Dangerous and Flammable Goods
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Impact assessment for the Swedish Civil Contingencies Agency's regulations and general advice on the handling of flammable gases and flammable aerosols

A. General

Description of the problem and desired outcome

The Swedish Civil Contingencies Agency (MSB) has several regulations on flammable goods based on the Act (2010:1011) on flammable and explosive goods (LBE). The regulations lay down, inter alia, requirements on how the handling of flammable gas is to be designed, as well as on the storage and placement of containers with flammable gas. The purpose is to obstruct, prevent and restrict accidents and damage to life, health, the environment or property that may arise from fire or explosion caused by flammable gases. This impact assessment concerns an update of the rules governing the handling of flammable gas and flammable aerosols, MSBFS 2020:1.

In 2045, in accordance with the Riksdag's long-term climate goals, Sweden shall no longer have any net emissions of greenhouse gases to the atmosphere. This will entail major changes to Sweden's energy system. Hydrogen which is a flammable gas, if produced fossil-free, has been identified as an important energy carrier in the transition from fossil fuels to fossil-free forms of energy, as well as an input material in certain industrial processes, and its use is therefore expected to increase significantly in the near future. For example, hydrogen can be used in several types of operations, from small-scale storage of energy from solar and wind power, to new processes to produce iron and steel. There are numerous projects underway to develop technologies to produce, manage and build a hydrogen transport and storage infrastructure. Projects involving

hydrogen are also ongoing in the housing sector and municipal activities.[1]

Hydrogen has partly different characteristics than the most common flammable gases so far (e.g. LPG and methane) and will also be handled at significantly higher pressures and in new applications closer to society and the general public. The risk picture is therefore different. The purpose of the regulatory amendment is to supplement the current handling regulations for flammable gas and flammable aerosols with rules that to a greater extent also take into account the new forms of handling and the special risks involved in the handling of hydrogen.

The aim of the updated rules on the handling of flammable gas is that handling should also continue to be possible in a safe manner. As the green transition needs to be implemented swiftly, a high level of security needs to be maintained to ensure that no security incidents lead to setbacks. In order to obtain legal certainty and equivalence, it is also important that business operators, licensing and supervisory authorities across the country have a clear regulatory framework on the basis of which to proceed. It contributes to equivalent and more efficient licensing processes as the need to request additions to licensing applications decreases with greater clarity.

Since there is a very rapid development in the area and many projects depend on political developments both in Sweden and abroad, it is difficult to be certain about which sectors and which types of businesses will be affected and how many businesses will actually be covered by the new rules. We have considered including activities that are currently being planned, designed or developed, but we have concluded that it is at present too difficult to assess which activities will actually be implemented and which technology will be considered best practice and would therefore have been introduced regardless of additional regulatory requirements. The impact assessment therefore focuses on the existing handling of hydrogen and how this will be affected by the changes.

[1] Hydrogen for energy and climate transition, Final report within the mandate to coordinate work on hydrogen in Sweden, Swedish Energy Agency, ER 2024:25

The Swedish National Inspectorate of Explosives and Flammables regulations (SÄIFS 1998:5) on filling stations for methane-powered vehicles that contain specific regulations on filling stations for methane gas are outdated and will be repealed with this update. Requirements for, inter alia, protection against high pressure and the control of filling stations for methane and hydrogen will now be included instead in this updated regulation for the handling of flammable gas.

Some other, mostly editorial changes are also made in conjunction with the amendment to the regulations with regard to hydrogen.

Description of alternative solutions for the stated objectives and effects if no changes are made

The zero alternative is not to update the gas handling regulation, but instead to allow the existing rules to continue to apply. The MSB's assessment is that the risks associated with the special properties of hydrogen, its handling at high pressures and in more community-oriented (closer to the public) applications, may in such cases be overlooked. This could lead to more accidents of varying severity. Serious accidents can affect society's acceptance of technological development, which in turn risks slowing down the rapid transition from fossil fuels to renewable energy sources that is necessary for climate reasons.

In this context, it is also relevant that there are operators, as well as supervisory and licensing authorities, that have not yet had time to acquire the necessary expertise and familiarise themselves with the changed risk picture. A lack of an adapted and clear regulatory framework could therefore delay the licensing processes and lead to lower security but also reduced equivalence and legal certainty in the supervisory and licensing processes in the country.

In the long term, technology will mature, international standards will be developed, companies, consultants, authorities and industry organisations will develop the necessary skills. The MSB’s assessment is that the need for clear regulations will remain for the foreseeable period of time and that these regulations help to guide developments in the right direction.

An alternative solution could be to provide guidance on how existing rules can be applied to hydrogen instead of updating regulatory requirements. Such guidance could then be given in a manual text.

However, the MSB's assessment is that this would not provide sufficient clarity and legal weight for the licensing and supervisory authorities. In order for the same high level of safety to cover all operators, a regulation needs to be the basis. Reducing the risks associated with the handling of flammable products is one of the main objectives of the LBE. In order to continue to achieve this purpose, the rules regarding the handling of flammable gas, due to the rapid development with increased and wider use of hydrogen, now need to be supplemented.

Information concerning those affected by the regulation

The group affected by the regulation is broad, since flammable gas is handled by many different companies (see Annex 1). Hydrogen is currently handled within a selection of these many activities, e.g. in hydrogen manufacturing (electrolysers), process and manufacturing industry, transport activities, laboratories, etc., see Table 1.

The licensing and supervisory authorities under the LBE will have to familiarise themselves with a partially new set of regulations for their review of cases involving the handling of flammable gases, including hydrogen.

Private individuals handle flammable gas mainly in the form of LPG cylinders (for e.g. barbecues, caravans and camping equipment), aerosol dispensers (spray cans) and to some extent acetylene cylinders (welding gas). Private individuals are to some extent affected by the changes in, for example, Chapter 3 and Chapter 8 for these gases and to a lesser extent by the supplementary rules for hydrogen.

Information about the authorisations on which the HaV's decision-making power is based

Law (2010:1011) on flammable and explosive goods

By virtue of Section 25 of the Ordinance (2010:1075) on flammable and explosive goods (FBE), the Swedish Civil Contingencies Agency is authorised to provide for the handling of flammable goods. According to Section 25, paragraph 1, point 7, the Swedish Civil Contingencies Agency may issue regulations on the matters referred to in Section 36, paragraphs 5-14 of the Act (2010:1011) on flammable and explosive goods (LBE).

The MSB's authorisation also allows regulations for transmission lines (pipelines) for hydrogen pursuant to Section 25.1.7 of the FBE, Section 10 of the LBE, to be governed by the MSB. Such a Regulation for natural gas pipelines, MSBFS 2009:7, has previously

been issued on the basis of Section 41 of the former FBE (1988:1145) and Section 6 of the former LBE (1988:868) on flammable and explosive goods. No corresponding regulations for hydrogen have been issued by MSB. These rules at issue governing the handling of flammable gas may, to some extent, be considered relevant for hydrogen transmission pipelines, but these have nevertheless been excluded because they do not comprehensively regulate the safety aspects of such pipelines. However, the Act (2010:1011) on flammable and explosive goods contains safety requirements, e.g. Sections 6–11, which always apply, although at a more comprehensive and less detailed level.

Parallel regulations

Swedish Work Environment Authority

The Swedish Work Environment Authority's regulations on product rules, AFS 2023:4, AFS 2023:5 and AFS 2023:7, which are based on EU directives, always apply in parallel with the MSB's rules. The same applies to the regulations on the handling of flammable gas at a workplace, which are, for example, contained in AFS 2023:10, AFS 2023:11, AFS 2023:12 and AFS 2023:13. In many cases, the MSB's handling regulations on flammable gas supplement the Swedish Work Environment Authority's rules on flammable goods.

