



**AFS 2011:19**

# **Chemical Hazards in the Working Environment**

**Provisions of the Swedish Work Environment Authority with amendment of the Provisions and General Recommendations of the Swedish Work Environment Authority (AFS 2011:19) on Chemical Hazards in the Working Environment**

Amended until 8 May 2018

**Translation**

In the event of disagreement concerning the interpretation and content of this text, the printed Swedish version shall have priority.

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# The Swedish Work Environment Authority's Statute Book



**Provisions of the Swedish Work Environment Authority with amendments of the Provisions and General Recommendations on Chemical Hazards in the Working Environment;**

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adopted 29 November 2011.  
(Amended until 8 May 2018.)

## **Purpose and scope**

**Section 1** The purpose of these Provisions is to stipulate how ill-health or accidents caused by chemical hazards in an activity shall be prevented.

The Provisions apply to all activities where chemical hazards can occur. But in employers' housekeeping it is permissible to conduct investigation and risk assessment in accordance with Section 5, first paragraph without applying Sections 6-10. The same applies to commonly available chemical products for dishwashing and cleaning in connection to employees' use of kitchenettes, canteens or similar for own use.

## **The addressees of the Provisions**

**Section 2** The employer is responsible for the observance of the Provisions. Other parties are, in accordance with Chapters 1 and 3 of the Work Environment Act (1977:1160), also obliged to comply with the Work Environment Act regarding substances which can cause ill-health. These persons are subject to the provision with the restrictions described in the third and fourth paragraphs below.

In these Provisions an 'employee' is also those equal to an employee as stipulated in Chapter 1, Section 3 of the Work Environment Act.

Those who conduct professional activities without employees in accordance with Chapter 3, Section 5, second paragraph of the Work Environment Act are not obliged to comply with stipulations relating to obligations to give employees information.

Those who are only employers in the capacity of hiring out workers are only obliged to comply with the following stipulations.

- Section 5 last paragraph regarding ensuring that the hired workers do not start working before the lessor, through checking the lessee's documentation in accordance with Section 13, can confirm that investigation and risk assessment has been conducted and the necessary risk reduction measures have been taken and

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- Section 41 about registration requirements.

### The REACH Regulation

**Section 3** Activities which manufacture, import or use chemical substances or preparations shall also comply with the stipulations in Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC (the REACH Regulation).

According to the regulation, manufacturers, importers and downstream users are obliged to keep all information necessary for the implementation of the regulation for ten years and in certain cases also produce a chemical safety report.

### Definitions

**Section 4** The terms used in these Provisions have the same meaning as in the Work Environment Act (1977:1160), the Work Environment Ordinance (1977:1166) and the Swedish Work Environment Authority's Provisions on Occupational Exposure Limit Values. In addition, the Provisions use the following terms.

<i>Exposure</i>	To be exposed to a chemical hazard through inhalation, ingestion or contact with skin, mucous membranes or eyes.
<i>Hazardous chemical product</i>	Chemical product or explosive object, including those not placed on the market, which are classified as hazardous according to <ul style="list-style-type: none"><li>- 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)</li></ul> The term includes compressed air at a pressure of at least 2 bar.

<i>Handling</i>	Manufacturing, processing, treatment, packaging, storage, transport, use, disposal, destruction, conversion and comparable procedures.
<i>Chemical product</i>	Chemical substance or mixture of chemical substances which have been manufactured or extracted and whose function is primarily determined by its chemical composition or constitutes waste.
<i>Chemical hazard</i>	<p>Chemical product, chemical substance or several chemical substances together which can cause ill-health or accidents through</p> <ul style="list-style-type: none"><li>- properties which make it hazardous to health,</li><li>- its properties when it depends on the way in which the substances are used or occur,</li><li>- its temperature,</li><li>- reducing the level of oxygen in the air or</li><li>- increasing the risk of fire, explosion or other hazardous chemical reaction.</li></ul> <p>Mould spores and chemical substances released from microorganisms that can cause allergies and toxic effects are also included in the definition of a chemical hazard.</p>
<i>Chemical substance</i>	A chemical element or a chemical compound. (AFS 2018:2)

## Investigation and risk assessment

### When an investigation and risk assessment shall be conducted

**Section 5** The risk of chemical hazards causing ill-health and accidents in the activity shall be investigated and assessed in accordance with Sections 6-9 as often as the conditions of the activity demands it.

Furthermore, such an investigation and risk assessment shall always be conducted when the activity is temporarily or permanently changed or if it can be expected that the result of the risk assessment will be affected due to new information.

The air shall be examined and assessed every time work is to be commenced in a cistern, well, silo, loading space or similar. If it is not obvious that the air is safe, the air's content of oxygen and substances hazardous to health shall be measured and the risk of explosion shall be assessed by measuring the percentage of flammable gases and fumes.

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Work may not commence before an investigation and risk assessment have been conducted and necessary measures have been taken in order to prevent ill-health and accidents at work.

### **Chemical hazards which shall be identified and registered**

**Section 6** The chemical hazards which can be expected to occur in the activity shall be identified and registered. The chemical hazards shall be given a name which, for hazardous chemical products, may not differ from the name used when labelling in accordance with Section 19. Date when the information was registered shall be stated, and for each chemical hazard, the following shall be stated

1. type of hazard,
2. in which location it is stored and normally used,
3. if an occupational exposure limit value exists and
4. what other special rules may apply for the chemical hazard.

Such chemical hazards which are chemical products and which are handled or sold in closed packaging may be brought together and registered under a common name if the assessment of risks in the handling in accordance with Section 8 can be made jointly for these products.

### **Documents which are important for the risk assessment**

**Section 7** The additional information regarding the registered chemical hazards needed to make the assessment in accordance with Section 8 shall be produced. The following documents shall always be available.

1. Safety data sheets for chemical products as well as other information regarding risks and protective measures which the supplier shall provide. If however the quantities handled are so small that it is not probable that ill-health or accidents can occur, the information in the supplier's labelling is sufficient.

2. A document with the health and safety information needed for the hazardous chemical products manufactured at the workplace or brought into the country by the activity. The documentation need not be produced if the chemical product is manufactured or used on a small scale at a laboratory for own use.

### **Factors to assess in order to determine if measures are necessary**

**Section 8** An assessment shall be made if and when measures are necessary for limiting the risk of a chemical hazard causing ill-health or accidents in the activity through



1. harmful exposure via inhalation,
2. harmful exposure via skin contact, splashing in the eyes or ingestion through the mouth,
3. formation of inflammable air mixtures or fire hazards caused by other reasons, as well as

4. personal injury due to reactive, explosive or destructive properties.

The following factors, inter alia, shall be observed during the assessment.

1. How the hazardous properties of the chemical hazard may be expressed in the manner in which it occurs in the activity.
2. The nature, level and duration of the exposure to the chemical hazard where it occurs.
3. Any interacting effects with other chemical hazards or with other work environment factors in the workplace.
4. Possible reactions together with other chemical hazards or material occurring in the workplace.
5. Conditions of work which may affect the risk, including the effect of taken and planned protective measures.
6. Experiences of ill-health, accidents or incidents in the activity, at contingency exercises in accordance with Section 12, last paragraph, as well as experiences from medical supervision.

The assessment shall lead to a decision regarding which measures shall be taken in order to limit the risks.

**Section 9** For chemical hazards included in Appendix 1, the Swedish Work Environment Authority's Provisions on Occupational Exposure Limit Values, it shall be determined during the assessment in accordance with Section 8 whether the content in the air of each substances is acceptable considering the limit value. The assessment and reasons for this shall be documented.

During the assessment, consideration shall be taken to the content of all chemical substances in the inhalation air which can entail ill-health or accidents, to how physically strenuous the work is and to the fact that certain substances can be absorbed by the skin.

Measuring of air contaminants in the breathing zone shall be conducted unless it can be clarified in another way, which measures are necessary for the exposure to be acceptable considering the limit value.

If measurement is not needed in accordance with the exemptions in the third paragraph or Section 50, second paragraph, the reasons for this shall be documented. (AFS 2018:2)

## **Documentation and information**

### **Documentation of the results of the risk assessment**

**Section 10** The results of a risk assessment and the decisions relating to measures in accordance with Section 8, last paragraph shall be documented. The documentation shall state

1. which parts of the activity the investigation and risk assessment includes,
2. in which situations or areas a chemical risk needs to be eliminated or limited,
3. which protective measures to take at different types of work tasks and which damage limiting and remedial measures to prepare,
4. which other measures or more detailed investigations have been decided, the person responsible and when they are to be completed,
5. which persons have participated in the assessment,
6. the time for the next planned investigation and risk assessment, unless it is not an assessment of a temporary work,
7. on what date the document was drafted and
8. the physical person who, as the responsible party, has approved the investigation and risk assessment.

If the assessment in accordance with Section 8, last paragraph concludes that there are no situations or areas in which any chemical risk needs to be eliminated or limited, the documentation in accordance with points 2, 3 and 4 may be replaced with information regarding this.

### **Handling and safety instructions as well as other routines**

**Section 11** The handling and safety instructions as well as other routines needed for the activity conducted at the workplace shall be determined. They shall be in writing, unless it is a matter of simple handling where the risks can easily be realized.

### **Contingency plan for accidents and emergency situations**

**Section 12** A contingency plan with routines and instructions in accordance with Section 11 shall be drafted if it is found during the investigation and the risk assessment that accidents and emergency situations may arise which require immediate measures to protect workers.

The contingency plan shall contain information on:

1. For which events immediate measures are required.
2. What information specially appointed persons have in such events.
3. Which damage limiting measures shall be immediately implemented, what protective equipment is then needed and where it is stored.

4. How the concerned employees shall be informed about the event.
5. What warning systems are available and how they work.
6. When evacuation shall occur.
7. Where first aid equipment is stored.

Exercises shall be conducted in the extent necessary for the contingency plan to be followed to in the event of an accident or emergency situation.

### **Obligation to inform about risks and keeping documentation available**

**Section 13** Concerned employees shall be informed on the health and accident risks connected to the chemical hazards which are handled or which in any other way occur in the activity and about how these risks shall be prevented. The information shall detail the obligations this entail for the employees, especially the obligation to inform the employer when there is a suspicion that a chemical hazard has caused ill-health, an accident or incident. It must be ensured that the employees have understood the information.

Information in accordance with the first paragraph primarily relates to information from the following documents.

1. The registered chemical hazards in accordance with Section 6.
2. Safety data sheets, other information on risk and safety regarding hazardous chemical products and other documents which may be required in accordance with Section 7.
3. The assessment of exposure by inhalation and measuring reports which have been established in accordance with Sections 9 and 50.
4. The documentation of the results of the investigation and risk assessment and decided measures in accordance with Sections 10 and 40.
5. Handling and safety instructions and other routines when they need to be in writing in accordance with Sections 11, 36 or 44.
6. Contingency plan for accidents and emergency situations in accordance with Section 12.
7. Provisions on occupational exposure limit values as well as other Provisions which apply to the work.
8. The condition part of the permit from the Swedish Work Environment Authority in accordance with Sections 46 and 47.

The documentation shall be available to concerned employees and written in Swedish or other language used in the workplace by the entire personnel. The documentation which has been established in the activity shall be easy to grasp, easily read and clear.

