

**Swedish Civil Contingencies Agency**

FLAMMABLE PRODUCTS

**Handling in the laboratory**

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| This information shows how flammable gases and liquids can be handled in laboratories in a manner which meets the requirements of the legislation.  This information is based on laboratories in which mainly inspection (analyses), training or some development take place. For other types of laboratories, e.g. research laboratories at universities, an extensive investigation of the risks may be necessary as a basis for formulation of handling.  Flammable products  Flammable products are divided into flammable gases, flammable liquids and fire-reactive products.  **Flammable gases**  are gases which can form an ignitable mixture at 20 °C in air.  **Flammable liquids** are liquids which have a flashpoint of no more than 100 °C. The flashpoint is the liquid temperature at which a flammable liquid gives off an ignitable vapour-air mixture.  **Fire-reactive products** are the products indicated specifically by the Swedish Civil Contingencies Agency. The following products are currently covered by the legislation: hydrogen peroxide, organic peroxides, ammonium nitrate, weakly nitrated nitrocellulose and flammable cinematographic film. For rules on how fire-reactive products are to be handled, see the relevant regulation (annex 1).  **Storage**  To prevent spillage and leakage of flammable products, and for such products to remain protected in the event of a fire, it is appropriate to store them in cabinets or storerooms designed for the purpose. The flammable products left out can then be limited to the products required for the day's work. They are returned to the storage area after use. Ventilation in the storage area is also important so that minor leaks can be dissipated.1  Flammable products must not be stored or even temporarily  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  1 The requirements are found in the National Inspectorate of Explosives and Flammables' regulations (2000:2) on the handling of flammable liquids, chapters 4 and 6, the National Inspectorate of Explosives and Flammables' regulations (SÄIFS 1998:7) on flammable gas in loose containers, chapters 4 and 5. | placed in evacuation routes, e.g. corridors and stairwells, so as not to impede evacuation.  Flammable liquid  Storage containers suitable for the liquid being stored and correctly labelled with their contents are used for flammable liquids. Factory-sealed or resealed containers are used as far as possible. These are ideally stored in ventilated cabinets. "Ventilated cabinets" here refers to cabinets with openings at the top and bottom which permit air to circulate. Storage in fume cabinets of anything other than what is required for the work in hand is inappropriate.  To reduce the risk and consequences of a fire, it is appropriate to limit the quantity of flammable liquids to what is required, or max. 50 litres per fire compartment. Larger quantities should only be needed in exceptional cases. The flammable liquids are ideally stored in individual cabinets at each work area so as to reduce the risk of spillage while moving them. Guidelines for the storage of larger quantities (and larger containers) can be found in the handling rules in SÄIFS 2000:2 (Table 14 and Table 16). This generally involves a special storage area with class EI 30 or EI 60 fire resistance separation (see below), with ventilation directly to the open air. Storage can also take place in fireproof cabinets providing corresponding protection.  Warning signs indicating the presence of flammable products and prohibition signs banning the use of naked flames must be placed around cabinets and storage areas containing flammable liquids2:    Flammable gas  Apart from the fact that only the quantity of flammable gas needed in a laboratory can be used, there is an upper limit of max. 60 litres3. Larger quantities must be stored  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  2 The requirements can be found in the Swedish Work Environment Authority's regulations (AFS 2008:13) and general advice on signs and signals.  3 Applicable to laboratory in A-building, i.e. where people are normally present in the same building who cannot be expected to be aware of how to handle flammable products. The requirements are found in the National Inspectorate of Explosives and Flammables' regulations (SÄIFS 1998:7) on flammable gas in loose containers. |

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| outdoors or in a special area with min. EI 30 fire resistance separation, with plenty of ventilation to the open air. If more than 250 litres are handled, the area must be separated to a minimum fire resistance class of EI 60. Quantities above 1000 litres are normally stored in a separate storage area or container outside the laboratory building.  If the gas cylinders are stored outdoors, they must be protected to prevent unauthorised access. This can be achieved by placing the cylinders in a well ventilated, locked metal cabinet. Four volumes above 60 litres (up to 1000 litres), a minimum distance of 3 metres between LPG cylinders and the building must be observed. However, no distance is required with fire resistance separation EI 30 (EI 60 for volumes above 250 metres) (see the section Fire resistance separation below).  