The EU regulation on the deployment of infrastructure for alternative fuels in the Union for road vehicles, trains, ships and stationary aircraft[2], (AFIR)

The AFIR contains EU-wide objectives for the deployment of hydrogen and methane refuelling infrastructure for, inter alia, road vehicles in the trans-European transport network, TEN-T. AFIR has two different scopes. One that applies only to the TEN-T extension (Article 6) and one that applies to all filling stations (Article 21). AFIR imposes technical requirements on filling stations for both methane and hydrogen to comply with certain safety-related standards. AFIR aims to make things easier for consumers and LBE to manage fire and explosion risks. The technical requirements of the AFIR dealing with compliance with certain safety-related standards partly correspond to those set up to date in SÄIFS 1998: 5 3.1, for methane. The technical standards in the AFIR include that filling stations for both methane and hydrogen shall protect against excessive pressure in vehicle tanks. The requirement of professionalism in the present gas handling regulation means that

[2] REGULATION (EU) 2023/1804 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 September 2023 on the deployment of alternative fuels infrastructure, and repealing Directive 2014/94/EU.

these standards must be complied with. The Swedish Civil Contingencies Agency has chosen to supplement these requirements with a new requirement to control the same protection against excessive pressure in vehicle tanks, including temperature compensation in line with the AFIR. See further under X Chapter 2, Section F below.

AFIR has also led to the introduction of a new Act (2024: 960) on alternative fuels infrastructure in Sweden that entered into force on 31 December 2024. The Act replaces the Act (2016:915) on requirements for installations for alternative fuels. The Act means, inter alia, that municipalities shall continue to be responsible for supervising compliance with the requirements for hydrogen refuelling stations, i.e. 3.1 and 3.3-3.6 of Annex II of the AFIR. The Act also regulates the possibility of passing on supervisory tasks to a private operator, the supervisory authorities' ability to decide on injunctions and the right to charge a fee for supervision and the handling of cases, as well as for appeals.

Information on the cost and other impacts of the regulation and an impact comparison of the considered regulatory alternatives

It is, for climate and environmental reasons, of great importance that the green transition can take place in a safe, equivalent, legally certain and efficient way across the country. Since hydrogen replaces fossil gas in many applications and constitutes a raw material in the production of, for example, fossil-free steel and in the production of other e-fuels, regulation that facilitates the transition has great environmental significance. There is also no equivalent alternative to the regulation, as has been described above. The social consequences of a clearer and better regulation are positive as it means better security for people living and staying in the vicinity of hydrogen plants. Below are the descriptions and cost implications of new, amended and repealed requirements.

New, amended and repealed requirements

This section presents and justifies new requirements and general advice, which previously did not exist at all, as well as amended requirements and general advice, which previously had a different meaning, in the current regulation. Where relevant, the costs it entails for those concerned are also described. Finally, repealed requirements are reported and justified in the current regulations.

New requirements

Chapter 2, Section 4 – Installation, repair and maintenance shall be carried out by persons competent for the gas in question
A new section has been added to the requirement for professional competence in relation to permanently installed equipment, stipulating that installation, repair and maintenance must be carried out by persons with competence in the gas in question, i.e. the requirement applies to all flammable gases with permanently installed equipment. The change in competence must be seen in part as a clarification and does not mean that competence was not previously required. The clarification is justified by the fact that, for example, hydrogen installations, due to specific characteristics of hydrogen, in addition to general competence for flammable gas, are to be handled by persons with special hydrogen competence. Furthermore, the requirement is justified by new uses of hydrogen that may be closer to the general public and that hydrogen is handled at high pressure. However, it is not reasonable to require this without, at the same time, requiring knowledge of flammable gas in general.

The specific terms of professional competence for flammable gas in general, and for hydrogen, are described in more detail in Annex 4, which is a new general advice. According to the general advice, an accredited certification of persons (in accordance with SS-EN ISO 17024) for the tasks, where available on the market, or a corresponding completed training from a college or industry institute, should be seen as the recommended way to demonstrate that competence is available. However, a precondition for the certification of persons is that at least one certification body undertakes this task and is accredited by SWEDAC. The accreditation ensures that different certification bodies have the same requirements for issuing certificates. However, this has not been developed at present.
The competence requirement has existed for a long time and already involves costs for both theoretical and practical training in general for flammable gas. A cost should therefore not be charged. However, the general advice on the certification of persons entails an increased cost for the installation companies if this way of fulfilling the requirement is chosen. Certification costs are incurred, inter alia, for the application, processing, reviewing and examination, and the costs will be recovered in case of re-certification at approximately 5-year intervals. The annual rate is

approximately SEK 3 000[3] per person certification per year. The number of persons who will work with the installation, repair and maintenance of hydrogen installations and certify themselves is estimated at 100 persons per year, which means a cost of SEK 3 million over a 10-year period.

X Chapter 2, Section A – Collection of Hydrogen
Hydrogen has high rise power and penetrates quickly and easily through different materials. This results in an increased risk of accumulation in high points and in adjacent spaces both inside and outside, which, if the accumulated gas ignites, can cause major damage. The risk is higher when hydrogen is managed at high pressure, which is becoming more common. The requirement entails costs for addressing a few existing plants with hydrogen, where this risk has not been taken into account. This is unlikely to entail any increased costs for the vast majority of plants, as according to SRVFS 2004:7 and the duty of care and risk assessment requirements in Sections 6–7 of the LBE, the need for appropriate measures to this effect should already have been identified. The number of operations where rebuilding may be necessary is estimated at 50, and the rebuilding costs are estimated at SEK 50 000–100 000 per plant[4]. This gives a cost of SEK 2.5–5 million.

X Chapter 2, Section B – Detection and alarm in case of hydrogen emissions
Risk analysis is generally an important tool to identify needs for detection, alarm and automatic shutdown for all gases. However, for hydrogen gas, the risk profile is such that gas detection during indoor handling has been made a regulatory requirement, partly because hydrogen gas is invisible, odourless and prone to leakage and detonation. In the event of a hydrogen emission, it is important to detect it early and reliably and alert the relevant parties so that they can respond to the emission. This already applies when handling relatively small quantities indoors and, in some cases, outdoors. As hydrogen is colourless and odourless and an emission requires rapid action, detection with automatic alarm is necessary in these cases. The speed and reliability can be achieved by the correct type, number and location of detectors and the fact that the safety functions have the correct SIL class or equivalent, which is stated in a general advice to the requirement.

[3] Data from RISE under the H2 Safe cert Vinnova Project, autumn 2024.
[4] Information from H2 Risk Consultant, autumn 2024.

The amount of detection that should be considered necessary is set out in a general advice.

The requirement may entail costs to fix a small number of existing, older plants that handle hydrogen but do not have detection and alarms installed to the extent necessary. Increased costs for newer plants are not taken into account as detection and alarm are considered state-of-the-art and are assumed to be included in the installation costs of newer plants.

The necessary scope for existing older plants is appropriately developed and documented in the risk investigation in accordance with Section 7 of the LBE for activities subject to a license. For non-licensed activities, this may be done in a separate investigation, which may be reported to the supervisory authority in the event of an inspection.

An investigation, which may also conclude that detection is not necessary, is estimated to be required for 100 plants with hydrogen installations, at an average cost of SEK 6 400 (8 hours at SEK 800), i.e. a total of SEK 1.28 million.
Costs for additional detection systems are assumed to be needed for all 100 plants. The average cost is estimated at SEK 100 000, of which the control system is SEK 10–50 000, gas detectors indoors SEK 10–25 000 and ultrasonic meters for outdoor or large indoor premises SEK 150–170 000[5]. This results in an additional cost of 10 million. Taken together, this represents a cost of approximately SEK 11.3 million.