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## **Obligations to take certain special measures and adhere to prohibitions**

**Section 14** The regulations in Sections 15-49 shall be observed when implementing Section 8, last paragraph.

### **Primary obligations in activities where chemical hazards occur**

**Section 15** Regardless of the result of the assessment in accordance with Section 8, the following obligations apply in work where chemical hazards occur providing that the costs of the measure are reasonably proportionate to the reduction of the risk.

1. Chemical products and materials shall be chosen so that chemical risks, along with other risks connected to the work in total become as small as possible.

2. The exposure and the number of exposed persons as well as the risk of accidents shall be limited through choice of suitable work methods, adapting premises, work equipment, place and time.

3. The amount of every chemical hazard in the workplace shall be limited to the amount necessary for the work if this can reduce the risk.

### **Priority order for choice of measures in order to further limit the risks (staircase of measures)**

**Section 16** If the assessment in accordance with Section 8 shows that there are still risks, despite the choice of chemical product, work method and work equipment in accordance with Section 15, further measures shall be taken. The risks shall be reduced to an acceptable level through implementing one or more of the following types of measures in the following order of priority.

1. Perform the work or process in a closed system, use remote control or other technical measures which entail the employees not being exposed to risk.

2. Use process ventilation or other technical protective measures in connection to the chemical hazard in order to reduce the risk to the employees.

3. Move the work to a specific time or place where only personnel needed for this work are present.

4. Use personal protective equipment when measures in accordance with the above are insufficient or impossible to implement.

### **Information about waste**

**Section 17** Persons submitting waste for disposal which is a chemical hazard shall give the recipient the product information needed for safe handling.

### **General requirements on labelling**

**Section 18** Containers and pipelines holding a chemical hazards shall be labelled with the particulars necessary for clearly identifying the content and the risks associated with it. Such pipelines shall also be labelled with an arrow for the direction of flow. If the direction can vary, this may be indicated by arrows in both directions.

Pipelines that may be confused and by that entail a chemical hazard to cause ill health or accidents shall, regardless of their content, be labelled so that the content can be identified and to prevent them from being wrongly connected.









There are further requirements for use and control of pressurized containers and pipelines in the Swedish Work Environment Authority's Provisions on the Use and Control of Pressurized Devices. (*AFS 2018:2*)

### **Particularly on labelling of hazardous chemical products at work**

**Section 19** Containers of hazardous chemical products shall, when they are used or stored in connection with use, be labelled in accordance with alternative 1 or 2 below.

1. In accordance with Regulation (EC) No 1272/2008 (CLP).
2. With the following:
  - a) name of the product,
  - b) the pictograms which shall be present on the labelling when the product is placed on the market in accordance with the CLP regulation and the text in accordance with the table below, and
  - c) text with information thereon when the product is
    - carcinogenic,
    - allergenic,
    - damaging to heritable genetic material, or
    - toxic to reproduction.

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Physical hazards				
Pictogram according to the CLP-Regulation				
Text for the pictogram	Explosiv	Brandfarlig	Oxiderande	Gas under tryck
Health hazards				
Pictogram according to the CLP-Regulation				
Text for the pictogram	Giftig	Frätande	Hälsosfarlig	Skadlig

Containers that are part of a technical device, in which the hazardous chemical product is required for the function of the device, need only fulfil the requirement of Section 18.

The labelling may be limited to the product name only, or be completely omitted, if other measures are taken to ensure that doing so does not entail an increased risk of ill-health or accident, and if the requirement of Section 18 is fulfilled. (AFS 2014:43)

**Section 20** Visible pipelines which contain a hazardous chemical product shall be labelled with the pictogram of the product according to Regulation (EC) No 1272/2008 (CLP Regulation). On a pipeline used for products with different hazards, all relevant hazard pictograms may be used.

Labelling shall be positioned visible in vicinity of the most dangerous points, such as valves and joints, and at reasonable intervals.

An employer who fails to label one or more pipelines containing hazardous chemical products, in accordance with the requirement of the first paragraph, shall be obligated to pay a sanction charge, see Section 52. For unlabelled pipelines containing only compressed air no penalty will be charged.

The lowest sanction charge is SEK 15,000 and the highest is SEK 150,000. If there are 500 people or more employed, the sanction charge is SEK 150,000. If there are fewer than 500 people employed, the sanction charge is calculated as follows:

$$\text{Sanction charge} = \text{SEK } 15,000 + (\text{number employed} - 1) \times \text{SEK } 271.$$

The sum shall be rounded down to the nearest hundred. (AFS 2018:2)

### **Signage, storage and containers**

**Section 20 a** Areas, rooms and enclosures where sufficiently large amounts of hazardous chemical products are stored, as to have an impact on safety, shall be marked with the appropriate hazard pictograms, unless the labelling of the individual containers can be seen and read from outside.

In addition to signage in accordance with the first paragraph, prohibitions signs, mandatory signs and warning signs concerning chemical hazards shall be put up when the risk assessment, in accordance with Section 8 of these provisions, indicates a need for such. (AFS 2017:4)

**Section 21** Chemical hazards shall be stored in such a way that risks of ill-health and accidents are prevented. Among other things, the following shall be observed.

1. Storage cupboards and storage rooms indoors shall have fan-driven ventilation when gases or fumes hazardous to health can be emitted from the containers.

2. Containers shall be kept separate if they can cause increased risks when combined.

3. Risk of leakage of chemical hazards shall be monitored and acted upon. (AFS 2014:43)

**Section 22** Containers which contain chemical hazards shall be adapted to the properties of the chemical hazard and to its handling, through material, form and solidity, so that ill-health and accidents are prevented. The container shall, if possible, be closed when the chemical hazard may contaminate the air. Containers shall have safety equipment when necessary.

Chemical hazards may not be kept in containers that entail a risk of causing ill-health or accidents through confusion. (AFS 2014:43)

### **Measures against risks connected with inhalation**

**Section 23** Work shall be organized, conducted, followed up and rectified so that the inhalation air is as free from air contaminants as is practically possible considering the resources required to limit the air contaminants.

Measures shall immediately be taken if the inhalation air is not deemed acceptable when considering the limit values in Appendix 1, the Swedish Work Environment Authority's Provisions on Occupational Exposure Limit Values.

After measures have been taken to reduce the amount of air contaminants in the breathing zone, a measuring of the content level shall be conducted no later than three months after the measures have been taken in accordance with the second paragraph, unless it is evidently unnecessary. (AFS 2018:2)

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### **Organic Solvents**

**Section 24** Paint or varnish used on temporary workplaces situated indoors or in a wholly or partially confined space, shall be free from organic solvents or be water-based unless organic solvents are needed for technical or culture-historical reasons.

### **Respiratory protection**

**Section 25** Respiratory protection shall be individually fitted and provide full protection with consideration to the level of oxygen in the air, the prevalence of solid and liquid particles as well as gases and fumes hazardous to health.

### **Measures against risks from skin contact, splashing in the eyes and ingestion**

**Section 26** To ensure that no one is harmed through skin contact or ingestion

1. containers and equipment shall be kept clean on the outside,
2. work clothes and protective clothing which may cause ill-health or accidents as a result of having been contaminated with a chemical hazard shall immediately be replaced,
3. mouth pipetting or other methods where chemical hazards can enter the mouth must not be used,
4. protective clothing shall be removed and hands shall be washed when visiting toilets, staff canteen or other spaces where the chemical hazard for which the clothes are used does not exist.
5. personal effects shall not be carried when performing work where chemical hazards are handled if this can entail a risk of ill-health and
6. food or drink may not be prepared, consumed or stored, tobacco products may not be used and cosmetics may not be applied where chemical hazards are present, if this can entail a risk of ill-health. (*AFS 2014:43*)

**Section 27** When choosing protective gloves and clothes, the following factors shall be observed.

1. In which way the substance is hazardous when in contact with skin.
2. How often and how long skin contact is estimated to occur.
3. Which materials protect against the substance and for how long the material protects against skin contact with the substance, referred to as "break-through time".
4. The work's requirements for function and strength.
5. Supplier information on suitable protective gloves and clothes.



**Section 28** If the risks for splashing or drenching have not been sufficiently eliminated through other measures, eye protection with good function and fit shall be used in situations where a chemical hazard may injure the eyes.

**Section 29** There are rules concerning washing facilities, emergency decontamination showers and eye wash facilities in Sections 36 and 73 of the Swedish Work Environment Authority's Provisions (AFS 2009:2) on Workplace Design and Sections 9 and 10 of the Swedish National Board of Occupational Safety Provisions (AFS 1999:7) on First Aid and Crisis Support.

**Section 30** Before a pressure-retaining device which contains a chemical hazard is taken apart it shall be depressurized and drained, if technically possible.

#### **Work in cisterns, wells, silos, loading spaces or similar**

**Sections 31** Before commencing work in a cistern, well, silo, loading space or similar, a special risk assessment shall be performed in accordance with Section 5, third paragraph. When implementing Sections 8 and 9, it shall be assessed whether the air needs to be continually monitored throughout the work.

If the space cannot be ventilated so that the composition of the air becomes safe, suitable respiratory protection shall be used.

**Section 32** Work as referred to in Section 31 shall be supervised so that help can be obtained quickly. Procedures for lifting a person out of the space shall be prepared unless it is clearly unnecessary.

#### **Measures to prevent risks of fire, explosions and reactions**

**Section 33** When deciding measures in accordance with Section 8, last paragraph in order to prevent the risk of fire and explosion, types of measures shall be considered in the following order.

1. Avoid handling of chemical hazards which may entail the formation of inflammable content in the air.
2. Avoid sources of ignition which may cause a fire or explosion.
3. Design the work premises and technical devices so that a fire or explosion entails the smallest possible risk of personal injury.

**Section 34** Suitable equipment for firefighting and life-saving shall be available during activities in which a chemical hazard may cause a fire or explosion. The same applies to activities in which a chemical hazard occurs which at the event of a fire can produce a dangerous amount of gas or aerosols.

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**Section 35** Situations which may cause dangerous chemical reactions or the formation of unwanted chemical hazards shall be avoided.

Chemical hazards which are chemically instable substances shall be handled so that situations which increase the risk of uncontrolled decomposition or polymerisation are avoided.

### **Work permit**

**Section 36** Before work in accordance with point 1–3 below can commence, the employer or other person with equivalent obligations in accordance with Section 2 shall have given their written consent on a document which contains handling and safety instructions for the work task in accordance with Section 11 and a certificate by the person performing the work that they have read, understood and intend to follow the instructions. The document shall be named 'work permit' and be kept for at least three months after the completion of the work.

1. Work in a cistern, well, silo, loading space or similar where a flammable liquid, gas or aerosol in accordance with Regulation (EC) No 1272/2008 (CLP) is handled or occurs in any other way.

2. Welding, cutting, soldering, grinding, drilling or performing other work which involves high temperatures in or on pipelines, cisterns, drums or other containers which hold or have held flammable goods or a combustible liquid.

