded or brazed joints. Such pipelines shall have casing to prevent wear and to prevent leaking gas from spreading inside the walls, ceilings, roofs, or floors of the building.

These requirements do not apply to piping that is accessible without the aid of tools.

§ 5 Pipelines with hydrogen gas may not be placed indoors, hidden in a building except at penetrations through walls, ceilings, roofs, or floors. For such penetrations, casings shall be used to prevent wear and to prevent leaking gas from spreading inside the walls, ceilings, roofs, or floors of the building. Pipelines passing through such penetrations shall not have any joints inside the penetration.

Underground pipelines

§ 6 Underground pipelines shall be:

- placed in such a way that they are protected from the harmful effects of ground movements, erosion, and other external stresses; and
- surrounded by material that cannot damage it.

§ 7 Pipelines underground shall be traceable by pipe measurements. A record of the measurement shall be kept.

§ 8 Pipelines underground shall be protected from being accidentally dug up by:

- ensuring there is marking tape that provides information regarding the presence of gas piping along and above the route of the pipe;
- there being a sufficient distance between the pipeline and other underground installations;
- there being a sufficient distance between the pipeline and buildings; and
- the covering depth of the pipeline being at least 0.6 metres.

For directional drilling, no marking tape is needed.

General advice

Distances between an underground pipeline and other underground installations, and between an underground pipeline and a building, should adhere to standards or industry norms.

§ 9 Underground pipelines shall be protected against traffic loads by:

- being buried at least 1 metre deep (if the pipeline is only subjected to traffic loads from heavy goods vehicles in exceptional cases, then 0.8 meters is sufficient);
- having mechanical protection against traffic loads; or
- being located away from the road surface.

Connections for vessels

§ 10 A ship connection shall be electrically insulated between the connection and the land-based piping.

Decommissioned piping

§ 11 Permanently decommissioned pipelines shall be emptied and declared gas-free. Connections for flammable gas shall be removed or measures taken so that they cannot be used.

This requirement does not apply to landfill gas extraction systems.

Chapter 7 Hose lines

§ 1 Hose lines may only be used when their mobility is needed.

§ 2 Hose lines shall be reinforced or made of steel. Reinforced hose lines that are connected between loose containers and equipment intended for LPG or unreduced pressure shall be reinforced with steel.

§ 3 Measures shall be taken to protect hose lines that are at risk of being subjected to wear and tear.

General advice

Hose lines in restaurant environments that are at risk of incurring caustic damage due to grease accumulation should be plastic coated.

A refuelling station should be so designed that no part of the hose trails on the ground and so that the gas does not flow out if the vehicle is driven from the refuelling point without the hose being removed.

4 § 4 Hose lines shall be inspectable.

5 § 5 Hose lines shall not be built into walls, ceilings or floors or be otherwise concealed in a building.

X Chapter 7, § A Connections to hose lines that may be confused with other connections shall be designed or marked to prevent any risk of confusion with regard to different gases and different pressures.

Connections at refuelling and filling stations for mobile gas storage devices, shall be both designed and labelled to avoid any risk of confusion between different gases and different pressures.

§ 6 When welding or cutting with a welding torch using oxygen or compressed air, there shall be non-return valves between the welding handle and hose lines for flammable gas and oxygen or compressed air. The functionality of non-return valves shall be checked on a regular basis.

General advice

Non-return valves should be checked at least once every six months. To do this, the manufacturer's instructions must be followed.

Chapter 8 Special requirements for handling acetylene

§ 1 Loose containers with acetylene connected to a pipeline or hose shall stand upright.

§ 2 When handling acetylene in pipelines, the risk of decomposition shall be prevented by restricting the internal diameters of the pipeline.

General advice

The maximum pressure relative to the inner tube diameter of the hose should comply with standards or established industry standards.

§ 3 Acetylene may only be handled in fittings and pipelines that contain less than 70 % copper.

§ 4 When acetylene is incinerated, flashback protection shall be provided to counteract the risk of a flashback reaching the acetylene container or pipeline. Flashback arrestors shall be checked on a regular basis for external damage, wear, and functionality.

General advice

Flashback arrestors should be checked at least once every 24 months. To do this, the manufacturer's instructions must be followed.

§ 5 In multi-dwelling buildings, loose containers with acetylene shall be stored in a specifically intended space with ventilation to the open air, that constitutes a separate fire compartment with a fire resistance class equivalent to at least EI 30.