X Chapter 2, Section C – Measures for hydrogen detection
The requirement means that measures must be taken automatically upon detection of an unwanted emission of hydrogen gas that could lead to a dangerous situation (high alarm) in a facility covered by the detection requirements in X Chapter 2, Section B above. The plant shall then automatically, quickly and reliably be placed in a position that cannot aggravate the consequences (fail-safe mode), the gas flow shall be shut off and damage-limiting measures shall be activated to the extent necessary to reduce the hydrogen concentration in order to prevent damage caused by fire and explosion. The measures must be carried out automatically because it is time-critical to, among other things, stop the emission in order to reduce possible consequences to a tolerable level.

[5] Euromechanics

The fact that, according to the general advice, a dangerous situation should be considered likely to arise at the latest when 1% hydrogen is exceeded is in line with practice. The time limit of 5 seconds in the general advice is based on the need for rapid and safe shutdown which can be achieved through SIL Class 2 or equivalent. According to the general advice, the remaining uninsulated pipe section should not exceed 50 metres in order not to allow the remaining amount of gas in the pipelines to cause more than short-term continued emissions after the emission point has been isolated.
Increased costs for newer plants are not taken into account because similar measures schemes as described above are considered state-of-the-art and are assumed to be included in the construction costs of newer plants.
The requirement for older existing plants involves, in addition to detection costs and alarms reported above, costs for a number of fast closing valves and non-return valves at selected locations. In addition, there are in some cases additional costs for forced ventilation or other damage-limiting measures. The number of existing older plants where this may be necessary is estimated as above at 100 mainly smaller hydrogen plants, and the cost is estimated as an average of SEK 100 000. In total, the safety measures are therefore estimated to amount to approximately SEK 10 million.

X Chapter 2, Section D – Monitoring when detecting hydrogen emissions
In order to facilitate the selection of measures during an intervention in the event of an unwanted emission of hydrogen, it is often important to know the extent of the emission. Being able to read the current concentration gives a picture of which events are likely and any intervention measures can be designed on the basis of the information.
The requirement means that when detecting an unwanted release of hydrogen in a plant as referred to in X Chapter 2, Section B, it is possible to assess whether safe conditions exist from a safe place, if there is a need.
The number of plants where there is an estimated need and where there is not already one is estimated at 100 large and small facilities, out of a total of just over 1 000 hydrogen gas facilities according to Section C below, and the cost is estimated to be an average of SEK 100 000. The total cost is estimated at approximately SEK 10 million.

X Chapter 2, Section E – Pressure relief of spaces where hydrogen is handled

Ignition of a hydrogen emission into a space carries the risk of high pressure build-up that can affect building structures or people in the vicinity. Pressure relief of the space itself reduces the risks of harmful pressure.

Pressure relief walls/panels shall be placed in a safe direction. However, there may still be a risk that pressure relief devices need to be installed to prevent flying debris, as this could cause serious damage to building components and people in the vicinity. The requirement may entail costs to rectify a number of existing, older hydrogen plants. However, increased costs for most plants should not arise as according to both SRVFS 2004:7 and Chapter 2, Section C, see above, appropriate measures should have been taken against this to a sufficient extent.

Therefore, the number of existing establishments where this is deemed necessary under this new requirement is estimated at a few. If the number is set at 10 and the cost is assumed to be SEK 500 000 on average, the total cost will be SEK 5 million.

X Chapter 2, Section F – Requirements for installation, recurrent and audit control to prevent vehicle tanks and mobile gas warehouses from being subjected to unauthorised pressure both during refuelling or filling and during normal operation, for CNG and hydrogen refuelling stations and filling stations

CNG and hydrogen refuelling stations may not be put into service or operated without having undergone installation checks, periodic checks and, where applicable, audit checks. The requirement specifies what the checks shall cover. Including functional control of temperature compensation and protection against excessive pressure during refuelling. This ensures that vehicle tanks cannot be subjected to unauthorised pressure both during refuelling and during normal operation.

This requirement also applies to filling stations when filling mobile gas layers for CNG and hydrogen. The checks shall be carried out by accredited third-party inspection bodies. According to general recommendations, periodic inspections should be performed primarily at intervals according to the manufacturer’s instructions and, secondly, according to standards or established industry norms. However, according to the requirement, the time between the checks may not exceed three years. General advice further specifies how the checks should be carried out.

Corresponding requirements for checks have previously existed for CNG in the Swedish National Inspectorate of Explosives and

Flammables' regulations and general advice (SÄIFS 1998:5) on filling stations for methane-powered vehicles, Chapter 4. This requirement (check of protection against unauthorised pressure) is hereby moved to this updated gas handling regulation. The requirement has now been supplemented to also include hydrogen. SÄIFS 1998:5 is phased out and repealed; see below under the heading Repealed requirements.
Costs for checks of CNG refuelling points are not included here, as the requirement has already existed.
For the corresponding checks for hydrogen, the cost is estimated at SEK 30 000 per control and refuelling station. It is assumed that the checks can be carried out automatically according to standardised filling protocols, but competent third-party bodies should nevertheless ensure that the checks are carried out and documented correctly. For the existing 8 hydrogen refuelling stations, this means a total cost of SEK 240 000 per 3-year period. For filling stations for mobile gas layers of hydrogen and CNG taken together, which are estimated to be 100, it is assumed that half already carry out the corresponding checks. For the remaining amount, the cost is SEK 1.5 million per 3-year period.

X Chapter 3, Section A – Protection of loose containers against fire in leaking hydrogen gas connections

Loose containers have the same level of protection as a gas tank in terms of protection against a harmful temperature effect on the container caused by a fire in a leaking hydrogen gas connections. The reason is that jet flames from a hydrogen gas connection may become long and very hot and the risk of them hitting a container and causing rupture must be minimised. Containers are also protected by the location requirements for a hydrogen installation under Chapter 2, Section 9, but in some cases it is not possible to maintain these distances. In accordance with a general advice, the requirement should be achieved by screening off, flange protection or a protected location.

The cost calculated for flange protection has been estimated at SEK 1 000/protection, but cheaper solutions are likely to be created through different forms of shielding or placement. If the number of loose hydrogen containers to be protected is estimated at 15 000, the total cost will be SEK 15 million.

X Chapter 5, Section A – Underground mobile gas storage units
Mobile gas storage units must, in accordance with the requirements, be placed on a stable, load-bearing and non-combustible surface and thus have the same level of protection as a

gas cistern, as they have the same protection requirements as a fixed installation.
The requirement does not entail any increased costs, as it coincides with current practice and, in accordance with the risk assessment requirement in Section 7 of the LBE and the duty of care requirement in Section 6 of the LBE, the need for this should have been identified to a corresponding extent.

X Chapter 5, Section B – Connection point and potential equalisation of mobile gas storage units
To avoid risks associated with static electricity, it is important that connection points for mobile gas storage units are connected to earth and that the mobile gas storage unit is potential equalised to this point before and during connection. If the connection of the mobile gas storage unit is part of a transport, i.e. if the content is transferred to another storage unit, it is regulated by the Act on the transport of dangerous goods. However, as the mobile gas storage unit forms part of the plant, it is regulated after completion of the transport by the LBE. The requirement does not entail any increased costs as it coincides with practice.

X Chapter 5, Section C – Leave the spot without reversing
A place for setting up mobile gas storage units shall be designed so that the transport vehicle can leave the site without having to reverse. The requirement does not entail any increased costs as it coincides with practice.

X Chapter 5, Section D – Protection of mobile hydrogen gas storage units against fire in leaking hydrogen gas connections
Mobile hydrogen gas storage units shall have the same level of protection as a gas tank in terms of protection against a fire in a leaking hydrogen connection causing a harmful temperature effect. However, connections included in ADR-approved mobile gas storages are excluded. In accordance with a general advice, the requirement should be achieved by screening off, flange protection or a protected location. The aim is to further increase protection against rupture as the likelihood of detonation in the case of hydrogen gas is higher than for other gases.

