

Information how to perform a risk assessment

Introduction

Risk assessment according to AFS 2014:43 Chemical health hazards.

Why

The risk that chemical hazards may cause, ill health or accidents in the activities, shall be investigated and assessed as often as the circumstances in the business requires.

In addition, such examination and risk assessment (RA) shall always be carried out if the business changes temporarily or permanently or if it can be assumed that the results of the risk assessment will be affected due to new information. Risk assessment is made on the whole method/ process rather than one chemical at a time to take in count any possible synergistic effects.

Each chemical, have a so called MSDS document.

A Material Safety Data Sheet (MSDS) is a document that contains information on the potential hazards (health, fire, reactivity and environmental) and how to work safely with the chemical product. It is an essential starting point for the development of a complete health and safety program. It also contains information on the use, storage, handling and emergency procedures all related to the hazards of the material. The MSDS contains much more information about the material than the label. MSDSs are prepared by the supplier or manufacturer of the material. It is intended to tell what the hazards of the product are, how to use the product safely, what to expect if the recommendations are not followed, what to do if accidents occur, how to recognize symptoms of overexposure, and what to do if such incidents occur.

Procedure

Rules of procedure - New assessment

Use the form – Risk assessment form.

All information in parenthesis is example or information of text to be included under this paragraph, remove it from the risk assessment when adding your text. Write the RA as clearly as possible.

The Risk assessment must be signed by the responsible group leader to be considered as approved. The final risk assessment must be stored at the respective institutions and shall be available for the staff, head of the department and supervisory authority concerned.

Rules of procedure - updating an existing assessment

Make sure that the new risk assessment has exactly the same name as the previous version and add as a suffix v. 02 (or what version it is).

1. Final assessment of the whole method

This is filled in in the **end** of this procedure – copy the information from paragraph 10.

2. Name of the Risk assessment

The name of the risk assessment must be informative, to make sure that the reader just from the name can see if it is relevant or not for them to use.

Example: RNA extraction from tissue v.01

3. State the premises in which the activity is taking place

Make sure to add all rooms/floors if you perform parts of the method in different locations.

4. Description of activity

Describe the method working routine you employ, especially those parts that describe possible risks. A short description of the risky moments and situations is needed and you should include any requirements regarding the premises and / or equipment in the premises i.e. ventilated hood, safety cabinet, signs etc. and waste handling. Also include information regarding storage of the chemicals / reagent especially if there is a risk of storing reagents together. This needs to be considered: kind of danger, storage, exposure limit.

Factors to be assessed to determine whether action is required:

- Harmful exposure through inhalation
- Harmful exposure through contact with the skin
- Harmful exposure through splash in the eyes
- Harmful exposure through oral intake
- Formation of flammable air mixture or fire hazard for other reasons
- Personal injuries due to reactive, explosive or material destructive properties
- How the hazardous properties of the hazard can be expressed in this way as it occurs in the business
- How is the nature, level and duration of exposure to the source of risk
- Any co-operative effects with other chemical hazards or with other work environment factors
- Possible reactions with other chemical hazards or material present in the workplace
- Conditions at work that may affect the risk, including the effect of taken and planned protective actions
- Reaction formulas

The assessment shall lead to decisions on what measures are to be taken to limit the risks.









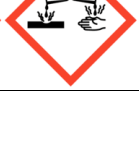
5. Products included in the Risk Assessment

Write Name of the chemical (s) and the CAS number(s).

INFO: you can use the SIGMA-Aldrich website to get all information about chemicals, Sigma has one of the largest and most updated chemical databases in the world and it is easy to use for searching. You can use it even if your chemical is bought somewhere else.

Include total amount of each substance used in the method.

Include hazardous label (picture see below) the orange ones are old labels that are no longer used (We still have some old packaging left with the old labels see conversion table below).