3. Perform work which may cause fire or explosion within an area where an explosive atmosphere may occur.

In a joint workplace, the conditions and instructions which apply to work in accordance with the first paragraph as well as information about the potential risks for those working for other companies or the equivalent, shall be submitted to the person responsible for the coordination of work environment issues. Work may not commence until the person responsible has approved it. (AFS 2014:43)

### **Measures when handling radioactive chemical hazards**

**Section 37** Radioactive chemical hazards shall be handled so that protection is obtained against intake and uptake of the chemical hazard as well as against external radiation.

### **Special requirements for allergenic chemical products and certain processes**

**Section 37 a** The regulations of Sections 37 b–g shall be applied to the following work tasks. If there is an assessment showing that the exposure to

allergenic substances is negligible, even without the use of protective measures, the regulations do not apply.

1. Work with chemical products that, in accordance with Regulation (EC) No 1272/2008 (CLP), shall be labelled with one of the following hazard statements,

- H317 May cause an allergic skin reaction,
- H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled,

2. Work with adhesives or other chemical products that contain ethyl-2-cyanoacrylate or methyl-2-cyanoacrylate or

3. Work that entails thermal degradation of materials that release isocyanates or processes that release formaldehyde. (AFS 2018:2)

### **Documentation of the risk assessment**

**Section 37 b** When the results of the investigation and risk assessment are documented in accordance with Section 10, for works referred to in Section 37 a, particular emphasis shall be placed on the following information:

1. The areas and spaces where the hazardous chemical products shall be handled, and where isocyanates and formaldehyde can be released.
2. The protective measures necessary to ensure that the exposure is as low as practically possible.
3. In which situations personal protective equipment is required, and which protective equipment to use.
4. How the function of equipment and ventilation is to be checked and maintained to prevent allergenic substances from causing ill-health. (AFS 2014:43)

### **Signage**

**Section 37 c** Signs indicating that open handling of hazardous chemical substances as referred to in Section 37 a is under way shall be posted in close proximity to the work station. These signs are to be posted on the door of the premises or area to inform employed persons other than those handling the chemical products. If the risk assessment has indicated that the work does not entail any risk of exposure to other employees, the sign can be omitted. (AFS 2014:43)

### **Information**

**Section 37 d** The employer shall ensure that those leading or being employed in the work referred to in Section 37 a have knowledge of how to carry out

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these tasks safely. Supervisors and employees shall at least have been informed of the risks involved with handling, and the measures to be taken in accordance with the risk assessment of Section 37 b. (AFS 2014:43)

### **Training**

**Section 37 e** Training is required in order to lead or be actively employed in work with hazardous chemical products that contain:

1. diisocyanates,
2. epoxy plastic components,
3. organic acid anhydrides,
4. formaldehyde resins,
5. methacrylates that shall be labelled with H317 or H334
6. acrylates that shall be labelled with H317 or H334

and any work that entails the thermal degradation of materials that release isocyanates or processes that release formaldehyde.

Training is also required for work with chemical products containing ethyl-2-cyanoacrylate or methyl-2-cyanoacrylate, if the work is carried out for more than a total of 30 minutes per week.

The training shall at the least contain information about the risks entailed by the work, and the protective measures that may need to be taken to conduct the work safely.

The training of those leading or being actively employed in the work referred to in the first and second paragraph shall be verified through a training certificate no more than five years old. The training certificate shall describe the elements included in the training.

The employer who allows a person without such a training certificate to lead or conduct work, in violation of the fourth paragraph, shall be obligated to pay a sanction charge of SEK 10,000 for each such person, see Section 52. (AFS 2018:2)

### **Medical examinations**

**Section 37 f** The employer shall offer a medical examination, in accordance with the Swedish Work Environment Authority's Provisions on Occupational Medical Supervision, for employees who are or will be employed in work with hazardous chemical products containing

1. epoxy resins,
2. formaldehyde resins,
3. methacrylates that shall be labelled with H317 or H334,
4. acrylates that shall be labelled with H317 or H334. (AFS 2014:43)

**Section 37 g** The employer shall ensure that periodical medical examinations with a employability assessment, in accordance with the Swedish Work Environment Authority's Provisions on Occupational Medical Supervision, are conducted for those employees who are or will be employed in any of the following:

1. Work with chemical products containing diisocyanates or organic acid anhydrides that shall be labelled with H334.

2. Work with chemical products containing ethyl-2-cyanoacrylate or methyl-2-cyanoacrylate, if the work is carried out for more than a total of 30 minutes per week.

3. Work that may entail exposure to isocyanates formed through thermal degradation.

Regulations pertaining to sanction charges for those who employ persons who have not been deemed employable can be found in Section 6 of the Swedish Work Environment Authority's Provisions on Occupational Medical Supervision. (AFS 2014:43)

### **Special requirements for chemical products which are carcinogenic, mutagenic and toxic to reproduction and for certain activities**

**Section 38** The stipulations in Sections 39-44 apply for the handling of chemical products which meet the criteria in Regulation (EC) No 1272/2008 (CLP) for classification with a hazard statement stated below.

1. H350: May cause cancer.

2. H340: May cause genetic defects.

3. H360: May cause harm to fertility or to the unborn child.

Regardless of whether the criteria in the first paragraph have been met or not, the stipulations in Sections 40, 41 and 44 shall be applied for activities which involve

1. manufacture of auramine,

2. work involving exposure to polycyclic aromatic hydrocarbons present in coal soot, coal tar or coal pitch,

3. work involving exposure to dusts, fumes and sprays produced during the roasting and electro-refining of cupro-nickel mattes,

4. strong acid process in the manufacture of isopropyl alcohol and

5. work causing exposure to hard wood dust. (AFS 2014:43)

### **Investigation regarding the possibility of replacing a product**

**Section 39** A chemical product in accordance with Section 38, first paragraph can only be handled if there is a documented investigation indicating that it

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is not technically possible to replace the product by using other chemical products which present a lower risk of ill-health and accidents.

The requirement does not apply to chemical products used for engine operation or heating or stored for such use.

### **Documentation of the risk assessment**

**Section 40** When the results of the investigation and risk assessment for handling of such chemical products and for the activities described in Section 38 are documented in accordance with Section 10, the following information shall be stated with particular clarity.

1. Within which places and spaces chemical substances which are carcinogenic, mutagenic and toxic to reproduction may occur and what measures shall be taken so that only persons needed for the work can access them.
2. The protective measures necessary for ensuring exposure is minimal.
3. In which situations personal protective equipment is necessary.
4. How the handling of and functions of the equipment, processes or ventilation shall be supervised in order to facilitate early detection of deviations which may entail an increased risk.

### **Register**

**Section 41** The employer shall keep a register of employees who have been exposed to potential risks of ill-health while working with chemical products which meet the criteria to be labelled with hazard statement H350 or H340 or in activities in accordance with Section 38, second paragraph. The register shall contain information on

1. the name of the employee,
2. work tasks,
3. which chemical hazard the employee has been exposed to as well as
4. measured or estimated level of exposure. (*AFS 2018:2*)

### **Reduction of the exposure**

**Section 42** Chemical products in accordance with Section 38, first paragraph, shall be handled in a system which is as closed as is technically possible.

**Section 43** Where chemical products in accordance with Section 38, first paragraph, are handled without the system being completely closed, the following measures shall always be taken in addition to the other measures chosen as a part of the assessment in accordance with Section 8.

1. Equipment and methods shall be chosen and designed so that the smallest possible amount of air contamination is formed and so that spraying or splashing is avoided.

2. Contaminated air shall be dealt with through process ventilation at the location from which the air contamination originates.

3. Protective clothes and protective gloves shall be used if there is a risk of contact with the chemical product. They shall be exchanged when commencing another type of work.

4. Spillage shall be collected as quickly and safely as possible.

5. Surfaces which may have been contaminated shall be cleaned daily and when a work task has finished.

6. The chemical product and the waste from the handling shall be stored and transported in shockproof, sealed and clearly labelled containers.

**Section 44** The handling and safety instructions referred to in Section 11 shall be in writing for the handling and activities regulated in Section 38.

## Prohibitions and permits

**Section 45** A chemical substance which belongs to group A in Appendix 1 or a chemical product which contains an additive of such a substance may not be handled, with the exception of the situations described in Sections 46 and 48 in these Provisions. The same applies for chemical products which contain such a substance as contamination at a level of 0.1 weight per cent or more. Regarding Erionite, however, the level of 1 weight per cent or more applies.

Breaches of this provision may result in fines, see Section 52.

**Section 46** A chemical substance or product referred to in Section 45 may be handled following permission from the Swedish Work Environment Authority

1. when researching a carcinogenic substance's effects,
2. when developing analysis methods for a substance belonging to group A as well as
3. in other activities where there are special reasons for handling such a substance.

**Section 47** A chemical substance which belongs to group B in Appendix 1, or a chemical product which contains such a substance at a level of 1 weight per cent or more, may not be handled without permission from the Swedish Work Environment Authority.

Offences against this provision will entail a penalty of SEK 50, 000, see Section 52.

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**Section 48** Permission in accordance with Sections 46 and 47 is not needed when stock-keeping for sales or transport of unopened original packaging.

**Section 49** In the application for permit in accordance with Sections 46 and 47, the following shall be stated.

1. The chemical substance or product which is to be handled.
2. Description of the work method being used.
3. The purpose of the handling.
4. The time period for which the permit is sought.
5. The largest quantity which shall be stored and used respectively during one given day.
6. Annual consumption.
7. The number of persons concerned.
8. The reasons for why the substance or product cannot be replaced by a less hazardous chemical product.

The documentation of the results of the risk assessment and decisions regarding measures in accordance with Sections 10, 37 b and 40 as well as handling and safety instructions for the work in accordance with Section 44 shall be attached to the application. If there is a safety representative, a statement from her or him shall be attached to the application. (AFS 2014:43)

## **Periodic measurements of certain chemical substances**

**Section 50** When the substances below, or materials containing the substances are handled so that exposure by inhalation may occur, the risk assessment shall always contain measurements of the substances in the breathing zone.

1. Lead and inorganic lead compounds.
2. Ethylene oxide.
3. Cadmium and inorganic cadmium compounds.
4. Styrene, vinyl toluene or other reactive monomers when manufacturing polyester resin.

Measurements in accordance with the first paragraph need not be conducted if it is a work which is conducted for less than two months per year. Also, measurements need not be conducted if it can be proven to be clearly unnecessary due to the amount being negligible, the exposure time short or if the handling is arranged so that the concentration in the air is negligible.

Measurement shall be conducted

- within three months after the handling has commenced,
- if the handling has been changed so that previous measurement is inaccurate, and



- after one year.

Thereafter, measurements shall be conducted at the time intervals below. The time intervals may be exceeded by no more than two months.