The cost for flange protection has been estimated at SEK 1 000/protection, but cheaper solutions are likely to be created through different forms of shielding or placement. If the number of mobile gas storage units for hydrogen needing protection is estimated at 500, the total cost would be SEK 500 000.

Chapter 6, Section 5 — Pipes containing hydrogen gas must not be concealed in buildings
For all gases, the risk of leakage in concealed spaces must be prevented in different ways (in accordance with Chapter 6, Section 4). Taking into account the characteristics of hydrogen, a ban on hidden laying of hydrogen pipelines in buildings is introduced. Pipe runs for hydrogen gas in walls, ceilings and floors shall be limited to where penetration is necessary. In such cases, there shall be no joints and protective pipes shall be used to reduce the risk of leakage. A penetration should be relatively short and straight.

The requirement entails costs to rectify a number of existing hydrogen plants. For piping that needs to be rerouted outside walls, ceilings or floors and for continuous welded pipes, including protective pipes at penetrations, an average cost of SEK 100 per metre is estimated. If the number of establishments where this needs to be remedied is assumed to be 200 and the average length of pipes/activities that need to be retracted to 50 metres, a total cost of SEK 1 million is obtained.

X Chapter 7, Section A – Hose connections with a risk of confusion
Hose connections receive the same level of protection as pipe connections, which is reasonable since the risk of confusion is the same in the case of a hose connection as in the case of a pipe connection. The requirement means that the risk of incorrect connections must be prevented by means of labelling or physical design. With hydrogen, it is more common for plants to handle substances under different pressures and therefore the need to avoid confusion between both different gases and different pressures is clarified.

In addition, for refuelling stations and filling stations for mobile gas storage units, it is added that they should be both designed and marked to prevent the risk of confusion between different gases and different pressures. The right design is important when connecting a mobile gas storage unit to a filling station and when refilling a mobile gas storage unit. For example, labelling is also needed to avoid the use of adapters or similar.

The requirement involves costs amounting to SEK 25 000 per connection to address a number of existing refuelling points and filling stations for mobile gas storage units where connections are

not designed to avoid confusion. The number of CNG and hydrogen plants is estimated at 260 and 8 respectively. The proportion where this is needed to prevent the risk of accidents is estimated to be half. Assuming 3 hose connections per refuelling station, this gives a total cost of 130 x 3 x SEK 25 000 = SEK 9.75 million for CNG and 300 000 for hydrogen. The cost of supplementing the signage and design of new plants is negligible.

Annex 3 General advice on Chapter 2, Section 9, Design damage cases and damage criteria for hydrogen installations
Annex 3 presents recommended input values for developing safety distances from outdoor and indoor hydrogen gas installations based on the special characteristics and risks of hydrogen. The Annex also contains recommended safety distances for the effects of fire in the surroundings of hydrogen storage. The estimated distances may entail costs for remedying existing plants, but the rules also offer savings as they provide guidance on how the risk investigation in accordance with Section 7 of the LBE should be designed. See also Chapter 2, Section 9 below.

Annex 4 General advice to Chapter 2, Section 4, Competence of gas installers
This general advice lists the minimum competence that persons involved in the installation, repair and maintenance of both gas and liquid gas installations should maintain in order to carry out professional work. See also Chapter 2, Section 4 below.

Amended requirements

Chapter 1 Section 1 – Scope of application – Hydrogen mixtures
The section dealing with the scope of the regulation has been supplemented by information on which sections contain specific requirements for hydrogen. It clarifies that in addition to the requirements applying to pure hydrogen, they also apply to gas mixtures with hydrogen, provided that the risk of fire and explosion increases due to the proportion of hydrogen.

The general advice provides guidance on the properties on which an assessment of whether the fire and explosion risk of the gas mixture increases due to the proportion of hydrogen should be based.

This addition to the requirement does not in itself entail any costs as it only provides information to the reader on when other sections

become applicable provided that the hydrogen mixture increases the risks of fire and explosion. In turn, the general advice provides support in the assessment of when a certain gas mixture should be considered to increase risks in accordance with the requirement.

Chapter 1, Section 2 – Excluded gas installations
The provisions do not apply to

- gas installations in vehicles.

The exemption for gas installations in vehicles is removed. This exemption was initially intended to meet only the requirement in Chapter 2, Section 4 of the regulation. It has been shown that the meaning was interpreted more broadly and meant that, in certain cases, all gas installations in vehicles were considered to be exempt from all the requirements of the regulation. This posed a risk on roads, campsites and storage sites of such vehicles, which was never intended.
The MSB has investigated whether an exemption from Chapter 2, Section 4 is needed for what is referred to as Whole Vehicle Type Approved vehicles, i.e. vehicles that have gas installations installed at the factory. The conclusion is that these vehicles already comply with the provision and thus there is no need to exempt them. However, vehicles being converted shall be covered by the provision. Therefore, there is no justification for the exemption.

The MSB estimates that gas installations are rebuilt or installed annually in about 500 vehicles. The cost of ensuring that these are installed in a professional manner does not need to entail increased costs in all cases, since many are already carried out in a professional manner. For those that are currently not carried out in a professional manner, the additional cost is estimated at SEK 3 000 (4 working hours at SEK 750). Assuming that half is already carried out on a professional basis, this would result in a total cost of SEK 750 000 per year.

A number of vehicles may have been rebuilt since the introduction of the exemption in 2020 and these may now need to be rebuilt both to reach Chapter 2, Section 4, but also because other provisions may have been infringed because they have been considered exempt. According to the above estimate, there should be around 2 000 vehicles (500 annually). By the same analogy, half of them nevertheless comply with the rules, they are 1 000 vehicles. The cost is still estimated at SEK 3 000 per car, which leads to a total cost of just over SEK 3 million.

- Gas installations in vessels regulated by other statutes

The exemption for gas installations in vessels regulated by other statutes has been broadened to also include handling and has been editorially amended. It now reads: - *gas installations and handling on ships covered by other* statutes. The changes do not entail any increase in costs.

- Pipeline systems for natural gas in the gaseous phase with an operating pressure exceeding 4 bar (0.4 MPa) overpressure

This regulation already exempts pipeline systems for natural gas with an operating pressure exceeding 4 bar overpressure. The exemption has been supplemented with the reservation covered by MSBFS 2009:7, or other legislation that has replaced or amended MSBFS 2009:7. It now reads: *pipeline systems for natural gas in the gas phase with operating pressures exceeding 4 bar (0.4 MPa) overpressure, covered by MSBFS 2009:7 or other statutes that have replaced or amended MSBFS 2009:7.* The clarification does not entail any increase in costs.

- Management systems for hydrogen in the gas phase, including associated stations and equipment, from the last shut-off device within a plant to the first shut-off device within another plant. The management system shall be partly located outside the premises of the plants.

This is a new exemption. A regulation corresponding to MSBFS 2009:7 for natural gas is not currently developed. The exemption means that MSBFS 2020:1 does not apply to hydrogen management systems. This is justified by the fact that certain provisions would have to be modified in order to apply to a hydrogen management system, which does not fall within the scope of this regulatory project. It is therefore not relevant to carry out a cost estimate.

- Hydrogen in liquid phase

This is also a new exemption. The rules have not been adapted to hydrogen in liquid phase because it has not been included in the regulatory project. Hydrogen in liquid phase is in principle not yet present in Sweden and the risks need to be studied before the rules can develop to include hydrogen in liquid phase. It is therefore not relevant to carry out a cost estimate.

- Handling regulated by regulations issued by the Swedish Armed Forces

This is another new exemption that has actually applied before but has now been clarified. It refers to handling that is regulated by the Swedish Armed Forces. The meaning is that the rules of the Swedish Armed Forces take precedence. The addition is merely a clarification and does not entail any costs.