LPG cylinders must be positioned in a location where they are stable, containers for other flammable gases must be secured, and it must be possible to release these without using tools. A central distribution system is better from a safety standpoint as this minimises the handling of gas cylinders.  Warning signs indicating the presence of gas cylinders and prohibition signs banning the use of naked flames must be placed around cabinets and storage areas containing flammable gas4:    **Ventilation when storing flammable gas**  Any cabinet or area in which gas cylinders are stored must be well ventilated. This ventilation must open out into an appropriate location, normally outdoors. It must not be recirculated into the building. One way of complying with this requirement is to have openings with a total area of at least 1% of the floor area of the room, divided evenly at the ceiling at the top and at the floor at the bottom. In any area that can be entered (i.e. not a cabinet), ventilation openings must also be provided on opposite walls. Snow, leaves and suchlike must allow the ventilation to work and not block it.  It is also possible to have mechanical ventilation (fans) offering good reliability. Good reliability involves rotation sensors, for example, which provide an indication if the fan stops. If the area is below ground level, the ventilation must always be mechanical, i.e. ventilated with fans.  Note that ventilation openings puncture fire resistance separation (unless they are provided with fire dampers with a fire resistance rating). In the case of outdoor storage, therefore, it may be appropriate to have the ventilation openings on the same side as the door, facing away from the building.  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  4 The requirements can be found in the Swedish Work Environment Authority's regulations (AFS 2008:13) and general advice on signs and signals. | Fire-reactive products  Some of the fire-reactive products may spontaneously ignite or decompose, producing heat. Containment may then lead to destination. These products are often sensitive to heat, shocks and contamination. Some products spontaneously ignite on contact with flammable material. General rules on storage can be found in the relevant regulations for fire-reactive products. A list can be found in Annex 1.  Fire resistance separation  Fire resistance separation involves creating walls and load-bearing structures, for example, with a fire rating class indicating that they can withstand fire for a certain amount of time. This document contains references to 2 different types of fire rating class, EI 30 and EI 60, where 30 and 60 indicate (in rather simple terms) the number of minutes for which the walls can withstand a fire. By way of example, 50 mm concrete gives EI 30, 70 mm gives EI 60. However, in the event of a fire involving a flammable product, these times may be shorter on account of the fact that such fires may be hotter and more intensive than the standard fires used when determining fire rating classes.  For fire resistance separation to be completed, doors, windows and other lead-throughs must be of the same fire rating class.  Fireproof cabinets  Correctly manufactured and installed fireproof cabinets can be regarded as constituting a fire resistant, separate area and can therefore be used for storage of larger quantities of flammable products.  Cabinets manufactured and tested in accordance with the standard SS-EN 14470 are appropriate for use in laboratories. This standard comes in two parts, where part 1 relates to cabinets for the storage of flammable liquids and part 2 relates to cabinets for the storage of flammable gas. The liquid cabinets have waste collection, and both cabinets are provided with ventilation ducts for supply air and exhaust air. The fire rating class can be indicated in different ways, but it always include a number – 15, 30, 60 or 90 – corresponding to EI 15, EI 30, EI 60 or EI 90 respectively.  Cabinets tested in accordance with SP method 2369, class 1, provide a fire resistance separation approximately equivalent to EI 30. These cabinets are primarily designed for storage of factory-sealed packaging in shops. *They have no ventilation and are thus generally unsuitable for use in laboratories.*  There are also cabinets, mainly older ones, which have not been manufactured in accordance with the above standard. For it to be possible to use these, they must have fire rating class EI 30 or EI 60 and be provided with mechanical ventilation. The extractor for the ventilation is sited higher up for storage of lighter gases, and lower down for storage of heavier gases and liquids. Cabinets for storage of liquids must have waste collecting tanks.  For the cabinets to be compliant with the specified fire |

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| resistance class, the connected ventilation ducts must have fire insulation in the same fire resistance class. For longer pipes, it is normally sufficient for one metre of the ventilation pipes to have fire insulation. It is also important for the suspension of the ventilation ducts to be capable of withstanding fire.  Storage of incompatible materials  Storage of different types of flammable product with one another or with other products is not permitted if the risk of damage increases more than slightly on account of the storage of incompatible materials5. Toxins, acids/alkalis and highly flammable materials are examples of other products. However, storage of incompatible materials in small quantities – single small containers – may be permitted. This must be assessed for each case individually. Flammable materials which in themselves can give rise to toxic gases in the event of fire, e.g. halogenated hydrocarbons, are stored separately.  