<b>Measurement result compared to the level limit value from two consecutive measurements</b>	<b>Time until next measurement</b>
At least one of the measurement results are above 1/2 of the limit value	1 year
Both measurement results are between 1/5 and 1/2 of the limit value	3 years
One of the measurement results are between 1/5 and 1/2 of the limit value and the other is below 1/5 of the limit value	3 years
Both measurement results are below 1/5 of the limit value	5 years

The measurement shall be documented in a measurement report in accordance with the Provisions (AFS 2011:18) on occupational exposure limit values. (AFS 2014:43)

**Section 51** A copy of the measurement report shall be sent to the Swedish Work Environment Authority no later than three months after a measurement has been conducted in accordance with Section 50. (AFS 2014:5)

### **Provisions on sanction charges**

**Section 52** The regulations in Section 20 constitute provisions in accordance with Chapter 4, Section 1 of the Swedish Work Environment Act (SFS 1977:1160). The regulations in Section 37 e constitute provisions in accordance with Chapter 4, Section 1 of the Swedish Work Environment Act (SFS 1977:1160). The regulations in Section 45 constitute provisions in accordance with Chapter 4, Sections 2 and 4 of the same Act. The regulations in Section 47 constitute provisions in accordance with Chapter 4, Section 2 of the same Act.

Any person who violates these provisions shall pay a sanction charge, in accordance with Chapter 8, Sections 5–10 of the Swedish Work Environment Act. The size of the sanction charge is calculated on the basis provided in Sections 20, 37e, 45 and 47. (AFS 2014:43)

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### *AFS 2011:19*

These Provisions enter into force on 1 July 2012 when the following Provisions of the Swedish Work Environment Authority and the Swedish National Board of Occupational Safety and Health shall be repealed.

1. The Swedish National Board of Occupational Safety and Health's Ordinance (AFS 1986:13) with Provisions on Oils.

2. The Swedish National Board of Occupational Safety and Health's Ordinance (AFS 1992:18) with Provisions on Motor Fuels.

3. The Swedish National Board of Occupational Safety and Health's Provisions (AFS 1997:10) on Laboratory Work with Chemicals.

4. The Swedish National Board of Occupational Safety and Health's Provisions (AFS 2000:4) on Chemical Hazards in the Work Environment.

Permissions which have been pronounced in accordance with the repealed Provisions shall apply as permissions in accordance with the new Provisions.

For work which commenced before 1 July 2012, measurement in accordance with Section 50 shall be performed for the first time no later than 1 October 2012.

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### *AFS 2014:5*

These provisions enter into force on 1 July 2014.

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### *AFS 2014:43*

1. Regarding Section 20 third paragraph and Section 37 e fifth paragraph these provisions enter into force on 1 June 2017. The rest enter into force on 1 June 2015 when the Swedish Work Environment Authority's provisions on Thermosetting Plastics are repealed.

2. For containers with chemical products that are legally placed on the market, labelled according to the Swedish Chemical Agency's Regulations (KIFS 2005:7) on Classification and Labelling of Chemical Products, Section 19 may be applied according to its latest version (AFS 2014:5) until 1 June 2019.

3. Permissions which have been pronounced in accordance with the repealed Provisions shall apply as permissions in accordance with the new Provisions.

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### *AFS 2017:4*

These provisions enter into force on 1 December 2017.

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### *AFS 2018:2*

These provisions enter into force on 21 August 2018.

## Appendix 1: Substances which are prohibited or require a permit

### Group A – Substances which may not be handled according to Section 45

The stipulations in Section 45 also apply to the substance's salts and when the substance contains water of crystallization. CAS No is the identification number of the substance according to Chemical Abstract Service.

(AFS 2018:2)

Carcinogenic substances	CAS No
2-Acetamidofluorene .....	53-96-3
4-Aminobiphenyl .....	92-67-1
Benzidine.....	92-87-5
Bis(chloromethyl) ether .....	542-88-1
Chloromethyl methyl ether.....	107-30-2
1,2-Dibromo-3-chloropropane (DBCP).....	96-12-8
N,N-Dimethyl-4-aminoazobenzene.....	60-11-7
Erionite .....	66733-21-9
	12510-42-8
Hexamethylphosphoric triamide (HMPA).....	680-31-9
20-Methylcholanthrene (3-methylcholantrene).....	56-49-5
N-Methyl-N-nitrosourea (MNU) .....	684-93-5
β-Naphthylamine .....	91-59-8
Nitrodiphenyl .....	92-93-3

### Group B – Substances which according to Section 47 may only be handled following permission from the Swedish Work Environment Authority

The stipulations in Section 47 also apply to the substance's salts and when the substance contains water of crystallization. CAS No is the identification number of the substance according to Chemical Abstract Service.

(AFS 2018:2)

Carcinogenic substances	CAS No
p-Aminoazobenzene.....	60-09-3
Auramine .....	492-80-8
(4,4'-imidocarbonyl-bis(N,N-dimethylaniline))	
Benzal chloride .....	98-87-3
Benzotrichloride .....	98-07-7
β-Butyrolacton .....	3068-88-0
4,4'-Diamino-3,3'-dichloro-diphenylmethane.....	101-14-4
(MOCA, methylene bis(o-chloroaniline))	
2,4-Diamino-1-metoxybenzene (2,4-diaminoaniso).....	615-05-4
2,4-Diaminotoluene (2,4-Toluenediamine) .....	95-80-7

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Dianisidine (3,3'-dimethoxybenzidine) .....	119-90-4
Diazomethane .....	334-88-3
3,3'-Dichlorobenzidine .....	91-94-1
2,2'-Dichlorodiethylether .....	111-44-4
2,2'-Dichlorodiethylsulfide (mustard gas).....	505-60-2
1,2:3,4-Diepoxybutane.....	1464-53-5
Diethyl sulfate .....	64-67-5
3,3'-Dimethylbenzidine (o-Tolidine) .....	119-93-7
1,1-Dimethyl hydrazine .....	57-14-7
1,2-Dimethyl hydrazine .....	540-73-8
Dimethyl sulfate.....	77-78-1
Ethyleneimine (aziridine) .....	151-56-4
Ethyl methanesulfonate (EMS) .....	62-50-0
Methylmethanesulfonate (MMS).....	66-27-3
Monomethylhydrazine .....	60-34-4
$\alpha$ -Naphthylamine.....	134-32-7
N-Nitrosodimethylamine (N,N-dimethylnitrosamine).....	62-75-9
Phenyl- $\beta$ -naphthylamine .....	135-88-6
1,3-Propane sultone .....	1120-71-4
$\beta$ -Propiolactone .....	57-57-8
1,2-Propyleneimine.....	75-55-8
Thioacetamide .....	62-55-5
Tris(2,3-dibromopropyl) phosphate .....	126-72-7
Urethane (ethyl carbamate).....	51-79-6

Sensitizing substances	CAS No
2,4-Diaminotoluene (2,4-Toluenediamine).....	95-80-7
3,3'-Dichlorobenzidine .....	91-94-1
S-[2-(Dimethylamino)ethyl]-pseudothiurea- dihydrochloride (PBA).....	16111-27-6
Hexahydrophthalic anhydride .....	85-42-7
	13149-00-3
	14166-21-3
Methyl hexahydrophthalic anhydride .....	25550-51-0
	19438-60-9
	48122-14-1
	57110-29-9

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Methyl tetrahydrophthalic anhydride .....	26590-20-5
	11070-44-3
	34090-76-1
	1694-82-2
	3425-89-6
	5333-84-6
	42498-58-8
Tetrahydrophthalic anhydride .....	85-43-8
	935-79-5
Tetrachlorophthalic anhydride .....	117-08-8

<b>Substances toxic to reproduction</b>	<b>CAS No</b>
Etylentiourea.....	96-45-7

**General Recommendations for the Appendix**

As a guidance value, 0.005 mg/m<sup>3</sup> for the combined exposure to organic anhydrides during 15 minutes of inhalation should not be exceeded.

## **The Swedish Work Environment Authority's General Recommendations on the Implementation of the Provisions on Chemical Hazards in the Working Environment**

### **Purpose and scope**

**Guidance on Section 1** Work in an employer's household refers to work involving cooking, washing-up and cleaning, help with personal hygiene and similar. Craft work, work in animal stables and repairs are normally not included.

When an investigation and risk assessment is conducted in an employer's household, attention should be paid to the labelling on all chemical products that the persons working in the household may come into contact with. Regarding household chemicals, it should be possible, based on the information on the label, to determine whether any dangerous situations can arise and which protective measures therefore are needed. Examples of protective measures which may be required are protective gloves, protective goggles, ventilated workplace, measures against ignition of flammable goods and safe packaging.

When exemptions may be made from Sections 6-10 in these Provisions, the requirements for documentation of the risk assessment in accordance with the Swedish Work Environment Authority Provisions on *Systematic Work Environment Management* still apply.

When a workplace has special employees who during the majority of their work hours perform cleaning and washing-up etc., it should never be a matter of these employees' own personal use, which is why Sections 6-10 shall be applied.

### **The addressees of the Provisions**

**Guidance on Section 2** The Work Environment Act applies to all work that an employee performs for an employer. The Work Environment Act also applies to a certain extent outside professional life. Pupils, inmates of an institution and persons who are engaged in service under the Total Defence Service Act are in some cases equal to employees, e.g., regarding the conditions of the work environment (Chapter 1, Section 3 of the Work Environment Act). Therefore these Provisions also apply in the school if there are substances present which can cause ill-health.

The Work Environment Act and its Provisions also apply in certain parts for

- those who conduct commercial activities without employees, alone or together with a family member,
- those who orders execution of building or construction work and their subcontractors,
- architects, construction planners and others participating in the planning and designing within the framework of their commissions,
- the building work environment coordinator,
- those who manufacture prefabricated buildings and constructions,
- those who are responsible for the co-ordination of work environment questions,
- those who manufacture, import, deliver or provide a machine, tool, protective equipment or other technical device,
- those who manufacture, import or deliver a hazardous substance,
- those who deliver or make a packaged product available,
- those who install a technical device,
- those who hire rented labour,
- those who control a worksite and
- those who provide premises, land etc.

The Work Environment Act only applies in part for those who conduct professional activities without employees, alone or together with a family member. Sole traders or family businesses are obliged to adhere to that which is stipulated in the Work Environment Act and in support of it, regarding technical devices or hazardous substances which can cause ill-health and accidents as well as that which regards joint workplaces.

For a contractor at a joint workplace where someone else is managing and coordinating, it is as a rule sufficient that the contractor conducts their investigation and risk assessment by utilizing the documents which have already been produced for the joint workplace. However, the contractor must make an own investigation and risk assessment for chemical hazards they themselves bring to the work place and produce the documentation in accordance with the Provisions. The result of such a risk assessment and other documentation must be anchored with the workplace coordinator for the work environment.

As those who hire rented labour organize the labour and exercise the direct work management, they have a responsibility which in principle corresponds to an employer's work environment responsibility. It means, among other things, that those who hire labour shall assess the risks in the work tasks that a hired employee performs.

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### **The REACH Regulation**

**Guidance on Section 3** An employer who is a manufacturer, importer or downstream user may be liable to produce a chemical safety report, in addition to the risk assessment and documentation requirements which are stipulated in the Swedish Work Environment Authority's Provisions. This is in accordance with the stipulations of the REACH Regulation.

### **Definitions**

**Guidance on Section 4** The definition of a *hazardous chemical product* does not include chemical products such as cosmetic and hygiene products, pharmaceuticals, foodstuffs, fodder and waste as these are exempt from the rules on classification and labelling to which the definition refers. Such chemical products are therefore not defined as hazardous chemical products even if they constitute chemical hazards.