Chapter 1, Section 3 – Scope – to whom and content
The section describes that it is those who have to handle or who do handle flammable gas to whom the provisions are addressed, i.e. that it is a handling regulation. Information that the provisions do not contain any product, design or manufacturing requirements has been deleted as this does not need to be clarified. If products and aggregates are covered by any of the EU Product Directives, handling provisions that could be interpreted as product requirements do not apply. The amendment does not entail any costs.

Chapter 1, Section 5 — Definitions

A number of definitions have been revised or added as they are used and need to be explained, they do not entail any costs.

Chapter 2, Section 4 — Professionally designed installations
The requirement for a professional installation of permanently attached devices has been extended so that the installations are both to be installed, repaired and maintained in a professional manner, and by persons with competence for the gas in question. This latter part of the requirement concerning competence is a new part described in the section on new requirements above, see page 5.

The change from *shall be installed* to *are installed, repaired and maintained* does not involve any change in the continuation of the expertise, but refers both to the work itself and to the continuation of the installation being professionally carried out.

References to individual instructions have been moved from general advice to handbook, and instead the general advice is that standards and established industry standards should be used in the parts that may have an impact on the risk of fire and explosion. The

amendment does not entail any real difference in costs for the purchase and the following of standards and instructions and therefore does not entail any costs.

Chapter 2, Section 9 — Safe positioning
In the case of loose containers, gas reservoirs, gasometers and digesters, *mobile gas* storage units *and other devices* are now added to the existing requirement for safe positioning.

The general advice for the positioning of loose containers with flammable gas excluding hydrogen, gas tanks with LPG above ground and gasometers and digesters still points to Annex 1. The advice has been complemented by a recommendation for the placement of acetylene bottles, see below under Annex 1.

The general advice has also been supplemented to state that the placement of loose containers and mobile gas storage units with hydrogen, as well as outdoor hydrogen gas installations above ground, should comply with protection distances based on the design damage cases and injury criteria in Annex 3. The general advice opens up ways to examine, on that basis, what is a safe location, but at the same time provides clarification as to how the requirement of safe location of these devices should be interpreted. This benefits both operators and authorities in their work of planning and approving locations, distances, etc., which in turn provides a basis for increased efficiency, legal certainty and equivalence in licensing and supervision throughout the country.

Furthermore, general advice states that even indoors, loose containers and gas tanks containing hydrogen should be protected against fire from the surrounding area based on the damage criteria in Table 3 in Annex 3.

The general advice further states that:
Risks of fire and explosion caused by leakage and ignition of hydrogen indoors should primarily be addressed through Chapter 2, Sections 13, and X Chapter 2, Sections A, B, C and E of the Regulation. The risk of jet flames from indoor connection points should be taken into account based on the design damage cases and damage criteria for the objects worthy of protection in the surrounding area, both indoors and outdoors, in accordance with Annex 3.

The amendment may potentially entail costs in order to remedy a small number of existing plants, but mainly affects future

installations where the risk assessment in accordance with Section 7 of the LBE and the duty of care Section 6 of the LBE should identify a need for adequate positioning to the same extent. The rules also mean savings as they provide guidance on how the risk assessment in accordance with the investigation requirement in Section 7 of the LBE should be designed.

Chapter 2, Section 13 – Ventilation
Additions are made to the requirement that supply air shall also be suitably positioned and that the functionality of all ventilation shall be continuously ensured. This addition is then also made when the location of the supply air is important for dilution and to avoid a leakage spreading to inappropriate places. It is also important that natural ventilation also maintains its function over time.

The general advice adds that the positioning of supply and exhaust air takes into account the density of the managed gas, which for hydrogen will be particularly deserving of attention. This is already the practice in most cases and should not entail any significant costs.

Hydrogen has special characteristics that entail increased risks in indoor handling. Therefore, general advice has been introduced that hydrogen should, in the first instance, be stored outdoors. When hydrogen is handled in enclosed spaces, the general recommendations contain a recommended minimum ventilation area for natural ventilation and a minimum ventilation flow in the case of mechanical ventilation, for different pressures and floor areas, calculated for a hole size of 0.1 mm^2.

The addition of acceptable ventilation for hydrogen entails costs to address a number of existing plants where sufficient ventilation is not available. The number of plants is estimated at 300 and the measures amount to an average of SEK 50 000, which gives a total cost of SEK 15 million.

Chapter 2, Section 14 – Unauthorised procedures
The existing requirement has been broadened to also include protection against unauthorised access to spaces where flammable gas is handled. Previously, the requirement was that only *valves and other operable components of devices shall be protected against unauthorised operation.* The amendment clarifies that buildings and spaces in which flammable gas is stored shall also be inaccessible to unauthorised persons. The requirement is likely to entail only a marginal increase in costs in a few plants.

Chapter 2, Section 16 — Inspections — general advice on tightness checks
The first choice for density control to follow the manufacturer's instructions remains, but the second choice is now to comply with standards or established industry standards. The reference to individual instructions for periodic checks of devices has been moved from general advice to manual. The amendment does not entail any real difference in the purchase or following of standards and instructions and therefore does not entail any costs.

Chapter 2, Section 17 – Instructions
An addition is made for new general advice on hydrogen. The specific risks of hydrogen, such as material compatibility and increased risks of leakage associated with it, must be taken into account in particular in the planning and implementation of maintenance.
For hydrogen detection to function over time, it is important that it is regularly checked and calibrated.
The requirement does not entail any increased costs as it coincides with practice.

Chapter 2, Section 18 – Distribution of flammable gas by network companies

The requirement applies to network companies, meaning companies that distribute flammable gas (usually urban gas, natural gas or biogas) via pipelines to more than 10 establishments or households. The first existing sentence of the requirement means that the network company supplying the gas to the customer via a pipeline must make sure that the customer's device is safe before the gas can be delivered. The network company can ascertain this by either checking that there is documentation that the device is CE marked or whether the device is not covered by any EU directives or regulations, has undergone what is known as a system inspection. 'Inspection according to established industry standards' means the Energy Gas Standards (EGN).

The provision has been supplemented by a sentence which excludes the responsibility of the network operator for ensuring that the consumer's device is adequately constructed in the light of the risk of fire and explosion, where the supply is to an activity subject to licensing. This means that the network owner will be exempted from this task when the activity becomes subject to a licence requirement

under the LBE and the municipality takes over all of the supervisory responsibility.

It is always the operator's own responsibility (Section 6 of the LBE) to ensure that the equipment for flammable gas has been safely set up, taking into account the risk of fire and explosion. The same applies in cases where flammable gas other than that of the network company is connected and can be used in the device. If the network owner does not see the possibility to ascertain that the customer's device is safe, e.g. because the customer is unable to present the necessary documentation, the network owner may be forced to shut off the gas supply to the business. Another way is that the operation applies for an LBE license for the handling. When delivery is made to an operation with an LBE license, the supplier does not need to ensure in particular that the user's device is set up in a safe manner.

The general advice on how the requirement should be met, i.e. how the devices should be checked, has been generalised from providing specific industry instructions to recommending standards or established industry standards. The change means that the supervisory responsibilities for a number of activities are shifted from network owners to the municipality. However, the costs should largely be the same, as both oversight is reasonably ultimately borne by the party that handles the gas.

Chapter 3, Sections 3-4, 6 – Special requirements for residential buildings and storage for households

The sections have been adjusted to harmonise with the similar requirements of the fluid regulation, MSBFS 2023:2, without changing the meaning in the strict sense.

In Section 4, the possibility of storage under certain conditions of loose containers with a capacity of up to 30 litres has been restricted to LPG only. The Swedish Civil Contingencies Agency sees no reason to handle loose containers larger than 5 litres, with flammable gases other than LPG that in some cases are used for cooking or heating, in multi-dwelling buildings.

The amendment does not entail any costs.