Storage containers  Storage containers must be appropriate for the liquid to be stored6. Containers larger than 5 litres for nonpolar solvents, e.g. toluene, should be conductive or semiconductive so that they can dissipate static electricity. In the case of open handling, it is appropriate to use explosionproof containers if such are available. Ignition does not spread down into the container in the case of explosionproof containers.  Storage containers must be labelled to indicate their contents, along with a warning label in accordance with a safety data sheet or similar.  **Gas pipes**  In laboratories, gas pipes are sometimes used for gases, the gas cylinders being stored in a gas centre. Pipes made of copper or stainless steel are normally used in this case. These must be designed for the flammable gas. Ideally, these pipes should be laid in a single piece all the way to the consumption point. If it is necessary to use joints, it is important for these joints to be visible so that leaks in the system can be found easily, and for these joints not to be concealed behind panels or in walls or skirtings. Welding, brazing or connections designed for LPG are acceptable jointing methods. Soft soldering does not provide a sufficiently strong joint, however.  External influences, e.g. impacts, loads or collision, can cause damage leading to leaks. Therefore, it is important for the LPG pipe to be laid in a manner which protects it, with collision protection or a protective plate where so required.  If a leak occurs in a pipe, it must be possible to locate the leak. Therefore, LPG pipes must not be cast or built into walls, floors or ceilings. If there is a requirement to lay an LPG pipe in a wall, floor or ceiling, there is an option to place it in a protective pipe. This must then be sealed at the point where it opens out indoors, but open outdoors (or towards the area in which the LPG cylinders are stored, if the pipe does not go outdoors).  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  5 In accordance with Section 11 of the Act (2010:1011) on explosives and flammables.  6 The requirements are found in the National Inspectorate of Explosives and Flammables' regulations (2000:2) on the handling of flammable liquids, chapter 5. | If the pipe has a plastic casing (Prisol pipe), it is important for this to be removed at each wall lead-through to prevent any leak in the pipe spreading to other areas. Wall lead-throughs can have the same fire resistance class as the wall, otherwise it loses its fire resistance class.  Labelling of gas pipes  The gas pipes must be labelled so that it is possible to see what they contain. The labelling should ideally follow the Swedish standard SS 741, which means:  • colour wrap (orange7 for gas, brown for liquid),  • hazard symbol or hazard pictogram8 (black flame),  • white arrow indicating the direction of flow, and  • the name of the flammable product (black letters).    **LPG**  **Pipeline labelling with hazard pictogram**  **LPG**  **Pipeline labelling with hazard symbol**  Labelling with the hazard pictogram is applicable from 1 June 2015. Until then, either hazard pictograms or hazard symbols can be used.  Next to valves, wall lead-throughs and branch points are appropriate locations for labelling.  Hoses  Hoses for flammable gas, e.g. LPG hoses, must be designed for the gas and no longer than necessary. Lengths of up to 1.5 metres are normally considered to be sufficient for most applications. Gas pipes as described above can be used instead for longer distances.  As hoses are less durable and gas pipes and also wear out more quickly, it must be possible to inspect them and they must be protected against wear and external influences. They must not be laid through walls, therefore.  Check each year that gas hoses are not dry or have surface cracks in them. If they do, they must be replaced.  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  7 Colour 1080-Y50R in accordance with SS 03 14 11 or colour 2008 in accordance with RAL.  8 The hazard pictogram (in accordance with the CLP regulation) will be applicable as of 1 June 2015. Both labels can be used until then. |

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| **Liquid pipes**  Pipes for flammable liquid are present in a small number of laboratories. Appropriate materials and jointing methods can be found in regulations on tanks and pipelines for flammable liquids9. Otherwise, the rules as described for gas pipes above are applicable.  **Open handling**  Open handling of flammable gases and liquids involves a risk of fire or explosion, and therefore is best carried out in fume cupboards or downdraught benches or with local exhaust ventilation. However, attempts should always be made to achieve closed systems.  The risk of flammable liquids igniting during work can be reduced as follows:  • short (maximum 0.1 m) free-falling jet and potential connection when tapping or pouring quantities in excess of 1 litre. This is particularly important for polar liquids and liquids with a flashpoint of no more than 30 °C,  • indirect heating during distillation and evaporation, for example,  • control of the presence of peroxide (applicable in particular to ethers);  • semiconductive floors and footwear and special protective clothing when working with large flammable product volumes in areas where there is a risk of an explosive atmosphere.  