9 Chapter Exemptions in individual cases

§ 1 The authorities for social protection may grant exemptions from this statute in individual cases if there are special reasons for doing so.

General advice on requirements for assessments and supervisors

This section provides direct general advice on the Act (2010:1011) on flammable and explosive goods (LBE).

Requirements for assessments

According to § 7 of the LBE, those who run operations that are subject to licence requirements under LBE shall ensure that there has been a satisfactory study of the risks of accidents and injuries and damage to life, health, the environment, or property which may result from a fire or explosion caused by flammable or explosive goods as well as the consequences of such events.

General advice

A study of the risks involved in the handling of flammable gas should include a description of the handling that specifically considers:

- risk of gas leakage and ignition sources in the vicinity;
- risk of high or low pressure;
- risk related to human factors;
- materials of devices with flammable gas,
- operations, buildings, and other objects in the vicinity of the handling;
- accident prevention and damage mitigation measures; and
- how safe handling is maintained over time.

In the case of facility types for which there are established industry recommendations or standards, the study should consist of a description of the facility, risks, and measures as per the above, with references to the relevant parts of the recommendations or standards. Supplementary studies are necessary for any parts of a facility that are not covered by or which do not fully comply with the recommendations or standards.

For shops, the assessment should consist of a description of handling in the shop, risks and measures as referred to above, with references to the relevant parts of Chapter 2 of the Swedish Civil Contingencies Agency's Manual on the handling of flammable gases and liquids in shops, supplemented, if necessary, by assessments for matters not covered by the manual.

Supervisor requirements

According to § 9 of the LBE, those who run operations that are subject to licence requirements under LBE shall designate one or more operational supervisors. The second paragraph states that the task of a supervisor is to make efforts to ensure that the operation is run in accordance with the duty of care requirements and in compliance with the other obligations imposed by the LBE or regulations issued pursuant thereto. Additionally, said paragraph also states that the licence holder shall ensure that a supervisor is

given the powers and discretion otherwise necessary for them to be able to accomplish their tasks.

General advice

A supervisor of the handling of flammable gas should have knowledge on:

- how roles, responsibilities and powers are allocated in the operation;
- the properties and risks of the flammable goods;
- the legislation that is relevant to the fire and explosion risks;
- conditions of the licence;
- the structure, function and operation of the facility; and
- documentation that is relevant to the safety of the handling.

The scope and complexity of the handling should determine the depth of knowledge in the different areas required.

1. This statute shall enter into force on 1 January 2026. At the same time, the Swedish Civil Contingencies Agency's Regulations (MSBFS 2020:1) on handling flammable gas and flammable aerosols, and the Swedish National Inspectorate of Explosives and Flammables' Regulations (SÄIFS 1998:5) on filling stations for methane-powered vehicles shall be repealed.
2. Pipelines installed before 1 August 2020, and where the installation complies with earlier provisions, do not need to comply with the provisions of Chapter 6, §§ 4, 6 and 7.
3. Transitional provisions with deferred entry into force are introduced for the following paragraphs as follows:
    a. 1 January 2027 for Chapter 8, § 5;
    b. 1 January 2028 for X Chapter 2, §§ A, B, C, D, X Chapter 5, §§ A, C, Chapter 6, § 3, second paragraph, and X Chapter 7, § A;
    c. 1 January 2029 for X Chapter 2, § E, and Chapter 6, § 5.

The Swedish Civil Contingencies Agency

Annex 1 is general advice to Chapter 2, § 9

Location of loose containers with flammable gas, excluding hydrogen, LPG tanks above ground, gasholder works and digesters

Definitions

The following concepts are used in this Annex.

Flammable activities	activities that can create sparks or involve naked flames, e.g. welding work or a barbecue area;
tank hose connection point	the place on the tank, or its piping, where the hose is connected;
non-public operation	handling in operation to which the public does not have access;
public operation	handling in operation to which the public has access;
large amount of combustible material	e.g. tyre dump, lumber yard, tanks above ground containing flammable gas or liquid (including filling connection), loose containers containing flammable gas or liquid with a total volume more than 600 litres;
difficult-to-evacuate premises	premises from which an evacuation can be expected to take a long time due to the operations on the premises or the type of building;
escape route	means to evacuate people from a building;
tank vehicle hose connection point	the location on the tank vehicle where the hose is connected.

Loose containers

Table 1 and 2 below shows the recommended minimum distance between loose containers and surroundings. There may be situations where the conditions differ from what the tables assume, which may lead to different distances. Table 1 applies to non-public operations and Table 2 applies to

public operations. However, shops are excluded in Table 2 for public establishments.