Chapter 3, Section 5 – Storage in multi-dwelling buildings

The requirement has been corrected as it could previously be interpreted as meaning that the storage of flammable gas (with the exception of individual aerosol containers) in attics, basements and similar storage areas was generally prohibited in all dwellings, but

that it was only prohibited to store flammable gas in a garage in multi-dwelling buildings.

The meaning has now been clarified to mean that the storage of flammable gas (with the exception of single aerosol dispensers) is prohibited in all these spaces, in the case of multi-dwelling buildings. In single-family houses, these prohibitions do not exist.

The changes do not involve any changes in substance and therefore do not entail any costs.

Chapter 4, Section 3 – Protection in case of leakages in couplings at gas reservoirs and gasometers

The term ‘flange’ has been replaced by ‘coupling,’ which refers to flange couplings as well as other types of couplings. The requirement’s various alternative solutions have been moved to general advice. In practice, this does not entail any significant changes. Couplings have generally been oriented in this way for a long time, since the companies have generally followed the alternative solutions and established industry instructions.

Previous options of 3 m have been changed in the general advice to the appropriate distance with regard to the relevant gas and pressure, as different gases and pressures may need different distances in order to achieve the same level of safety. This may mean longer distances for certain gases and pressures (hydrogen) but also shorter for others (e.g. biogas). The general advice has also clarified the option of fire-resistant separation to E60/EI60 for steel and composite containers, respectively. Changing distances for where the first link is placed or other solutions do not entail significant costs.

The cost has been calculated for flange protection and has been estimated at SEK 1 000/protection. If the number of gas tanks with hydrogen that need to be protected is estimated at 100, the total cost will be SEK 100 000.

Chapter 6, Section 3 — Connections on pipes at risk of confusion
An addition is made to ensure that confusion between different pressures is covered, in addition to different gases as previously. With hydrogen, it is becoming more common for facilities to handle flammable gases at different pressures, which highlights the need to avoid confusion in this area as well.

In addition, for refuelling stations and filling stations for mobile gas storage units, it is added that they should be both designed and marked to prevent the risk of confusion between different gases and different pressures. The right design is important when connecting a mobile gas storage unit to a filling station and when refilling a mobile gas storage unit. For example, labelling is also needed to avoid the use of adapters or similar.

The requirement is estimated to give rise to costs equivalent to SEK 25 000 per coupling to rectify a number of existing hydrogen plants where the connections are not designed to avoid confusion. The cost of supplementing the signage and design of new plants is negligible.

Chapter 6, Section 8 — Protection against digging into pipes in the ground

The general advice on how the requirement should be met, i.e. distance between an underground pipeline and other installations in the ground, as well as between an underground pipeline and buildings, has been generalised from specifying specific industry instructions to recommending standards or established industry standards.

Chapter 7, Section 3 — Hose lines that are at risk of being subjected to wear or hose breakage

The requirement has been supplemented with a requirement that hose lines must be protected against wear, hose breakage and detachment. The general advice has also been supplemented to state that a filling station should be designed so that no part of the hose drags on the ground and that gas does not flow out if the vehicle drives away from the filling point without the hose being disconnected.

This requirement was already contained in Chapter 3, Section 4 of Regulation SÄIFS 1998:5 and has now been moved over to this updated gas handling regulation. Since the requirement already exists, it does not entail any costs for filling stations. For other plants, additional measures may be necessary in some cases, but in most cases the measures are likely to have already been introduced as a result of the duty of care.

Chapter 8, Section 2 — The risk of decomposition shall be mitigated when handling acetylene

The general advice on how the requirement should be met has been generalised from providing specific industry instructions to recommending standards or established industry standards.

Chapter 8, Section 5 — Storage of acetylene in multi-dwelling buildings

The requirement has been changed so that it now applies in multi-dwelling buildings and not in all dwellings. The change means that it becomes clear that operations that handle acetylene in multi-dwelling buildings where the premises do not constitute a dwelling are also covered. This requirement means that the design of the space must be specifically intended for the purpose and ventilated directly to the outside, in addition to what should previously be a separate fire compartment with a fire resistance class equivalent to at least EI 30.
Dwellings in single-family houses are not covered by this requirement, but are nevertheless subject to a license requirement in accordance with MSBFS 2013:3 for the handling of more than 10 litres.
Acetylene is also subject to rules in Chapter 3, which means, inter alia, that containers larger than 5 litres of acetylene may not be handled in multi-dwelling buildings on more than one floor. The number of businesses handling acetylene in containers smaller than 5 litres in multi-storey dwelling buildings is estimated at 100. They are expected to purchase EI30 cabinets at a cost of SEK 20 000 each and install ventilation from the cabinets to the outside at a cost of SEK 3 000 per cabinet, for a total cost of SEK 2.3 million.

Annex 1 General advice on Chapter 2, Section 9 Placement of loose containers with flammable gas, excluding hydrogen, gas tanks with LPG above ground, gasometers, and digesters

The general advice for loose containers has been supplemented by the fact that acetylene should primarily be stored in a specially locked ventilated space outdoors. The advice is relevant as acetylene has similar risks to hydrogen in terms of storage at high pressure and wide flammability area. Domestic storage of acetylene bottles is often an aggravating factor in a rescue operation in the event of a fire. The use of acetylene in many cases also does not justify an indoor placement. However, in cases where the gas is used frequently, it may be justified. Hence, the wording that

acetylene should primarily be placed outdoors according to the advice.

Repealed requirements

This section lists the requirements that are repealed without being replaced in the new regulations.

SÄIFS 1998:5 The Swedish National Inspectorate of Explosives and Flammables' regulations on filling stations for methane-powered vehicles.

All requirements in SÄIFS 1998:5 regarding filling stations for methane-powered vehicles have been moved to, or are already covered by, the gas handling regulation or other requirements, and the regulation will thus be repealed.

3.2 Protection against air penetration

The requirement that devices containing flammable gas at a pressure below atmospheric pressure must be protected against air ingress or other damage caused by negative pressure is set out in Chapter 2, Section 3 of MSBFS 2020:1 and can therefore be repealed.

3.3 Protection against wet or contaminated gas

The Swedish Civil Contingencies Agency cannot regulate what gas the operation provides to its customers. However, equipment that is part of the filling station must be resistant to the gas, additives and pollutants that can be expected to occur in accordance with Chapter 2, Section 1 of MSBFS 2020:1.

Assessment of whether the regulation is in line with or exceeds Sweden's obligations as a Member State of the European Union

The new regulations consist only of national rules. The draft rules are not considered to go beyond the obligations arising from Sweden's accession to the EU. The following EU regulations and directives affect the handling of flammable gases:

- Gas Appliance Regulation, Regulation (EU) 2016/426 of the European Parliament and of the Council on appliances burning gaseous fuels,

- The Pressure Equipment Directive (Directive 2014/68/EC of the European Parliament and of the Council of 15 May 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment.)

- Machinery Directive, Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery,

- The ATEX Directives, Directive 2014/34/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres, Directive 1999/92/EC of the European Parliament and of the Council of 16 December 1999 on minimum requirements for improving the safety and health of workers potentially at risk from explosive atmospheres,

- The Aerosol Dispenser Directive, European Parliament and Council Directive 75/324/EEC of 20 May 1975 on the approximation of the laws of the Member States relating to aerosol dispensers.

The present regulations do not contain any requirements that conflict with any of these directives. This has been clarified in particular in Chapter 1, Section 1 on the scope of application by stating that the statute contains provisions on the handling of flammable gas and aerosol dispensers with flammable content. Section 3 of the same chapter also clarifies that the provisions are addressed to those responsible for handling, or those who handle, flammable gas or aerosol dispensers with flammable content. However, after consultation with the national Board of Trade, the regulations are deemed to contain requirements that are subject to notification in accordance with regulations regarding technical regulations. A notification of technical regulations has been submitted.