If there is an obvious risk of flammable liquids in quantities greater than a decilitre or so escaping, work should be carried out on a drip tray or similar so as to restrict the spread of liquid and flammable vapours. This is also applicable when working in fume cupboards.  **Explosive atmosphere classification**  Anyone using flammable products must ensure that the risks of them forming a flammable, explosive atmosphere are kept to a minimum. In this instance, "explosive atmosphere" means a mixture of flammable gas or vapour with air which may ignite and cause an explosion. It is also necessary to ensure that there are no ignition sources in the locations where such risks exist. The aim is to reduce the risk of fire and explosion.10  Formation of an explosive atmosphere must be prevented in the first instance. However, in certain cases it is not possible to avoid this. Depending on the extent to which the escape is anticipated, it is necessary to determine the zone generated: zone 0, zone 1 or zone 2. This is known as classification, and the zones are described in a classification plan.  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  9 The Swedish Civil Contingencies Agency's regulations (MSBFS 2011:8) on tanks and pipelines for flammable liquids.  10 The requirements in respect of this are specified in the Swedish Rescue Services Agency's regulations (SRVFS 2004:7) on explosive environments when handling flammable gases and liquids. | Zone 0: Risk of explosion constant, long-term or frequent. An explosive atmosphere can always be expected inside containers containing flammable liquid.  Zone 1: Risk of explosion sometimes during normal handling. The area in which minor spills, splashes, evaporation and escapes normally occur and in which an explosive atmosphere may occur.  Zone 2: Infrequent risk of explosion, and only a short-lived risk where applicable. When rare but predictable incidents occur.  The easiest way to go about classification is to use the SEK Handbook 426 Classification of explosive areas. Handbook 426 includes examples of how classification can take place for various operations, e.g. fume cupboards and workbenches with local exhaust ventilation.  Laboratories in which flammable gases and liquids with a flashpoint up to 30 °C are used are generally always classified. Laboratories in which flammable liquids with a flashpoint above 30 °C are heated to more than 5 °C below the flashpoint are classified in a corresponding manner. The risk area is extended when heating to the boiling point of liquids.  Ventilation ducts are generally classified in the same manner as the area from which they extract. A zone of a radius of 0.5 metre is normally sufficient around the outlet (outdoors).  Equipment in classified zones  The classification plan provides a foundation for the selection, installation and use of electrical and mechanical equipment. Any equipment which may constitute a source of ignition must be avoided in classified areas. If installation is necessary, it is carried out in accordance with SEK Handbook 427 Electrical installations in explosive areas. The standard SS-EN 13463 is available for mechanical equipment.  Classification examples  The classification examples below may serve as guidelines when producing classification plans for laboratories.  **Example: Open handling of flammable liquid**  Open handling of a few litres of flammable liquid with a flashpoint of up to 30 °C at room temperature in a location with good ventilation:  Zone 0: Inside container.  Zone 1: 0.5 m around open handling (horizontally), and from floor to 0.5 m above (vertically).  Zone 2: 1.0 m around zone 1 (horizontally).  As open handling of solvents is spread throughout the premises, therefore, a large proportion of the premises may be covered by the classification. |

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| **Example: LPG gas centre**  Zone 1: 0.5 m around the connection points for the cylinders, with extension down to the floor.  Zone 2: 0.5 m outside zone 1.  **Fume cupboards**  The purpose of fume cupboards is to protect staff and the surrounding area when risky work is carried out, but also to protect delicate work from the influence of the surroundings. The SS-EN 14175 series of standards describes the design, installation and maintenance of fume cupboards laboratories.  Design and ventilation  The exhaust air should be extracted from both the upper and the lower sections of the cupboard in order to effectively dissipate both light and heavy gases and vapours. It has proven to be appropriate for two-thirds of the exhaust air to be extracted from the bottom of the cupboard and one-third from the top. New fume cupboards often provide the option of regulating the ventilation flow. If no such option is available, a barrier on the hatch to the fume cupboard which provides an appropriate gap when the hatch is closed may ensure sufficient airflow in the fume cupboard.  It is often appropriate for the fume cupboard ventilation to use a system of its own so as to prevent harmful or malodorous substances being passed back into the ambient air. Such systems can normally be shared by all fume cupboards in a building.  There must be no sprinkler system above fume cupboards as there is a risk of flammable liquids spreading out onto the floor of the premises and so assisting with the spread of fire.  