*Chemical product* has, as defined here, the same meaning as in the Swedish Environmental Code, (1998:808). The definition here is worded differently in order to clarify the difference between chemical substances and mixtures which occur naturally or unintentionally.

The term *chemical hazard* includes both hazardous chemical substances and mixtures when they occur as a chemical product and in other manners. Other manners may be as exhaust fumes or other air pollution, or in or on a material, plant or technical device. Even matters that cause ill health or accidents without being classified as dangerous according to the CLP Regulation are included.

*Causing ill-health through its properties as a result of the form which a substance takes* may for example mean that a substance is hazardous purely because it is in dust form. High levels of dust which have a harmful effect on the respiratory passages may therefore be a chemical hazard even if the composition of the dust is not hazardous to health. (AFS 2018:2)

### **Investigation and risk assessment**

#### **When an investigation and risk assessment shall be conducted**

**Guidance on Section 5** In order to ensure that equipment, competence and information is available when it is needed in an activity which is conducted in places not known in advance, such as at rescue work or inspection, where unknown chemical hazards may exist, the risk assessment is made based on



the chemical hazards and situations which could potentially arise. It is advisable, for example, to bring protection which can withstand most substances and learn about the limitations of the protection.

Some holes and pipe trenches are so deep and narrow that the requirement for investigation of the air before work commences applies. The determining factor is whether or not the air is naturally mixed with the surrounding air.

### **Chemical hazards which shall be identified and registered**

**Guidance on Section 6** When making a planned investigation and risk assessment it is suitable to make an accumulated register for the area the investigation and risk assessment relate to. For newly commenced or temporary work, it is sufficient to document the chemical hazards separately and then enter those which are still current in the accumulated register at the next planned investigation and risk assessment.

An example of such a name which is referred to in the first paragraph is "welding fumes from stainless" for a chemical hazard which consists of fumes from welding work with stainless metal.

You may use information from labelling such as hazard statement or hazard class and hazard category to indicate the type of danger in hazardous chemical products. For other chemical hazards, you must indicate the type of danger with your own words. It is often sufficient to describe a chemical hazard's type of danger with one or a few words such as *flammable* or *may cause allergy*. More in-depth information on the dangerous properties of chemical hazard such as the level of danger and the danger in different contexts which shall be evident from the information in accordance with Section 7, need not be stated when the chemical hazards are registered.

Sometimes it is easier to identify the chemical hazards systematically by dividing them into the following categories.

1. Hazardous chemical products in accordance with Regulation (EC) No 1272/2008 (CLP).
2. Other chemical products or goods with intrinsic properties which may cause chemical risks.
3. Chemical products which become hazardous as a result of their handling.
4. Chemical hazards or air pollution which form during handling.
5. Air with excessive or insufficient oxygen content. (AFS 2014:43)

### **Documents which are important for the risk assessment**

**Guidance on Section 7** Paper glue used for gluing on single occasions is one example of a hazardous chemical product where the information in the supplier's labelling is sufficient. This is because it is not probable that ill-health and accidents will arise due to the small quantity which is being handled.

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In the assessment of the risks when handling a chemical hazard for which it is impossible to obtain full information, it should be assumed that it has the suspect hazardous properties and that measures are needed against the risks which may arise.

### Factors to assess in order to determine if measures are necessary

**Guidance on Section 8** In order to determine when a chemical hazard entails a risk we need to e.g., observe how persons can be exposed to it in contexts where the risk has been identified. This includes foreseeing unintentional errors which may result in accidents in various work situations.

The properties of the substance along with factors such as amount handled, temperature, if the handling is conducted openly, ventilation, evaporation surface and aerosol formation determines how high the level of the substance will be in the breathing zone.

Internet-based tools where these factors can be entered can be used in the exposure assessment. Examples of generally available tools can be found at the following web addresses: [www.hse.gov.uk/coshh/essentials](http://www.hse.gov.uk/coshh/essentials) [www.stoffenmanager.nl](http://www.stoffenmanager.nl) and [www.advancedreachtool.com](http://www.advancedreachtool.com)

Interacting effects can be both additive and synergistic. If several chemical hazards with similar effects occur at the same time, their respective effect (additive effect) should be added together. One example of a synergistically interacting effect is the nerve-damaging effect of the solvents n-Hexane and Methyl ethyl ketone (MEK) which in combination is significantly stronger than the sum of the effect of the substances on their own.

**Guidance on Section 9** When an employee is simultaneously exposed to several air contaminants which work in a similar way, e.g., organic solvents which affect the central nervous system, their combined effect is calculated by adding together their proportion of the respective limit value in order to arrive at the occupational exposure effect. If both levels of two substances to be added together exceed half the limit value, the combination corresponds to the limit value.

It is not acceptable for a part-time employee to be exposed to higher levels of an air pollutant because of shorter exposure time. For longer work shifts and for calculation of occupational exposure effect, see the Swedish Work Environment Authority's Provisions on *Occupational Exposure Limit Values*.

#### *Physical strain*

The intake of air pollution in the body through inhalation becomes greater during physically strenuous work e.g., since such work increases the lung ventilation.

The limit values refer to the exposure level during medium heavy work. During heavier work with increased lung ventilation it is important to further limit the level of air pollutions. Here is an indication of lung ventilation during different types of physical strain.

<b>Work</b>	<b>Lung ventilation</b>
Working sitting down (reading and writing work, office work, car driving, inspection work)	<15 l/min
Light work (light engineering work, truck driving, walking)	15-25 l/min
Medium/heavy work (heavy engineering work, heavy health care work, construction work, fast-paced walk)	25-40 l/min
Heavy work (heavy construction work, manual construction work, heavy farm work, slow running)	40-50 l/min
Very heavy work (heavy stevedoring, smoke diving, manual forestry work, climbing in masts, running)	>50 l/min

## **Documentation and information**

### **Handling and safety instructions as well as other routines**

**Guidance on Section 11** Handling and safety instructions are instructions on how a certain work or operation shall be performed and on what protective measures including use of personal protective equipment are needed in the various operations.

The content and level of detail in the handling and safety instructions needs to be adapted to the level of difficulty of the work task and to the individual's needs and preconditions.

As a basis for the employer's instructions you may use manuals or suggested handling and safety instructions which are developed by someone other than the employer, e.g., supplier of equipment, a trade organisation or another company.

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In addition to the Section's requirement, written instructions shall also be available when the risks are serious as stated in the Swedish Work Environment Authority's Provisions on *Systematic Work Environment Management*.

The following points may also need to be included in the instructions:

1. What type of work the instructions are intended for, the issuer and the date for the issue.
2. How to prepare the work:
  - Where the work shall be executed.
  - Checking the equipment and apparatus.
  - Arrangements of protective equipment and decontaminant for spillage.
  - Placement of warning signs and barriers.
3. Work description, step by step, with information about:
  - The amounts of different chemicals which shall be added, in which order and which dosing equipment is to be used.
  - What measures shall be taken in order to reduce the risks, e.g., using a local extraction device or fume cupboard.
  - Personal protective equipment to use during the different operations.
4. What to do after finished work:
  - How waste shall be disposed.
  - Decontamination and cleaning.
  - Cleaning the skin and the personal protective equipment which has been used.
5. What to do if an accident or incident occurs (such as violent reaction, fire, spillage or air pollution):
  - What measures you should take yourself.
  - Whether protective equipment is needed.
  - How to call for help.
  - What type of first aid may be necessary.
  - Which persons need to be informed of the event.

### *Work in cisterns, wells, silos, loading spaces or similar*

Handling instructions for work referred to in Section 36 should contain information on what checks need to be performed, which tools and which equipment is to be used, who is authorized to perform the work and when it is to be performed. The handling instructions shall include how measurements, supervision and preparations for lifting in accordance with Section 32 shall be conducted.

Below are some examples of factors which are important to observe when issuing handling instructions for work with a flammable liquid in a confined space.

1. That the work method minimizes the area which the liquid can evaporate from and the risk of liquid spilling.
2. That the atmosphere in the space may need to be filled with inert gas (nitrogen gas or argon) or that you may need to ensure that the temperature in the space is at least 5 °C lower than the flashpoint of the occurring substances.
3. A guard with a suitable hand fire-extinguisher, prepared for a quick intervention, will normally be required on hand in the proximity of the entrance to the confined space.
4. Check that the equipment has an explosion-proof design.
5. The need for breathing apparatus with safety pressure and lifting harness with a cord.
6. The need for protective clothing for the risks which may arise.
7. The need to cordon off the site and use warning signs.
8. That the container is secured against substances flowing in and against e.g., stirrers being set off.

*Work with chemical hazards which are carcinogenic, mutagenic and toxic to reproduction*

The instructions referred to in Section 44 should apply to all stages of the handling, including maintenance, cleaning and removal of waste as well as the procedure in the event of a spillage or similar.

*Routines*

Routines are procedures determined in advance, e.g., who is responsible for a work task, what the work task entails and when various operations shall be carried out.

The Provisions specify which routines for the work environment management are required in accordance with Section 5 of the Swedish Work Environment Authority's Provisions on *Systematic Work Environment Management*. Except for routines for investigation, risk assessment and follow-up you may for the management of chemical risks also need routines for i.a.

- Product choices and purchases.
- Issuing of handling and safety instructions as well as for instructing the employees.
- Reception of hazardous chemical products, storage and repackaging.
- Introduction to new work tasks.
- Reporting, investigation and follow-up of ill-health, incidents and accidents.
- Checks and maintenance of equipment and ventilation.
- Waste management.
- Cleaning and collection of spilled chemicals.

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### *Routines for checks and maintenance*

Routines should, for example, be produced in order to ensure that equipment in general and protective equipment in particular function as intended. These routines can e.g., state when the equipment shall be checked and by who. For process equipment, routines for checks and maintenance may include checks of gaskets, controls and safety equipment and change or adjust them.

It is important to design the routines so that the work place complies with the rules on protection against chemical risks also from other Provisions. Examples of such rules are

- the rules on maintenance of work equipment in the Swedish Work Environment Authority's Provisions on *Use of Work Equipment*.
- the rules on function control and maintenance of ventilation in the Swedish Work Environment Authority's Provisions on *Workplace Design* and
- the requirements of maintenance of personal protective equipment which can be found in the Swedish Work Environment Authority's Provisions on *Use of Personal Protective Equipment*.

### *Inform the employer of ill-health or accidents*

It is often suitable to have a routine for the employees' obligation to inform the employer of suspected exposure. Such a routine should also state that ill-health in the form of transient discomforts such as headaches in some cases can give the employee reasons to suspect such exposure, which makes it necessary to inform the employer.

## **Contingency plan for accidents and emergency situations**

**Guidance on Section 12** The contingency plan should state how the employees shall act in the event of a fire. This should include e.g., what type of extinguishing agent to choose in different situations, how to use extinguishing equipment, when a fire guard may be necessary, how alarms work and how evacuation is conducted. In the contingency plan, it is suitable to inform about the measures taken regarding alarm and evacuation in accordance with the Swedish Work Environment Authority's Provisions on *Workplace Design*.

The contingency plan shall always state how to act when chemical hazards leak out and may form hazardous mixtures with air, causing an explosive fire or explosion.

Examples of immediate measures which may be needed are e.g., turning off stopcocks for gas.