Assessment as to whether special consideration must be given to the date of entry into force and whether special information initiatives are required

The regulations are expected to enter into force on 1 January 2026. At the same time, the Swedish National Inspectorate of Explosives and Flammables regulations (SÄIFS 1998:5) on filling stations for methane-powered vehicles are repealed.

Since the need for updated regulations with regard to hydrogen has existed for some time, it is desirable that the rules enter into force as soon as possible after decision.

According to a previous transitional provision, certain requirements for piping only apply to piping that is put into service after the previous regulation's entry into force, i.e. after 1 August 2020. The requirements are those relating to hidden laying of pipes inside walls, protection against harmful effects from ground movements, etc., and the need for pipes to be unsealed and traceable.

Transitional provisions with deferred entry into force are introduced for the following paragraphs as described below. The transitional provisions have been based on how long it is estimated to take to implement the various changes and the extent of the risk of postponing each section.

1.1.2027 for Chapter 8, Section 5,

1.1.2028 for X Chapter 2, Section A, B, C, D, X Chapter 5, Sections A and C, Chapter 6, Section 3, second paragraph, and X Chapter 7, Section A,

1.1.2029 for X Chapter 2, Section E and Chapter 6, Section 5.

The Swedish Civil Contingencies Agency intends to publish an updated version of the manual for the professional handling of flammable gas in close connection with the regulation. This manual will be updated with regard to new and amended regulations.

It will be important to disseminate information about new and amended regulations and the new handbook through various channels. Information initiatives will be carried out through various information channels such as through the Swedish Civil Contingencies Agency's website, newsletters and participation in conferences and training.

B. Municipalities and regions

( ) The regulation is not deemed to have an impact on municipalities or regions.

(X) The regulation is deemed to impact municipalities or regions.

Description of impact on municipalities and regions

Since the municipalities exercise supervision and are the licensing authority under the Act on flammable and explosive goods, they now have a partially new regulatory framework to base their supervision and licence management on. This will entail a need for training on the new rules, study and, to some extent, changes to procedures and working methods. However, the general recommendations along

with the manuals should, in the somewhat longer term, give the municipalities better tools for their work than what the previous regulations and associated general advice have done. Any economic impact is therefore assessed to be of marginal significance in the long run.

Some municipal and regional operations are affected in the same way as companies, e.g. schools, care facilities and workshops. These are a subset of the impact on companies reported in Section C.

C. Businesses

Description of the number of enterprises affected, the sectors in which the enterprises operate and the size of the enterprises

No statistics are available on exactly how many enterprises handle flammable gas and hydrogen. Although many of these operations are subject to licence requirements, no comprehensive statistics exist for this. In addition, there are many operations that handle flammable gas in quantities below the licensing requirement threshold.

Table 1 below shows a rough estimate of the number of enterprises.

Operations within different categories	**Number handling flammable gas, net**	**Number handling hydrogen, net**
Bakeries and farinaceous products	20	0
Chemical industry (paper, petroleum, chemicals, pharmaceuticals, etc.)	381	76
Materials and manufacturing industry (rubber, plastic, glass, metal, etc.)	10 622	212
Power and heating	416	8
Waste management (treatment plants, recycling, landfills)	1 814	0
Construction and civil engineering	11 301	226
Service (shop, workshop, fuel, bus)	28 191	0
Hydrogen refuelling stations	8	8
Methane refuelling stations	260	-
Liquefied petroleum gas (LPG) stations	47	-
Restaurants (including catering, central kitchens)	24 479	0
Educational institutions (primary & secondary	5 997	1 199

school, university, etc.)		
Farming	13 790	0
Other laboratories	800	160
Total score	**98 125**	**1 890**

Table 1. The number of operations with flammable gas and hydrogen for different categories.

The standard for Swedish business classification 2007 (SNI 2007) has been used as a basis for the list. 56 industries where the handling of flammable gas is expected to take place to a significant extent have been selected (see Annex 1). In some cases, information on numbers has instead been obtained from industry organisations. However, it has not been possible in all cases, as it involves very different enterprises.

The categories and enterprises that they include are briefly described below. The exact impact of the rules on different enterprises is described in more detail in section *Information on the costs and other impacts of the regulation and an impact comparison of the considered regulatory alternatives*.

Bakeries and farinaceous products

LPG or natural gas is used by some bakeries to heat the ovens. LPG is stored in the tank while natural gas comes from distribution networks.

Chemical industry

Flammable gas is used primarily for combustion in the paper and pulp industry, the pharmaceutical industry etc., and also in some cases in chemical processes, such as plastic manufacturing. The gas is passed through pipelines either from cisterns or distribution networks. This also includes the production of gas, e.g. in refineries.

Materials and manufacturing

Flammable gas is used to melt iron in the iron and steel industry, as well as in the processing of other materials such as plastics, rubber, glass, pottery and the like. LPG is then delivered to tanks or natural gas from distribution networks. Gas is also used in cutting or welding equipment. In this case, the gas is usually supplied in cylinders or bundles of gas bottles. Hydrogen has started to be used in the manufacture of iron and steel to some extent.

Power and heating

Gas is burned in gas engines, turbines or boilers to produce power or heating. The gas can come from a tank or distribution network.

Waste management

In landfills and treatment plants, biogas is produced by microbial decomposition of organic matter. The gas is then used for combustion within its own plant, distribution to other consumers, for upgrading to vehicle gas or for injection into the natural gas network. Recycling centres handle some loose containers, mainly used aerosol containers.

Construction and civil engineering

Examples of the use of flammable gas include welding sets, gas heater for roofing and asphalt machines. Gas cylinders and hoses are usually used here, rarely pipes.

Services

Shops sell containers containing flammable gas as propellant, e.g. hair spray, paint and other aerosol dispensers. Gas cylinders are sold for camping equipment, gas barbecues, disposable containers for hand torches and similar items. Workshops use LPG and acetylene for welding equipment. LPG is used as a refrigerant for air conditioning in vehicles, then from loose containers.

Hydrogen, methane, and LPG refuelling stations.

Flammable gas is used to refuel gas vehicles such as passenger cars, buses, and trucks. The filling stations are refilled by parking mobile gas storage units and connecting them to the filling stations. At a filling station, the gas is compressed before being transferred to the vehicle being refuelled. However, LNG is liquefied methane which is used in liquid form.

Restaurants

Both LPG and natural gas are used mainly for gas cookers in the restaurant industry. For liquefied petroleum gas (LPG), gas cylinders are used, usually on the outside of the building, with pipelines for gas stoves. For natural gas (methane), the gas comes from a distribution network via piping.

Training institutions

This includes training at several levels. In primary schools, LPG is used for Bunsen burners, as well as at university laboratories, where hydrogen may also be present in certain laboratory equipment. In most cases, gas cylinders and piping or hose lines are used.

Farming

In agriculture, welding equipment and sometimes LPG are used for drying hay, straw or grain. Therefore, both gas cylinders with acetylene or LPG as well as LPG cylinders are present. There is also farming where biogas is produced by manure.

Other laboratories

This refers to laboratories in the health service and other independent laboratories that are not included in the other categories. Flammable gas is used for Bunsen burners, gas chromatographs, chemical processes and other laboratory equipment.

Description of how much time businesses may need to spend due to the regulation and what the implications are in terms of the businesses' administrative costs.

In order to comply with the requirements of the regulations, it may be necessary to document how they have been met in order to be demonstrated in a licensing process or in case of inspection. This applies regardless of the type of activity carried out, since some rules that do not at all concern exclusively hydrogen handling are also affected. The time required varies considerably depending on the complexity of the operation.

It is estimated that the workload is between 2 hours and a working week. The hourly cost also varies because in some cases, operations provide the documentation required on their own, while others hire consultants. In the first case, the hourly cost is estimated at SEK 600 per hour, in the second at SEK 1 000 per hour. This means the total cost varies between approximately SEK 1 200 and SEK 48 000. Most of the enterprises are probably in the lower range. This cost is assumed not to differ from costs resulting from previous legislation.