It is appropriate for any cover glass or fittings above fume cupboards to be fitted loosely so that they can act as explosion vents. The motor for the exhaust fan should be located outside the duct.  When working with flammable solvents, it is important to limit the area which may be contaminated in the event of an accident inside the fume cupboard. This can be done by sloping the work surface against a channel or using a drip tray. The edge of the tray it must not be too high as this makes ventilation more difficult. The drip tray ensures that spills or vapours from spills do not escape out of the cupboard, thereby eliminating the requirement for external classification. In modern fume cupboards, at least the front edge is often elevated, which has a similar effect.  Special designs are required for floor-mounted fume cupboards which permit access. Similarly, certain types of work, e.g. with perchloric acid11, may require a special fume cupboard design in respect of choice of materials, equipment and exhaust air ducts.  Electrical equipment, interlocking, etc.  Electrical equipment, e.g. power sockets and switches, must  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  11 For more information, see the National Inspectorate of Explosives and Flammables' general advice (SÄI 1983:1) on fume cupboard equipment for working with perchloric acid. | normally be placed on the outside of the cupboard and higher than the work surface inside. Electrical equipment positioned beneath the opening, and which may therefore be affected in the event of spills, must meet requirements for zone 2 positioning.  The ventilation conditions in fume cupboards mean that there is generally no occurrence of explosive gas mixtures. Thus it is possible to use electrical equipment for unclassified areas. The power supply to the electrical equipment in the cupboard then needs to be interlocked over the ventilation, which means that it is switched off if the ventilation flow falls too low. Without interlocking, the fume cupboard is normally classified as zone 2 internally. Of course, this must not result in another hazardous situation, e.g. a necessary cooling water pump being switched off as well. It is important to allow the ventilation to ventilate any explosive atmosphere after a stoppage before the power supply to the equipment in the fume cupboard is switched back on. Therefore, switching the power back on needs to be manual, i.e. the power supply is not switched on automatically when the ventilation starts working again.  Positioning power sockets (min. IP 44 with self-closing cover) inside a fume cupboard is also permitted if interlocking is present. In this case, the sockets need to be located at least 0.4 metre above the work surface and have a means of switching off the power outside the cupboard.  Downdraught benches and local exhaust ventilation  A downdraught bench has a perforated work surface through which air is extracted. A certain amount of integration may occur. Local exhaust ventilation can be applied in various ways, sometimes in combination with integration. Both of these can be used when handling flammable products, but they have less stringent requirements and safety than fume cupboards.  **Refrigerators and freezers**  Refrigerators and freezers are normally placed outside explosive atmosphere risk areas. If a refrigerator or freezer must be positioned in a classified zone, it must meet the requirements for the zone in which it is positioned. Refrigerators and freezers in which flammable liquids are stored must also meet zone 1 requirements internally. The ventilation in such refrigerators and freezers is often very poor, and opened packaging, test tubes with cotton plugs and a number of containers which are not closed tightly are normally stored in these refrigerators and freezers. The best option is to choose a refrigerator or freezer with no electrical equipment inside such as lights. Alternatively, the electrical equipment may be explosionproof. If the compressor in the refrigerator or freezer is not positioned at the top, it needs to be enclosed tightly. This avoids any flammable liquid spilled being ignited by the compressor.  Other refrigeration or freezing equipment in which e.g. alcohols are used as refrigerants may also present risks unless they are explosionproof. |

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| **Waste disposal**  Flammable products (and other chemicals) which are no longer to be used are handed over to waste disposal companies. These companies provide instructions on how the waste is to be packaged, stored and otherwise handled until it is handed over.  In the laboratory, metal wastebaskets with lids are preferable if cloths and paper are used which are soaked in flammable products or anything which may spontaneously ignite, e.g. unsaturated vegetable oils.  **Fire safety measures**  It is appropriate for handheld fire extinguishers to be readily accessible. Foam extinguishers and carbon dioxide extinguishers are often well-suited to laboratory environments. Access to powder extinguishers can also be recommended for some requirements.  To reduce damage to fume cupboards and their associated ventilation systems, it is appropriate for a ventilation damper to close in the event of fire. This normally allows the fire to be extinguished easily using a carbon dioxide extinguisher, for example. For cupboards with spill collection containers which limit evaporation, the temperature increase is so small that the damper function is unnecessary. Fire extinguishing is also simplified considerably with such containers.  **Permits**  To check that the requirements of the legislation are met, and hence that there is sufficient protection against fire and explosion, the municipality is required to check some handling by means of licensing.12 Permits for the handling of flammable products are required when handling more than 500 litres of flammable liquids or 250 litres of flammable gases. For schools, these limits are 100 litres of flammable liquid and two litres of flammable gas. If the laboratory is part of another business, e.g. an industry, the permit must include the business' overall handling.13  Applications for permits are submitted to the municipality (normally the emergency services). Application forms can often be found on the municipality's website. The municipality needs the following to be able to deal with an application:  • A description of the planned activity  • A list of the names, flashpoints (for flammable liquids) and quantities of the flammable products in each room, tank, etc.  • An investigation of the risks (see below)  • A map showing the laboratory building in relation to the surrounding buildings, roads and car parks.  • Drawings showing  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  12 In accordance with Section 16 of the Act (2010:1011) on explosives and flammables.  13  Provisions relating to permits can be found in the Swedish Civil Contingencies Agency's regulations (MSBFS 2013:3) on permits for handling flammable gases and liquids. | ○ handling locations and any pipes laid for flammable products,  ○ the function of the rooms,  ○ evacuation routes,  ○ fire compartment boundaries, and  ○ the design of the ventilation.  • Classification plans with associated documentation (in accordance with SRVFS 2004:7)  • Compiled operating and maintenance instructions (these can be provided at a later date, but before the operation begins).  • Information on managers (this can be provided at a later date, but before the operation begins).  • Signature of an authorised representative for the operation.  Managers  One or more managers must be appointed for operations involving handling of flammable products requiring permits. Names and contact details must be provided to the supervisory authority (normally the emergency services).  The manager must act to ensure that handling takes place in accordance with applicable regulations and terms. The manager normally has a good knowledge and plenty of experience of the products being handled and the risks involved in handling such products.  More information about managers can be found in the Swedish Civil Contingencies Agency's publication Brandfarliga varor - Föreståndare [Flammable products - Managers].  Risk investigation  The law requires investigation of the risks associated with an operation14. For laboratories, an investigation of this type constitutes a basis for the design of premises and compilation of work instructions.  The investigation ideally includes the following points:  • How the flammable products are intended to be stored safely, e.g. by following the advice as described above.  • Instructions applicable prior to laboratory work in which flammable products are to be used.  • How laboratory staff and students are notified of the rules applicable at the laboratory in respect of the handling of flammable products.  • Instructions for regular checks, e.g. checking pipelines for leaks and checking that flammable products are stored safely.  • What action is to be taken in the event of a fire.  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  14 In accordance with Section 7 of the Act (2010:1011) on explosives and flammables. |

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| A new risk assessment needs to be compiled for new laboratory work in the case of laboratory operations undergoing constant change, e.g. during research and development work. Action may need to be taken if this indicates that there is a change to the risk profile. The manager and relevant staff should ideally take part in the risk assessment.  **Annex 1: References and bibliography**  *The Swedish Civil Contingencies Agency's regulations on fire-reactive products*  • Hydrogen peroxide, SÄIFS 1999:2  • Organic peroxides, SÄIFS 1996:4  • Ammonium nitrate, SÄIFS 1995:6  • Weakly nitrated nitrocellulose, SÄIFS 1989:5  *Standards and handbooks*  • The Swedish Rescue Services Agency's handbook on explosive environments when handling flammable gases and liquids, October 2004.  • Classification of explosive areas, SEK Handbook 426. Includes the European standard SS-EN 60079-10-1 (2009).  • Electrical installations in explosive areas, SEK Handbook 427. Includes the European standards SS-EN 60079-14 (2008) and SS-EN 60079-17 (2007).  • SS-EN 14470-1 (2004) Fire safety storage cabinets - Part 1: Safety storage cabinets for flammable liquids.  • SS-EN 14470-2 (2006) Fire safety storage cabinets - Part 2: Safety cabinets for pressurised gas cylinders.  • SS-EN 14175-1 (2003) Fume cupboards - Part 1: Vocabulary  • SS-EN 14175-2 (2003) Fume cupboards - Part 2: Safety and performance requirements  • SS-EN 14175-3 (2004) Fume cupboards - Part 3: Type test methods  • SS-EN 14175-4 (2004) Fume cupboards - Part 4: On-site test methods  • SS-EN 14175-5 (2006) Fume cupboards - Part 5: Recommendations for installation and maintenance | • SS-EN 14175-6 (2006) Fume cupboards - Part 6: Variable air volume fume cupboards  • SS-EN 14175-7 (2012) Fume cupboards - Part 7: Fume cupboards for high heat and acidic load |