	Harmful	The product is harmful by inhalation, skin contact or ingestion. Also used for products that cause skin contact allergy, which irritates skin, eyes or airways or causes anesthetic effects.
	Toxic	The product causes life-threatening inhalation, skin contact or ingestion.
	Dangerous for the environment	The product is toxic to the aquatic environment in the short or long term. Must be stored and used so that the product and waste do not damage the environment.
	Hazardous to the health	The product may cause hereditary genetic damage, cancer, birth defect or disturb reproduction. Also used for products that cause inhalation allergy, chemical pneumonia In case of ingestion or other serious injury during single or repeated exposure.
	Explosive	The product is explosive and may explode if exposed to impact, friction, sparks or heat. Must be handled with care.
	Flammable	The product is flammable and may burn violently during ignition or heat supply. Some products develop flammable gas in contact with water or self-igniting air.
	Oxidizing	The product causes reaction, fire or explosion in contact with combustible materials or materials.
	Gas under pressure	The product is a pressurized or heavily cooled gas. The container may explode in case of external fire.
	Corrosive	The product causes corrosion to skin, esophagus and eyes, or other serious eye damage. Also used for products that are corrosive to metals.

CMR substances

A chemical substance according to 38 § first part AFS 2011:19 (CMR-substance; carcinogenic, mutagenic, toxic for reproduction) is according to 39 § only allowed to be handled if a documented investigation regarding the possibility of replacing the substance have been carried out.

H350 May cause cancer
 H340 May cause hereditary genetic damage
 H360 May harm the fertility or the unborn child.
 R45: May cause cancer
 R46: May cause hereditary genetic damage
 R49: May cause cancer when inhaled
 R60: May cause reduced reproductive capacity
 R61: May harm the unborn child

6. Chemicals inherent risk

An overall risk category should be determined under this heading, using the table below.

Care should be exercised where the hazard level of an individual compound is unknown. Risk category B or category A should be applied if it is suspected (e.g. in view of similar chemical structure) that the compound may have properties that suggest category A. Where different criteria are used for a certain compound, the one that indicates the highest category shall apply.

Very high risk

High risk

Moderate risk

Low risk

Risk category	General description	R-phases	H-statements
A: Very high risk	Carcinogenic Mutagenic Toxic for reproduction (higher classification)	R45, R46, R49, R60, R61	H350, H350i, H360, H360D, H360Df, H360FD, H360fd, H370. H372, H340
A: Very high risk	Extremely explosive Extremely flammable substances or gases	R3, R6, R12, R15	EUH001, EUH006, H200, H201, H202, H203H220, H222, H224, H240, H241, H250
A: Very high risk	Very toxic substances	R26, R27, R28	H300, H304, H310, H330, EUH032
A: Very high risk	Substances that can cause allergy by inhalation	R42	H334
A: Very high	Very toxic to aquatic	R50, R50/53	H400, H410

risk	organisms		
B: High risk	Carcinogenic, Mutagenic, Toxic for reproduction (lower classification)	R40, R62, R63, R68, R39	H351, H361, H361d, H361f, H361fd, H362, H371, H373, H341
B: High risk	Substances that can cause allergy on skin contact	R43	H317
B: High risk	Toxic substances	R23, R24, R25	H301, H311, H331, EUH029, EUH031, EUH070
B: High risk	Explosive or flammable substances or gases	R1, R2, R4, R9, R11, R14, R16, R17	H204, H205, H221, H223, H225, H251, H260, H271, H280, H281, EUH044
B: High risk	Corrosive substances	R34, R35	H314, H318, H319, EUH071
B: High risk	Toxic to environment and aquatic organisms	R51, R51/53, R54, R55, R56, R57, R59	EUH059, H401, H411, H420
C: Moderate risk	Hazardous substances and/or irritating substances	R20, R21, R22, R36, R37, R38	H336, H302, H303, H305, H312, H313, H332, H333, H315, H320, H335, EUH066
C: Moderate risk	Substances that are explosive under certain conditions. Flammable substances	R5, R7, R8, R10, R18, R19	H226, H227, H228, H242, H252, H261, H270, H272, EUH014, EUH018, EUH019
C: Moderate risk	Harmful to aquatic organisms. Long-term adverse effects in the environment	R52, R52/ R53, R53, R58	H402, H412, H413

7. Level of exposure

The level of exposure should be calculated under this section (see table below).

The level is worked out by multiplying the factors by each other (exposure level = Factor A * Factor B * Factor C).