Where there is a risk of exposure for chemical hazards with high acute toxicity, there should be special instructions for first aid. If there are countermeasures (antidotes) available for a chemical hazard or oxygen in the event

of a lack of oxygen, information on this should be included in the contingency plan. In general it may be suitable that the routines for first aid which are required in accordance with the Swedish National Board of Occupational Safety and Health's Provisions on *First Aid and Crisis Support* are included in the contingency plan.

Where there is an internal plan for rescue operations in accordance with Section 11 of the Swedish Work Environment Authority's Provisions on *Prevention of Serious Chemical Accidents*, this also forms a contingency plan in accordance with these Provisions regarding the risks it applies for.

### **Obligation to inform about risks and keeping documentation available**

**Guidance on Section 13** How extensive the information needs to be depends among other things on the risks and on previous experience and education of the employees.

Please note that special information efforts may be needed for certain groups of employees, e.g., minors, persons with disabilities or persons with another language background, to ensure that they have understood.

The information should be provided on signs in cases where it is deemed to be a suitable method in order to reduce the risk of ill-health and accidents. The type of risk and who is exposed to it determine the actions needed.

When the instructions are in writing, they should be presented verbally when delivered to the employees.

CHECK LIST FOR THE INFORMATION - An example of what a list may contain:

1. Information on risks and protections in the individual work task and on what special operations may entail risks.
2. What other risks are present in the workplace and how these risks can be avoided.
3. The routines for the chemical safety work, e.g., for order, decontamination and instruction.
4. Points to consider before she or he commences a new task.
5. Information on personal protective equipment, where the equipment is located, how it is operated and what limitations the equipment has.
6. The meaning of the different labelling symbols.
7. Existence and storage of the documentation in accordance with Section 13.
8. The legislation that applies for the handling of the occurring chemical hazards, e.g., occupational exposure limit values.

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9. Evacuation plan in accordance with the Swedish Work Environment Authority's Provisions on Workplace Design and what to do if an alarm is set off.

10. Contingency plan in accordance with Section 12.

11. The use of equipment for fire-extinguishing and first aid as well as other measures for first aid.

The demand that the documentation shall be easy to overview and easily read means that it needs to be organized systematically so that it is possible to find the information needed. In order for the documentation to be understandable, it may be necessary to explain words and abbreviations which are difficult to grasp. In order for the concerned non-Swedish speaking personnel to understand the information, it may be sufficient to translate the document's contents verbally. The documentation can be entered into a computer-based system. It is normally required that all employees affected by the information in the documents are able to get information from these at all times during working hours, for the documentation to be considered available.

## **Obligations to take certain special measures and adhere to prohibitions**

### **Primary obligations in activities where chemical hazards occur**

**Guidance on Section 15** When assessing whether the cost of a measure stands in reasonable proportion to the risk decrease the measure would entail, consideration shall not be taken to the activity's capacity to pay for the measure.

Choosing the product and material which entail the combined smallest risks may mean that it is necessary to assess the risks in a combination of a work method and a product by e.g., weighing in risks from an ergonomic point of view, and for accidents, by the work method the chemical product is combined with. A musculoskeletal injury which arises due to unsuitable manual work such as cleaning may for example be more difficult to protect oneself against than a chemical injury.

The accident risks may be greater if one chooses to grind a surface by machine instead of using a chemical substance. The risk of slipping may also vary between different substances and methods.

The risk of hearing impairment is another important factor which should be included if the choice is between methods where the noise levels differ.



Another example of the implementation of the provision is that you normally should choose rubber ring joints instead of gluing with products hazardous to health when joining up plastic pipe systems at installation of e.g., sewage systems.

Another way to minimize the risk is to choose materials that are not affected by the substances and the environment they are subjected to.

Fixed installed pipes are often preferable to tubes.

To comply with the requirements in the Swedish Work Environment Authority's Provisions on *the Use of Work Equipment* is a prerequisite for Section 15, point 2 to be considered fulfilled.

Choosing a place to counteract different risks may entail considering early on in the planning stage the need for e.g., separate rooms and storages for certain handling, process ventilation, special waste and cleaning rooms, laundry facilities, devices for eye wash and emergency decontamination showers. Rules on process ventilation can be found in the Provisions on *Workplace Design*.

When spraying paint and putty, the exposure to overspray easily becomes so high that the limit value for organic dust is exceeded. This means that the work method should not be used unless ventilation has been arranged for this. One should also avoid spraying products which contain solvents, e.g., when removing graffiti, unless the ventilation is sufficient. Likewise, one should avoid washing off solvent residue with hot water as solvent fumes will then form in great quantities.

One can counteract the spreading of dust from chemical products in the form of powder by instead choosing a product in the form of paste, pellets, granules, suspension or solution. One can also prevent the spreading of air contaminants by means of water spray.

### **Priority order for choice of measures in order to further limit the risks (staircase of measures)**

**Guidance on Section 16** In order to separate the work or process from less polluting activities it is suitable to locate work methods or processes to a certain room or space, e.g., blast cabinet or spray booth. In such a room, the pressure should be lower than that of the surrounding rooms. In shielded areas, the exhaust air flow should be greater than the supply air flow so that the spread of air contaminants reduces.

### **Information about waste**

**Guidance on Section 17** Examples of product information on waste which may be needed is its chemical substance contents, its hazardousness and that it is necessary to decontaminate the packaging, where this contains remains

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of hazardous chemical products before, it is sent away for destruction, recycling or other final disposal. It is important to store the waste in a safe manner pending final disposal. Special storage facilities under a roof or other protection may be needed during the storage period.

### **General requirements on labelling**

**Guidance on Section 18** Containers refers to all types of containers, e.g. purchased packages, bottles, sacks, loose vessels, fixed tanks and cisterns. Containers that are part of a technical device are also included.

Please note that it may also be necessary to label items other than containers, e.g., ventilation channels and filters for those, if they have been contaminated with substances which entail that special measures are needed when working with these.

It is appropriate to label waste containers carrying chemical hazards with information about the risk in clear wording, a hazard pictogram if such are to be used for the chemical products which have created the waste and with the type of waste in accordance with the Swedish Waste Ordinance, SFS 2011:927. It is important to observe the need for labelling with information on containers holding waste in accordance with Section 17.

It is appropriate to label radioactive substances with the trefoil symbol for radiation, the text 'radioactive' and the name of the radioactive nuclides and information about their activities. As a rule, the point for indication of the activity shall be stated on the labelling. In certain cases, the Swedish Radiation Safety Authority has issued special Provisions which normally are sufficient for fulfilling this requirement.

It may be necessary to label packaging which contains material and goods if they have a surface layer which is a chemical hazard or if they can emit a chemical hazard during handling, e.g., packaging with plants treated with pesticides. Suitable information for labelling is the name of the product used the risk in clear wording and pictograms where applicable.

### ***Pipelines***

A pipeline that all the time contains the same chemical hazard should be labelled with the name of the hazard according to the register. A pipeline used for different products may be labelled with an identifier and with information on where current content is available.

It is also appropriate that pipelines are marked with the appropriate colour in accordance with Swedish standard SS 741.

Water vapor and hot water are chemical hazards without being hazardous chemical products. For water vapor and hot water, the pressure gives an important indication of the risk.

Liquids are considered flammable if the flash point is 100 °C or lower. However, only those with a flash point of 60 °C or less are classified as flammable liquids according to the CLP Regulation.

For example, the requirement for labelling where there is a likelihood of confusion means that both pipelines must be labelled if there are two pipelines and one contains a chemical hazard. It also means labelling must be on both sides of points where pipelines can be disconnected. (AFS 2018:2)

### **Particularly on labelling of hazardous chemical products at work**

**Guidance on Section 19** The guidelines for Section 18 specify what is included in the term "container".

Storage of hazardous chemical products that is not related to use is not subject to the labelling requirements of Section 19. An example of such storage is when the containers are not opened, but only stored for further transport or transfer. The legislation on the transportation of hazardous goods contains requirements on labelling during transport and associated handling. Usage of the term also includes hazardous chemical products that are transferred into other containers and transported on.

The requirement in Section 19 refers to the containers used to store the hazardous chemical products, and not any outer packaging that these in turn may be kept in. Outer packaging may need to be labelled in accordance with Section 18.

Those who have prepared chemical products on a small scale for their own use in a laboratory, and who have been unable to acquire full information on the hazard of such products should label these, in addition to the known hazard, with information stating that the properties are partially unknown.

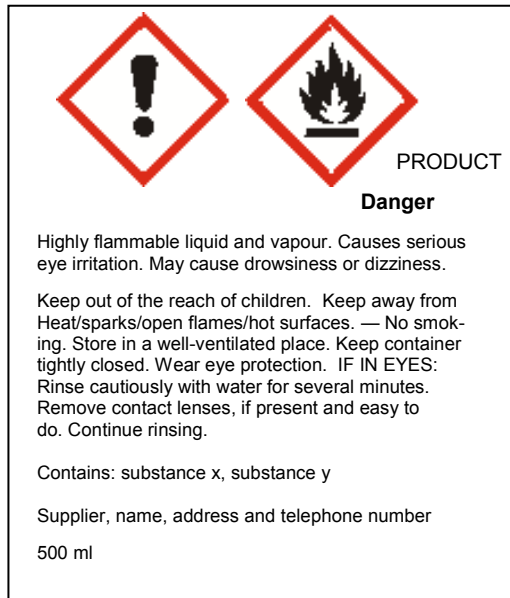
Information concerning the classification, in accordance with the CLP Regulation, of products that when purchased were labelled according to previously applicable legislation can be found on the safety data sheet. When a chemical product is to be labelled both in accordance with the CLP Regulation and the provisions on the transportation of hazardous goods, a hazard pictogram pursuant to the CLP Regulation can be omitted if it refers to the same hazard as the transport provisions.

A chemical product that has a function in a technical device includes, for example, fuels and coolants in vehicles, as well as fluids and gases in analysis equipment. For technical devices that are to fulfil the Swedish Work Environment Authority's Provisions on the Use of *Machinery*, there are requirements regarding measures against risks due to chemical products used in the machine, and warnings in the form of symbols or pictograms. If these are followed, the requirement of Section 18 will be fulfilled.

Below are some examples of labelling in accordance with alternative 1 and 2 of the paragraph respectively.

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### Labelling according to alternative 1



Hazard pictograms

Product identifier

Signal word

Hazard statements

Precautionary statements

Substances which contributes to the classification of the product

Nominal quantity

### Labelling according to alternative 2



Faropiktogram

Text enligt tabell i 19 §

Produktens namn

### *Omission of labelling*

Only labelling the product with its name, or completely omitting labelling normally requires well-established work routines as well as an otherwise satisfactory risk and safety information. If signs are put up in the area where a hazardous chemical product is used, such as fume cupboards or storage sites, labelling can sometimes be omitted or used only to provide the name of the product.

Omission of labelling is acceptable primarily for short-term handling where the contents of the containers are evident for all concerned. Please note that it shall be evident not only for employees who are directly affected by the work with the product, but also for persons who do not normally handle it, e.g., cleaning and service staff and guards.