Where the tables indicate the distance 0 metres, this means that the loose containers can be placed indoors. Where the tables indicate a distance other than 0 metres, this means that the containers should not be placed indoors in a building, as the distance applies between the containers and the building itself. They may, however, be placed on or in detached storage premises, containers, or the like that are specifically intended for the containers. Acetylene should, primarily, be stored in a specially locked outdoor ventilated space.

According to Table 1, for example, loose containers with a total volume not exceeding 60 litres, in the case of non-public operations, may be placed without distance or separation.

Fire protection separation (equivalent to at least EI 30 or EI 60 according to the tables) between loose containers and other items specified in the tables may result in shorter distances. This can be achieved by means of a ventilated space with fire resistant separation intended exclusively for the loose containers.

Another way is to place the loose containers outdoors at a fire protection separated outer wall, for example in a lockable sheet metal cabinet. In this case, the fire safety class of the wall can be taken into account without the need for any additional measures. However, if the total volume exceeds 1200 litres, a distance is always needed, according to the tables.

Note that an opening in a façade can compromise a fire protection separation. Therefore, distances may be needed to openings in the façade such as windows, doors or ventilation openings. Such distances would then need to follow the tables below, which gives either 3 or 6 metres, depending on the amount handled. Fire-rated cabinets can also be used if they have been classified for an equivalent of at least EI 30 or EI 60, respectively. They may then stand directly at a wall regardless of the fire engineering class of the wall or openings in the wall.

Tabell 1. Minimum distance for placement of loose containers (excluding hydrogen), non-public operations

Total volume of the loose containers (litres)	Distance between loose containers and - building in general - combustible materials or - flammable activities			large amount of combustible material		Escape route from difficult-to-evacuate premises	
	metres			metres		metres	
		EI 30*	EI 60*		EI 60*		EI 60*
0 - ≤ 60	0**	0	0	0**	0	0**	0
> 60 - ≤ 250	3***	0	0	12	0	25	0
> 250 - ≤ 1200	3	3	0	12	0	25	0

> 1200 - ≤ 4000	6	6	3	12	6	50	25
> 4000 - ≤ 8000	12	12	6	25	12	100	50

* Fire-protection separation equivalent to
** The containers should be gathered together in an appropriate location when not coupled/in use so that they can be moved to a safe location in the event of a fire.
*** No distance required when using loose containers on carts or the like that are readily accessible for the purpose of being moved to a safe location in the event of a fire.

Tabell 2. Minimum distance for placement of loose containers, -public operations

Total volume of the loose containers (litres)	**Distance between loose containers and - building in general - combustible materials or - flammable activities**			**large amount of combustible material**		**escape route from difficult-to-evacuate premises**	
	metres			**metres**		**metres**	
		EI 30*	**EI 60***		**EI 60***		**EI 60***
0 - ≤ 250	3**	0	0	12	0	25***	0
> 250 - ≤ 1200	3	3	0	12	0	25	0
> 1200 - ≤ 4000	6	6	3	12	6	50	25
> 4000 - ≤ 8000	12	12	6	25	12	100	50

* Fire-protection separation equivalent to
** No distance from the building is needed:
- up to 60 litres in outdoor storage at least 3 metres from openings to public areas of the premises, premises used by others, or emergency exits. Examples of openings are opening windows, doors and ventilation openings. If the bottles are instead placed in a locked metal cabinet or similar, it is enough with 1 meter to the same types of openings
- in the case of temporary work, e.g. the use of gas burners in restaurants, in teaching, or in the case of repair work with welding equipment
- if the size of the loose containers does not exceed 1 litre and the total volume of the containers does not exceed 2 litres.
*** shorter distances may be permitted, but not less than 3 metres, for gas-fuelled terrace heaters, and similar, outdoors.

Gas tanks with LPG

Table 3 below shows the recommended minimum distance between gas tanks and surroundings. There may be situations where the conditions differ from what the tables assume, which may lead to different distances. The stated maximum volume refers to the volume of a gas tank. The distances are counted from the skin of the gas tanks.
The table refers to the location of one or two tanks. In the case of two tanks, it suffices to have a distance between the tanks that equals the diameter of the larger tank.
In order for the table to be applicable, the tank vehicle's discharge hose needs to have been run straight as an extension of the refuel line in order to

prevent a jet flame from a leaking crack in the hose from causing damage to the tank.