The documentation may need to be updated if the operation changes, but there is no regulated frequency with regard to document updating.

Description of the extent to which the regulation may affect businesses' competitive environment

Some of the requirements that are new are to a large extent already fulfilled today by following industry instructions, guidelines or practices. To the extent that an enterprise fails to do so, the new regulation will lead to more competition-neutral conditions, as all companies will be subject to the same rules. In practice, the regulation is deemed to have little or no impact on the competitive conditions of enterprises.

Description of how the regulation may impact businesses in other respects

During the preparation of this impact assessment, the Swedish Civil Contingencies Agency has also investigated other aspects of the impact, but could not identify any.

One advantage for companies is that the Swedish Civil Contingencies Agency issues a manual aimed at professional activities that explains the rules, to some extent also together with requirements in the Swedish Work Environment Authority's regulations to provide an overall picture of the requirements that apply when handling flammable gas. The manual also provides examples of how certain of the requirements can be met (without excluding other solutions).

Description of whether special consideration should be given to small businesses when drafting the regulations

In its work on these regulations, MSB has primarily adapted the rules based on the risks associated with the handling of flammable gas. Consideration has been given to the possibility and need to adapt the rules for the environment of small enterprises. However, it is important to point out that the purpose is to protect against fire and explosion, and that is equally important for both small and large enterprises. The risks faced by small businesses are not necessarily any smaller and a small enterprise does not always have the option to have the same level of preparedness, skills or organisation in event of an accident as a larger enterprise.

In its guidelines and information in the form of information sheets, manuals and information on the website, MSB gives special consideration to the need for guidance directed at small and medium-sized enterprises.

D. Consultation

Description of any early consultation

The work on the regulations was communicated in spring 2022 by sending a pre-consultation with a number of proposals for amendments to the rules to a large number of operators, consultants, professional associations, municipalities and state authorities. The aim was to gather the views of different stakeholders at an early stage on the proposals and the need for regulatory changes. At the same time, a preliminary version of a distance report prepared by researchers at Lund University, which served as the basis for the general placement advice on which the proposed regulation was based, was accompanied.

More than 450 comments were received, which have been a valuable contribution to the continued work. Furthermore, in 2022–2024, the Swedish Civil Contingencies Agency participated in and organised a number of collaboration forums and conferences.

We already know from previous consultations, in connection with the current regulation being referred to, that the municipalities see their needs and have the desire for the regulations to be provided with general advice. The manual that provides background and clarification of the subject area is also appreciated. Another previous result was that both businesses and municipalities wanted to see that the possibilities for preparation are met. The regulations have therefore been provided with transitional provisions to a reasonable extent.

E. Contact persons

Specify who can be contacted in the event of any questions

For questions regarding the regulations or this impact assessment, please contact Carina Fredström, telephone: 010 240 5065, carina.fredstrom@msb.se or Rickard Granevald, phone: 010 240 5415, rickard.granevald@msb.se

Appendix 1: Statistics

Table I. Activities where the handling of flammable gas is assumed to occur. (SCB 2025 Company Account)

Category	Number
10.7 Bakeries	1 527
17.11 Pulp production	23
19 Industry for coal products and refined petroleum products	32
20.11 Manufacture of industrial gases	41
20.13 Manufacture of other inorganic basic chemicals	42
20.14 Manufacture of other organic basic chemicals	62
20.16 Manufacture of plastics in primary forms	41
20.17 Manufacture of synthetic basic rubber	3
20.3 Manufacture of paints, varnishes and similar coatings, printing ink and mastics	103
20.52 Manufacture of glues	12
20.59 Manufacture of other chemical products	117
21.2 Manufacture of pharmaceutical preparations	131
22.1 Manufacture of rubber products	183
22.2 Manufacture of plastic products	1 075
23.1 Manufacture of glass and glass products	260
23.2 Manufacture of refractory products	22
23.3 Manufacture of building materials of pottery	16
23.4 Manufacture of other porcelain and ceramic products	932
23.5 Manufacture of cement, lime and plaster	21
23.6 Manufacture of articles of concrete, cement and plaster	627
24.1 Manufacture basic iron and steel and of ferro-alloys	58
24.2 Manufacture of tubes, pipes, hollow profiles and related fittings, of steel	51
24.3 Other primary processing of steel	90
24.4 Manufacture of basic precious and other non-ferrous metals	73
24.5 Casting of metals	82
25.2 Manufacture of reservoirs, tanks, vats and other containers of metal	112
25.5 Forging, pressing, stamping and roll-forming of metal; powder metallurgy	443
25.6 Treatment and coating of metals; machining	6 094
25.7 Manufacture of cutlery, tools and other hardware products	579
25.9 Manufacture of other fabricated metal products	1 094
29.1 Manufacture of motor vehicles	181

32.1 Manufacture of jewellery, gold and silver articles and ornaments	1 154
35.2 Manufacture of gas; distribution of gaseous fuels through mains	99
35.3 Steam and air-conditioning supply	421
37.0 Waste water treatment	562
38.1 Waste collection	777
38.21 Treatment and disposal of non-hazardous waste (landfills)	213
38.22 Treatment and disposal of hazardous waste	26
38.3 Materials recovery	543
39.0 Remediation, soil and water treatment, and other pollution control activities	146
41 Construction contractors	25 331
42 Civil engineering contractors	4 620
43 Specialised building and civil engineering contractors	83 060
45. 201 Maintenance and repair of motor vehicles other than motor cycles	10 973
45. 202 Sheet metal, lacquer and glass repairs on motor vehicles other than motorcycles	1 644
45.204 Tyre service	1 394
47.1 Retail trade in non-specialised stores	8 327
47.3 Retail sale of automotive fuel in specialised stores (filling stations)	1 326
49.3 Other passenger land transport	11 968
56.1 Restaurant operations	28 162
56.2 Event catering and other food service activities	2 437
85.2 Primary education	4 399
85.3 Upper secondary education	1 825
85.4 Post-secondary education	1 272

The items in Table I have been grouped in such a way that activities included in the same industry fall into the same grouping in Table II. Some entries are broken out of their grouping when it has been possible to directly estimate the number of operations. In order to have the number of operations handling flammable gas, these values have been multiplied by estimated factors according to Table II. In order to obtain the number of operations that handle hydrogen from those handling flammable gas, this number has been multiplied by a new set of factors, see the last column in Table II. In cases where it has been possible to directly estimate the number of activities for an item, no factors have been used. The final estimated numbers of enterprises that use flammable gas and hydrogen are presented in Table 1 under Section C above.

Table II. Merging of activity types from Table I into categories as well as factors for flammable gas and for hydrogen respectively.

Category	**Number handling flammable gas, gross**	**Estimated percentage handling flammable gas**	**Estimated share handling hydrogen**
Bakeries and farinaceous products	1 456	-	-
Chemical industry (paper, petroleum, chemicals, pharmaceuticals, etc.)	418	0.8	0.2
Materials and manufacturing industry (rubber, plastic, glass, metal, etc.)	12 732	0.8	0.02
Power and heating	312	0.8	0.02
Waste management (treatment plants, recycling, landfills)	1 357	0.8	0
Construction and civil engineering	11 0295	0.1	0.02
Service (shop, workshop, fuel, bus)	19 586	0.8	0
Hydrogen refuelling stations	5	1	1
Methane refuelling stations	325	0	0
Liquefied petroleum gas (LPG) stations	34	0	
Mobile gas storage units			
Restaurants (including catering, central kitchens)	28 675	0.8	0
Educational institutions (primary & secondary school, university, etc.)	2 503	0.8	0.2
Farming	45 966	0.3	0
Other laboratories	1 000	0.8	0.2