Labelling cannot normally be omitted when the same container is used on different occasions for products with different risks, as this entails a large risk of confusion over the contents. For containers in which different substances are mixed and new ones are produced, the labelling need not be changed as the composition changes. However, there must always be information on the on-going process in order to know what the risks are. (AFS 2014:43)

**Guidance on Section 20** Examples of pipelines include fixed pressurized pipes that are used to transport gas, liquids or solid materials using gas or liquid. Flue gas ducts, ventilation channels and similar systems do not constitute pipelines. Pipelines in which the content change through a process are considered as process vessels, and shall be labelled in accordance with Section 19.

Reasonable intervals mean that you should be able to see a label at any point along the line. If there are other characteristics, such as colour marking, the spaces may be larger as long as it does not involve an increased risk. When a pipeline contains a less hazardous chemical product, such as compressed air, the gaps may often be long, if it is still clear what the pipeline contains.

A pipeline that temporarily contains a hazardous chemical substance can often be labelled through the hanging of signs.

A pipeline that originates from a labelled container and is visible in its entirety complies with the provision if it is clear that it contains the same product as the container. (AFS 2018:2)

**Guidance on Sections 20, 45 and 47** The current regulations are applicable for those subject to the provisions, see Section 2 of the provisions and the associated general guidelines. However, sanction charges may only be imposed on employers and those who conduct professional activities in accordance with Chapter 3, Section 5 of the Swedish Work Environment Act.

The number employed refers to the following, regardless of whether they are working full or part-time:

- Employees
- Temporary labour (see Chapter 3, Section 12, second paragraph of the Swedish Work Environment Act).

When it comes to operations with no employees (see Chapter 3, Section 5 of the Swedish Work Environment Act), the number employed refers to the following, regardless of whether they are working full or part-time:

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- The persons conducting professional activities.
- Temporary labour

The organisation number of the physical or legal person in question determines which people are to be included in the organisation. The number employed includes people in all of the organisation's workplaces. The number employed shall be calculated based on information regarding the day on which the violation of the sanction regulation was noted. (AFS 2014:43)

### Signage storage and containers

**Guidance on Section 20 a** Amounts that impact on safety during storage include the exacerbation of a fire or health risks associated with a leak.

In the event of signage referring to several different chemical products, hazard pictograms warning of a lower degree of danger may be omitted.

Up until 1 June 2019, warning signs in accordance with the former wording of Swedish Work Environment Authority's Provisions on *Signs and Signals*, appendix 2, section 3.2, may be used instead of the applicable hazard pictogram, as long as it has the same symbol. This is in accordance with a provisional regulation in the Swedish Work Environment Authority's Provisions on *Signs and Signals*.

There is a requirement for a warning sign for gas cylinders in the Swedish Work Environment Authority's Provisions on the *Use and Control of Pressurized Devices*.

In the application of the third paragraph: Remember that signs are primarily posted for the benefit of others than those working at the premises, and concern the precautions that these other people should take. Signs may be needed that prohibit open fire, that indicate a ban on entering or which impose the use of protective glasses. The design of signs other than the hazard pictograms, in accordance with Section 19, is provided in the Swedish Work Environment Authority's Provisions on *Signs and Signals*. (AFS 2018:2)

**Guidance on Section 21** The storage needs to be adapted to the properties of the chemical hazard in order to avoid risks of ill-health and accidents. This may entail keeping products in storage spaces intended for this purpose and arranged so that spillage will not be spread in a hazardous manner. Bunding may be necessary for e.g., flammable, reactive and corrosive chemical products. To prevent accidents cisterns and containers which carry hazardous chemical products or other chemical hazards may need protection against e.g., impact from a vehicle.

The requirement for separate storage can be met in a number of different ways depending on the amounts to be stored, what reactions can occur and what the risks are. Sometimes it is sufficient to keep a large enough distance

between the containers. In other cases it may be necessary to store the products in separate cupboards or place them in separate rooms which, when necessary, are banded. A security device such as an alarm connected to a sensor in the bottom of the banding which warns of leakages can sometimes be suitable in order to prevent risks of ill-health or accidents.

A prerequisite for the storage to meet the requirements in this provision is that the following rules are adhered to.

- The rules on packaging and storage of chemical products hazardous to health or the environment in the Swedish Chemicals Agency's *Chemical Products and Biotechnical Organisms Regulations* (KIFS 2008:2).
- The Swedish National Inspectorate of Explosives and Flammables' Provisions (SÄIFS 2000:2) on the *Handling of Flammable Liquids*.
- The Swedish Civil Contingencies Agency's Provisions (MSBFS 2010:5) on *Storage of Explosive Goods*.
- The Swedish National Inspectorate of Explosives and Flammables' Provisions (SÄIFS 1996:4) on the *Handling of Organic Peroxides*.
- The Swedish National Inspectorate of Explosives and Flammables' Provisions (SÄIFS 1999:2) on the *Handling of Hydrogen Peroxide*.

It may entail an increased risk to store a very toxic substance in the proximity of a substance which can cause a fire or explosion. In the event of an explosion, greater damage may be caused by the toxic substance spreading than by the explosion itself. It is important to observe the information in the supplier's safety data sheets on substances which together with the product may cause dangerous reactions.

The next page contains guidelines for storage in cupboards of chemical products in sealed jars and bottles when the individual risk assessment does not occasion any other storage.

If the chemical product is flammable, oxidizing, explosive or can emit flammable gas, it also falls under the rules for flammable and explosive goods within the area of responsibility for the Swedish Civil Contingencies Agency, see [www.msb.se](http://www.msb.se) (AFS 2014:43)

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### Guidelines for storage of chemical products in cupboards

<b>Hazard Product</b>	<b>Corrosive</b>	<b>Deadly and CMR*</b>	<b>Toxic</b>	<b>Harmful</b>	<b>Reaction- risks</b>
Volatile or smelly liquid or solid substance	Ventilated Spillage container Safe placing	Ventilated Outer protection Inaccessible	Ventilated Safe placing Inaccessible	Ventilated	Ventilated Separated
Other liquid	Spillage container Safe placing	Outer protection Inaccessible	Inaccessible		Separated
Dusty powder		Outer protection Inaccessible	Inaccessible		Separated
Solid, not dusty		Outer protection Inaccessible	Inaccessible		Separated

*Ventilated:* A cupboard which is connected to exhaust air and where the fan is operating 24 hours a day. There are cupboards with a constant airflow through the whole cupboard and cupboards which are intended for negative pressure. The latter have a minimal airflow when the cupboard is closed. Dimensioned air flows for the cupboards are generally approximately 10–20 l/s. For cupboards intended for negative pressure, the value applies when the cupboard is open.

*Spillage container:* The container is placed in a device which collects any spillage in case the bottle should burst.

*Safe placing:* The container is positioned low down so as to avoid getting the chemical in the face if it is dropped.

*Outer protection:* The container with the hazardous chemical is placed in a suitable outer packaging or similar which also provides protection when the packaging is moved to the location where it is to be opened.

*Inaccessible:* The chemicals are stored so that unauthorized persons cannot access them. This is normally achievable by locking the cupboards, the room or area.

*Separated:* The container is placed so that a spilled chemical cannot come into contact with substances which entail a reaction risk. Storage in different cupboards is necessary if the reaction can cause a serious injury.

\* Chemical products which are carcinogenic, mutagenic or toxic to reproduction.



**Guidance on Section 22 Packaging** which meets the requirements which apply for transport of hazardous goods can normally be used when storing the substances they are approved for. When transferring a substance to a container other than the original packaging it is important to assess the suitability of the container.

Containers, canisters and sacks which contain chemical hazards should be designed so that the least possible splashing or dust formation occurs during handling. It is also important that packaging or containers are easy to handle and designed to provide a good grip in all types of handling.

Safety equipment on containers may be protection against overfilling, level measure, safety valve, cooling device and similar. (AFS 2014:43)

### **Measures against risks connected with inhalation**

**Guidance on Section 23** When assessing whether a measure to limit air pollution is practically possible considering the resources required, consideration shall not be taken to the activity's ability to pay for the measure but only whether it is reasonable in comparison to the risk reduction it provides.

Implementation of the staircase of measures in Section 16 means that respiratory protection is a measure to be used only when there are no other possibilities, e.g., during a transitional period before the ventilation is improved.

Breathing zone refers to the area around the employee's nose and mouth outside of any respiratory protection.

An example of when measuring is clearly unnecessary is when the substance is completely contained and the employees cannot be exposed to it.

### **Organic Solvents**

**Guidance on Section 24** When organic solvents must be used, and it is not possible to take actions in accordance with Section 16, points 1 or 2, utilization should as a rule be scheduled outside ordinary work hours in accordance with implementation of Section 15, point 2 and Section 16, point 3.

### **Respiratory protection**

**Guidance on Section 25** In a premise where gas is handled, the Swedish Work Environment Authority's Provisions on *gases* requires that breathing apparatus shall be used where the oxygen level is below 18 per cent. This rule can also be used as guidance for other types of handling.

In a space where the oxygen in the air is used in different processes, e.g., during welding or storage of wood chips and pellets, the air in unventilated parts may become deadly due to low oxygen levels or occurrence of gases harmful to health such as carbon monoxide. As a rule, breathing apparatus is required in such a space for adequate protection.

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Adequate protection against dust with lead content may be a respirator mask with replaceable filters of class P 3. During conventional blasting of materials painted with leaded paint, breathing apparatus is required as a rule for the protection to be adequate.

The fit should be tested every time a filter protection is to be used so that the protection is secured tightly to the face.

### **Measures against risks connected with skin contact, splashing in the eyes and ingestion**

**Guidance on Section 27** In order to determine what protection is needed for the skin it is sometimes necessary to weigh the risk against the disadvantages in the form of skin problems which use of the protection may entail. If injuries do not appear during brief contact with the product, it is possible to sometimes refrain from using gloves if it is possible to immediately wash off any splashes. Contact allergies may arise after repeated brief contact. Gloves should therefore be used when handling allergenic substances.

**Guidance on Section 28** Examples of suitable protection against splashing of chemical substances are goggles with covered ventilation holes, face shield (visor), hood or full helmet. For certain work it is important to choose eye protection which does not increase the risk of accident by limiting the field of view.

### **Work in cisterns, wells, silos, loading spaces or similar**

**Guidance on Section 31** For examples of when the composition of the air is not safe, refer to the guidance on Section 25. Regarding control of the level of flammable fumes, refer to the guidance on Section 36.

An example of when the air needs to be continuously monitored during work is in spaces where there is sewage water, excrements and manure since methane gas may be released which entails a risk of explosion and harmful gases such as hydrogen sulphide and carbon monoxide. Furthermore, the level of oxygen in the space may decrease. If sufficient ventilation cannot be arranged, breathing protection must be used for protection against the substances.

**Guidance on Section 32** In order to lift a person out of the space, it is important to make sure that cisterns or equivalent, are constructed with an access opening large enough to lift out a person along with the equipment needed. Swedish standard SS 1797, *Inspection and access openings – dimensions*, can be used for guidance.

### Measures to prevent risks of fire, explosions and reactions

**Guidance on Section 33** When handling flammable goods, the measures must also be compatible with the rules on handling flammable and explosive goods in the Act (2010:1011) and Ordinance (2010:1075) on Inflammable and Explosive Goods as well as implementation provisions for these.