Fire protection separation equivalent to EI 60 between the gas tank and others listed in the table may result in shorter distances as shown in the table. Please, also note that any opening in an EI-rated wall/façade can compromise the fire-resistant separation. Therefore, distances may be needed to openings in the wall/façade such as windows, doors or ventilation openings.

Tabell 3. Minimum distance for placement of one or two gas tanks with LPG above ground

Distance in metres between	Building in general, combustible material or flammable activities	Large amount of combustible material	Escape route from difficult-to-evacuate premises	Pumps and evaporators	Parked vehicles (passenger cars/heavy goods vehicles)	Tank vehicle hose connection point	Tank hose connection point
Tank capacity not exceeding 13 m3	6*	12*	100*	3*	6/8*	12*	0
Volume of tank >13 m^3 ≤100 m^3	12*	25*	100*	3*	6/8*	12*	6*
Tank vehicle hose connection point	12*	25*	100*	3**	6	-	-
Tank hose connection point	12***	12*	100*	3*	6	-	-
Pumps and evaporators	3**	12*	-	3**	6*	3**	3*

- Not applicable.
* With fire protection separation equivalent to EI 60 or higher, the distance can be reduced by half.
** With fire protection separation equivalent to EI 60 or higher, no distance is needed.
*** The minimum permitted distance is 6 metres for hose connection points on gas tanks with a volume not exceeding 13 m3. With fire resistant separation equivalent to EI 60 or higher, the distances may be reduced by half for tanks with a volume not exceeding 100 m3.

Gasholder works and digesters

Table 4 below shows the recommended minimum distances between the environment and outdoor gasholder works or digesters. There may be situations where the conditions differ from what the tables assume, which may lead to different distances.

Tabell 4. Minimum distance for the positioning of gasholder works and anaerobic digesters outdoors

Distance in metres between	Building, combustible façade	Building, non-combustible façade*	Building, separated in at least EI 60 towards the gas handling**	Other gasholder works/digester			Flare
				Membrane	Steel	Concrete	
Membrane gasholder works as well as digester with membrane cover	18	18	9	14	11	4	10

Steel gasholder works or digester	9	7	4	11	4	4	5
Concrete digester	6	6	3	4	4	2	5

* Non-combustible façade means façade of material of at least class A2-s1, d0 according to EN 13501-1, without unprotected windows, ventilation openings and other openings in the façade.
** With roof covering of at least class A2-s1,d0 in accordance with EN 13501-1, or alternatively with material of at least class B_{ROOF}(t2) in accordance with SS-EN 1187, on non-combustible surfaces.

Annex 2 is general advice to Chapter 2, § 11

Prohibition and warning signs

Ban on smoking and open flames

The sign shall be as in § 3.3 of Annex 3 of the Work Environment Authority's Regulations (AFS 2023:12) on signs and signals.

Warning for flammable goods

The sign shall be designed as hazard pictogram GHS02 in accordance with Regulation (EC) No 1272/2008 of the European Parliament and of the Council (the CLP Regulation)[4].

[4] Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (the CLP Regulation).

Warning for gas under pressure

The sign shall be designed as hazard pictogram GHS04 in accordance with Regulation (EC) No 1272/2008 of the European Parliament and of the Council (the CLP Regulation).
Where gas cylinders are stored, the sign shall be supplemented with the additional text ‘Gas cylinders—to be brought to safety in the event of a fire hazard.

Annex 3 is general advice on Chapter 2, § 9, and X Chapter 2, § E

Design damage cases and damage criteria for the location of loose containers, mobile gas storages and hydrogen installations, and for the assessment of the need for other protective measures

Definitions
For the purposes of this general advice

design damage cases	damage cases used to assess the need for protective measures, taking into account the severity of the impact, in order to give rise to a tolerable risk;
Evacuation route to safe location	outdoor route to evacuate people from a building to a safe place where they are not affected by a fire or explosion;
Crowd	a larger number of people who are in a well-defined area outdoors and who can move around freely, such as a school yard, grandstand, outdoor service or equivalent;
Concentrated crowd	a larger number of persons staying in a well-defined area that cannot move freely in relation to each other in order to leave the area;
Air intake/opening	an opening in a building, a building’s ventilation air intakes, opening windows and doors and non-tight eaves;
Very difficult to evacuate	building where the persons are not expected