Total value up to 1000 = Low exposure level

Total value 1 001 - 10 000 = Medium exposure level

Total value above 10 000 = High exposure level

Where jobs are performed often (e.g. daily) or last for long periods, this extra factor should also be taken into account when assessing their exposure level. This applies in particular to substances covered by the R-phrases R33 ("Danger of cumulative effects") and R48 ("Danger of serious damage to health by prolonged exposure").

Check material safety data sheet (MSDS or SDS) section 9 for information on properties.

Parameter	Factor = 1	Factor = 10	Factor = 100
A: Quantity of the substance	< 1 g < 1 ml Solid substances	1 - 10 g 1 - 10 ml Dust-producing substances	10 g 10 ml Gases or aerosols
B: Physical properties of the substance	Non-volatile substances No skin absorption	Volatile substances Concentrated solutions Low skin absorption	Highly volatile substances Substances readily absorbed through the skin
C: Working method	Predominantly closed system Low risk of incorrect handling	Partially open system Low risk of incorrect handling	Open handling Medium to high risk of incorrect handling

Definition of volatility:

Volatile organic compounds (VOC) is any organic compound having an initial boiling point less than or equal to 250 °C measured at a standard atmospheric pressure of 101.3 kPa and can do damage to visual or audible senses.

Table of example (adopted from WHO)

Description	Abbreviation	Boiling Point Range(°C)	Example Compounds
Very volatile (gaseous) organic compounds	VVOC	<0 to 50-100	Propane, butane, methyl chloride
Volatile organic compounds	VOC	50-100 to 240-260	Formaldehyde, d-Limonene, toluene,

			acetone, toluene, ethanol (ethyl alcohol) 2-propanol (isopropyl alcohol), hexanal
Semi volatile organic compounds	SVOC	240-260 to 380-400	Pesticides (DDT, chlordane, plasticizers (phthalates), fire retardants (PCBs, PBB))

8. Personal protection

What you actually use and how you use it. Don't use any standard text from a (M)SDS this will only confuse other users.

9. Instructions to other personnel

Comment on whether special directions are required for other personnel (e.g. washing-up staff, security companies, cleaning companies).

Must include if there are entering restriction to the area where the work is performed. Do not forget to set up signs outside the areas where such rules apply. These signs must also include the name and telephone number to the person responsible for the room.

10. Final risk assessment of the method

A final assessment shall be prepared of the work as a whole. The matrix below should be used to help with this.

If the assessment reach "high risk", additional risk precautions must be taken before actual labwork can be performed i.e. other measures or more detailed studies needs to be decided to enable the procedure/laboratory experiment to be carried out.

What measurements / studies will be performed, who is in charge for them and when is the deadline must also be documented in the risk assessment.

- Low risk
- Acceptable risk
- Medium risk
- High risk
- Very High risk

Under "Comment to final risk assessment of the method" add information if precautions needs to be taken, more studies etc. the more information you give the better.

Take the information from this paragraph and copy it to "1. Final assessment of the whole method"

Probability <i>Of the accident</i> Different factors are taken into consideration <ul style="list-style-type: none"> • Frequency and duration. • Historic events. • Possibility of avoiding or limit the damage; training on the equipment, awareness of the risk, sudden - quick or slow event • Existing protection 	Consequence (Gravitas) <i>If the accident occurs.</i>					
	0. Safe or bagatelle	1. Short sick listing	2. long sick listing	3. Disablement	4. Casualties	5. Many casualties
5. Very common <i>Once a day.</i>	2	3	4	4	4	4
4. Common <i>Once a month.</i>	1	2	3	4	4	4
3. Rather common <i>Once a year.</i>	1	2	3	3	4	4
2. Rare <i>Once every ten years.</i>	1	1	2	3	4	4
1. Unlikely <i>Once every hundred years</i>	0	1	2	2	3	3
0. Very unlikely <i>Less than once every hundred years</i>	0	0	1	1	2	2

0. Negligible risk
 1. Acceptable risk, no action needed
 2. Some risk, action needed
 3. Severe risk, action needed
 4. Very severe risk, action needed

Participants in the assessment

Write both first and last names

Date of reassessment

If this method is used regularly you need to do a reassessment.

Signatures and dates

A risk assessment must be signed by the producer and responsible PI, write both printed name and signature.