Compliance with the following rules relating to limitation of sources of ignition, design of work premises and technical facilities is a prerequisite for the requirements in this provision to be considered met.

- The Swedish National Board of Occupational Safety and Health's Provisions on *Equipment for Use in Potentially Explosive Atmospheres*.
- Regulations on electrical equipment in the Swedish National Electrical Safety Board's Provisions (ELSÄK-FS 1995:6).
- Regulations on which electrical equipment shall be chosen when handling flammable goods in the Swedish National Electrical Safety Board Regulations (ELSÄK-FS 2008:1) on *how Electrical Installations shall be Installed*.
- Regulations on when premises, spaces, parts of a space etc. shall be classified as an explosive environment within the Swedish Civil Contingencies Agency's area of responsibility for *Handling of Flammable Gases and Liquids in Explosive Environments* (SRVFS 2004:7) and on the Swedish National Inspectorate of Explosives and Flammables' Provisions on *Classification when Handling Explosive Goods* (SÄIFS 1988:2).
- Regulations in the Swedish Work Environment Authority's Provisions on *Work in Explosive Environments*. (AFS 2014:43)

**Guidance on Section 34** Suitable equipment in accordance with the provision should primarily be equipment needed for reducing the risks of personal injury due to fire incidents and smaller fires, such as fire blanket, hand fire-extinguisher or a prepared hose.

The Rescue Service's advice in matters of suitable extinguishing equipment and extinguishing agent as well as how the equipment is used can be used when implementing this provision.

'Suitable equipment' in premises with particular risks in the event of a fire also entails that the requirement in the Swedish Work Environment Authority's Provisions on *Workplace Design* on automatic extinguishing equipment is met.

**Guidance on Section 35 first paragraph** The supplier's safety data sheet is a basis for determining which hazardous chemical reactions may occur. The chemical product's reactivity and chemical stability shall be stated on the sheet in accordance with the REACH Regulation. A description shall also be provided of what conditions should be avoided, with which substances and

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materials a hazardous situation may arise and which hazardous disintegration products may form when used, stored, spilled or heated.

The implementation of the provision may require heat dissipation when scaling up a chemical process.

**Guidance on Section 35 second paragraph** When implementing the provision, it is necessary to be observant of everything which may trigger an uncontrolled reaction. It may be pollutants, rust or other coatings as well as light and heat. Stabilizers should be used where possible considering the handling of the substance. The level of stabilizers may have to be monitored regularly. Plan the use of stabilizers based on the current handling and the supplier's recommendations on suitable analysis method, testing and the addition of stabilizers. It is appropriate to keep a journal of dates for controls, control results and any measures which have been taken.

Organic peroxides, hydrogen peroxide, trichloroethylene, tetrachloroethylene, 1,1,1-Trichloroethane and Methylene Chloride are examples of substances which can disintegrate uncontrollably. Condensed Ethylene Oxide is an example of a chemical product which can polymerize emitting strong heat.

## **Work permit**

### **Guidance on Section 36**

#### *Point 1*

When working in tanks, cisterns or similar spaces with a flammable liquid or aerosols, the level of flammable fumes must be monitored throughout the work by measuring with an explosimeter. It is important to ensure that the explosimeter is designed to be used in the atmosphere in question. Ex-classified explosimeters can be found for different gases, fumes and zone types. Furthermore, it is important that the measurements are executed so that they become representative for the entire space in which the work is to take place. The oxygen level must be measured at the same time, as the risk of explosion will be underestimated if the oxygen level is lower than normal.

The level of fumes should not exceed the following:

- When hot work is to be performed in the space: No more than five per cent of the lower explosion limit (at 21 per cent oxygen level in the space). It is therefore important that the explosion risk is controlled until the surfaces have cooled down.

- When other work is to be carried out: No more than 25 per cent of the lower explosion limit (at 21 per cent oxygen level in the space), provided that no sources of ignition exist in the proximity.

*Point 2*

Before consent is given to commence welding, cutting or other work which entails high temperatures on a container which has contained a flammable or combustible liquid, the risk for fire or explosion needs to be prevented. This can be done by checking that it is emptied and cleaned and ventilate it so that it does not contain an explosive atmosphere or fill it up with water.

When a pipeline is mounted to another pipeline that is under pressure, the Swedish Work Environment Authority's Provisions on *Use and Control of Pressurized Devices* also apply.

*Last paragraph*

Before the person responsible for the coordination of work environment issues approves the start of a work, she or he needs to know that the facility has been switched off in a safe manner so that the person performing the work is not exposed to risks from the facility.

**Measures when handling radioactive chemical hazards**

**Guidance on Section 37** A prerequisite for the requirements on handling in this provision to be considered met is that the rules on handling radioactive substances in the Swedish Radiation Safety Authority's Provisions are complied with.

**Special requirements for allergenic chemical products and certain processes**

**Guidance on Section 37 a** Instant adhesives that contain cyanoacrylates have caused allergic reactions, and are therefore included even though they are not classified as allergenic.

Certain chemical products are labelled as containing an allergenic substance, but in such a small content that the product is not classified as allergenic. In the risk assessment, it is important to note that these can cause allergy symptoms in sensitive individuals.

One example of a process that may release formaldehyde is the hardening of acid-hardening lacquers and paints. (AFS 2014:43)

**Documentation of the risk assessment**

**Guidance on 37 b** An example of a situation such as that described in point 3 would be the use of protective gloves that protect against a skin allergen because technical or other measures are not sufficient to avoid skin contact with the substance. Point 3 also refers to the use of respiratory protective

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devices due to it being impossible to take technical measures to completely prevent the inhalation of respiratory allergens.

When documenting the risk assessment, it is important to identify the situations during the process in which allergens are formed, and which measures to take. (AFS 2014:43)

### **Signage**

**Guidance on Section 37 c** The design of signs, with regard to colour, shape and symbols, is provided in the provisions on *Signs and Signals*. The warning sign "Fara" (Danger) in appendix 2, with a supplementary sign referring to the nature of the danger could be appropriate.

In the case of open handling, there is a risk of exposure of the skin and airways. Open handling essentially means that it is possible to physically touch the hazardous chemical product, or that fumes can be released into the environment.

When a product is in an applicator, or when the chemicals are mixed inside the applicator before use, this is not open handling. (AFS 2014:43)

### **Training**

**Guidance on Section 37 e** The training needs to cover the elements that are relevant to the work being conducted:

- Basic knowledge of chemical risks
- Knowledge of the chemicals being handled
- Review of the steps in the process that are potentially risky.
- What happens during processing and thermal degradation.
- What safety measures that are necessary to conduct work safely.
- What type of ventilation that is required.
- In what situations personal protective equipment is required, and what type of protective equipment is appropriate.
- Cleaning and sanitation techniques.

In order to provide the knowledge required by the provision, the educator needs to be well-versed in the Provisions on *Chemical Hazards in the Working Environment* and on allergenic substances. The educator should also be familiar with the work environment legislation and other laws and regulations relating to the chemical field. (AFS 2014:43)

### **Medical examinations**

**Guidance on 37 f** Examples of formaldehyde resins include phenol-formaldehyde resin, urea-formaldehyde resin and melamine-formaldehyde resin. (AFS 2014:43)

## **Special requirements for chemical products which are carcinogenic, mutagenic and toxic to reproduction as well as certain activities**

**Guidance on Section 38** During the risk assessment to be performed in accordance with the Swedish Work Environment Authority's Provisions on *Pregnant and Breastfeeding Employees*, the chemical products and activities applicable to this Provision need special attention.

Chemical products labelled according to the Swedish Chemical Agency's Regulations (KIFS 2005:7) on *Classification and Labelling of Chemical Products* may be on the market until 1 June 2017. When a chemical product is labelled according to KIFS 2005:7 the requirements apply to the following risk phrases.

R45: May cause cancer.

R46: May cause heritable genetic damage.

R49: May cause cancer by inhalation.

R60: May impair fertility.

R61: May cause harm to the unborn child. (AFS 2014:43)

### **Documentation of the risk assessment**

**Guidance on Section 40** In order to take a position on how to supervise the handling and functioning of the equipment, the factors which may affect the exposure need to be investigated. For a few substances, it is possible to continuously measure the level of the chemical hazard in the air. In other cases, it is for example possible to check that the ventilation has not deteriorated compared to what the handling has been planned for. Another way can be to regularly check whether surfaces in the surrounding area have been contaminated.

Rules on ventilation control can be found in the Swedish Work Environment Authority's Provisions on *Workplace Design*.

### **Register**

**Guidance on Section 41** The purpose of the register is to keep information on exposure to carcinogenic and mutagenic substances in order to facilitate investigations into connections between diseases.

Such exposures may for example exist when the work entails operations where technical measures are not sufficient for avoiding harmful exposure. The obligation to register also applies when increased exposure has been discovered through monitoring or in another way, e.g., the fact that the ventilation is not satisfactory or that the work has not been carried out as planned.

## **AFS 2011:19**

In order to determine the level of exposure an employee has been subjected to, information is required on what way the employee has been exposed, how high the exposure was and how long and often it has occurred.

In accordance with Section 3 of the Work Environment Ordinance, the employer shall keep registers for at least 40 years counted from the day the exposure ceased. (AFS 2014:43)

## **Prohibitions and permits**

**Guidance on Section 45–49** Permits are generally granted for 1–3 years.

See also the guidance on Section 20, 45 and 47. (AFS 2014:43)

## **Periodic measurements of certain chemical substances**

**Guidance on Section 50 second paragraph** The purpose of the measurements is to determine what measures are needed and to follow-up previous results. They shall therefore relate to the air outside any respiratory protection.

An expert such as a work environment engineer can assess whether measurement is clearly unnecessary based on information on the form of the substance, the quantities handled, manner of handling, ventilation, the substances' volatility, knowledge of results of measurements in similar activities etc. As regards lead, the following examples can be mentioned:

- Handling without processing of objects with lead enclosed in glass or plastic when lead exposure is not likely to occur.
- Manual soft soldering work with solder and electric soldering iron most often does not entail any harmful exposure if there is efficient ventilation to extract the smoke.
- Work in mines where lead exists as lead sulphide normally entails a small risk of uptake of lead due to the low solubility of the sulphide.
- Where a check of the blood lead levels has shown that there is no exposure.
- If the work is only carried out on isolated occasions or a few hours per week.

In this provision, work conducted in less than two months refers to the total amount of work conducted in one workplace. If the work is periodical, the periods are to be added together. When calculating how long the work is under way, no consideration is given to how many people are participating or whether the work is carried out by the same people.



## AFS 2011:19

An operation that carries out contracted work at other workplaces for less than two months at each location does not need to carry out periodical measurements.

Work with lead and cadmium shall also comply with the Swedish Work Environment Authority's Provisions on *Occupational Medical Supervision*. (AFS 2014:43)

**Guidance on Section 51** Forms can be found on the Swedish Work Environment Authority's website, [www.av.se](http://www.av.se) under the heading Blanketter (forms). You can also send the measuring report to the Swedish Work Environment Authority electronically. If the measuring report is a paper copy, it should be submitted in two copies.