building	to evacuate on their own, i.e. means-tested special housing in activity class 5B, spaces for health care in activity class 5C, and spaces where persons are kept locked away and other spaces in activities where the evacuation process may be associated with major difficulties in activity class 0, in accordance with the Swedish National Board of Housing, Building and Planning regulations BFS 2024:7;
Area of obstruction	an area with a high number of obstructions in the direction of the jet emission;
Obstruction	an obstacle that the flame front of an ignited gas cloud consisting of hydrogen and air passes and which extends out the flame front so that the area increases, thereby accelerating the course of combustion;
Persons, high attendance	persons expected to stay in an area for a large part of the time. Examples may be a well-trafficked pedestrian/bicycle path, entrance to shops or equivalent;
Persons, low attendance	persons who are expected to be present in an area where the extent is smaller than what is described as high presence above. Examples may include service roads, remote locations and footpaths or equivalent;
Assembly room	room with more than 150 persons, defined as class 2B or 2C in accordance with the National Board of Housing, Building and Planning regulations BFS 2024:7;
Damage criteria	criteria indicating the risk of damage that a certain type of protected object is deemed to be able to withstand;
Protection class	the division of protective objects into different classes depending on the severity of the potential impact;
Object worthy of protection	a place, activity, or other object that is considered a priority for protection.

	Examples of protective objects are: crowds, air intake/openings, and buildings;
Hydrogen storage	containers with hydrogen located in buildings or outdoors, with the exception of caverns and other underground storage;
Other building	building which is not a very difficult to evacuate building.

Protective measures for the effects of hydrogen installation on the environment

When developing protective measures such as safety distance and the need for pressure relief for a specific activity, firstly, risks and design damage cases for the relevant hydrogen installation should be identified.

The objects worthy of protection are first placed in three different protection classes according to Table 1, where protection class 1 is the most worthy of protection and protection class 3 the least worthy of protection. In protection class 1, objects worthy of protection that have a large simultaneous impact on several people should be placed. In protection class 3, buildings where the impact is primarily economic should be located. In some cases, a protected object should be protected in order to indirectly provide protection for another protected object. This is the case, for example, for 'difficult-to-evacuate building' and 'occupied area'.

Based on the protection class, the size of the design damage cases is determined. The design damage cases should be based on leakage from connection points, not from continuous welded pipes. The size of the discharge should be based on holes whose area is 3, 10 or 100 % of the cross-sectional area of the pipe at the coupling point. The leak flow is then calculated based on pressure and produced cross-sectional area of the hole, where the hole is approximated to a circle.

Table 1 below contains the proposed protective objects and recommended design damage cases for liquid gas installations and Table 2 contains recommended damage criteria for various protective objects. These should be used as a basis for risk analysis. It is also possible to supplement them with their own protective objects.

Tabell 1. design damage cases for different protective objects.

Protection class	Type of protected object	Object worthy of protection		Design damage cases, percentage of tube cross-sectional area
1	People	Concentrated crowd	if the persons in the crowd are prevented from leaving the area, for example in areas with very high population densities (>3 p/m^2);	100 %

	People	Crowds	Crowds need to be protected from unusual cases due to serious consequences.	100 %
	Very difficult to evacuate building	Air intake/opening	The building is protected from explosive atmospheres as the building is not intended to be evacuated.	100 %
	Assembly room	Evacuation route to safe location	In case of evacuation of assembly rooms (> 150 persons) it is difficult to reverse flows.	100 %
2	People	People, high attendance	The social risk becomes higher when people often stay in the area.	10 %
	Very difficult to evacuate building	Building	The building is not normally evacuated, but people remaining in the building are protected.	10 %
	Other building	Air inlets	The building shall be protected from explosive atmospheres.	10 %
	Other	Other gas containers	Other gas containers shall be protected against heating.	10 %
	Other	Area of obstruction	Protection distances shall protect against the transition of deflagration to a detonation.	10 %
3	People	Persons, low attendance	The risk to society will be lower when people are rarely present on the site.	3 %
	Other building	Building	The building is protected against extensive damage to property.	3 %

Where there are several different damage outcomes that may occur for the same design damage case, the design with the highest protective measure for the various design damage cases should be implemented.
A measure of the impact an object worthy of protection can be exposed to before a more serious injury occurs in an accident according to a design injury case is called the injury criterium. Table 2 contains injury criteria specified for the various protective objects. The damage criteria, together with the relevant design damage case, give the scope of the protection measure that should be implemented.

Tabell 2. Damage criteria for hydrogen installations. A highlighted value is what gives the farthest distance and thus becomes a basis for a design.

Protective objects	Hydrogen concentration	Jet flame	Radiant	Overpressure

Protective objects with People[1]	8 %	115 °C 309 °C	2.5 kW/m^2 10 kW/m^2	10 kPa
Building	-	Flame length	15 kW/m^2	10 kPa
Air inlets	8 %	-	-	-
Lots of obstructions	30 %	-	-	-
Other gas containers[2]	-	1,5 × flame length/ Flame length	10 kW/m^2 30 kW/m^2	-

1 the lower value applies if persons cannot leave the area immediately (e.g. > 3 p/m^2)
2 The first value is used for gas cylinders with low resistance, and the second for those with higher resistance.

The safeguards in this Annex have not considered scenarios of a tank rupture or a larger trapped gas volume exploding when developing. Such scenarios are prevented, inter alia, by other requirements of the regulation so that the probability of their occurrence is reduced to a tolerable low level.

Protection distance for the influence of fire in the surroundings against hydrogen storage

Table 3 shows the critical radiation level of different types of hydrogen containers provided that cooling of the containers can start within 30 minutes or if the power development can be expected to decrease significantly within this time frame.

Tabell 3. Resistance of different types of individual hydrogen containers;

Resistance	Container	Critical radiation, kW/m^2
High resistance	Steel: >2000 l or >500 bar	30
Low resistance	Steel: 0-2000 litres and 0-500 bar. Composite: All	10

1 The radiation level presupposes that cooling of the containers can be started within 30 minutes after a developed fire in the immediate area.

Table 4 below summarises the protective distances for how a hydrogen storage should be protected from an ambient fire or other influences. If the conditions deviate from what the tables assume, other distances may need to be provided.

Tabell 4. Compilation of protective distances to hydrogen containers against the influence of fire in the environment or other influences.

Exposure	**Resistance of the container**[1)]	
	Low	**High**
Large amount of combustible material[2]	11 m	5 m
Industrial building and civil engineering. Non-combustible façade	9 m	5 m
Industrial building and civil engineering.	13 m	7 m

Combustible façade		
Offices and counterparts. Non-combustible façade	6 m	5 m
Offices and counterparts. Combustible façade	9 m	5 m
Parked passenger car	3 m	2 m
Parked truck	12 m	6 m
Forest[3]	10 m	5 m
Power line[4]	15 – 60 m	15 – 60 m
Road[5]	10 – 25 m	10 – 25 m

1 The distances (except for power line and road) can be halved with a separation in class E 30. At EI 30, no distances are required, but the separation must not be part of the building's construction. In the case of a class of EI 60, the separation may be part of the construction of the building. If the barrier does not cover the entire line of sight from the hazard to the container, the original safety distances as shown in the table apply.
2 Based on 2500 kW/m^2 and surface area 30 m^2.
3 Note that the distances must be so large that the trees cannot fall onto the container.
4 depending on design voltage (ELSÄK 2022:1). The distance applies from the power line to the explosive atmosphere area.
5 Depending on speed (TRVINFRA-0039, the Swedish Transport Administration).

Annex 4 is general advice to Chapter 2, § 4

Competence of persons required to install, repair and maintain fixed gas installations

Have basic knowledge/understanding of:

Generally about flammable gas

- how the distribution of roles, responsibilities and powers for the handling of flammable gas in the establishment, including the role of the manager;
- how a gas system is built, as well as what pressure levels, shut-off options and safety functions are available;
- the importance of compliance with assembly and service instructions;
- which activities and parts of an installation fall under AFS 2023:5 or AFS 2023:11;
- the requirements for third-party and self-monitoring and how the control results in accordance with AFS 2023:5 and AFS 2023:11 are to be documented;
- control requirements, leak detection methods and commissioning of pipe installations;

- the inspection requirements for metallic pipes and jointing;

- classification documents in accordance with ATEX and know how work may be carried out in classified areas;

- properties and risks of flammable gases as well as how they affect the risk of leakage, fire and explosion;

- have the necessary practical training in the installation of couplings for pipes, fixtures, etc., including the selection of suitable gasket material, etc.;

Hydrogen

- the specific characteristics and risks of hydrogen and their impact on the risk of leakage, fire and explosion;

- how materials may be affected in contact with hydrogen, e.g. hydrogen embrittlement, high temperature hydrogen attack and permeation, and which materials are susceptible;

- which factors can affect hydrogen embrittlement during installation, repair and maintenance, such as plastic processing, that no tools shall be used that can damage the surface of the steel and act as initiation points for hydrogen embrittlement and cracking, and external load;

- the structure of a gas system with safety functions such as detection and response systems for hydrogen.

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