

Guidelines regarding Chemical Risk Assessment



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What is a Chemical Risk Assessment?

A Chemical Risk Assessment obliges the employer to control substances that are hazardous to the workers' health. There are a number of ways how one can achieve this. These include:

- the identification of the health hazards;
- The evaluation of the risks to the health and safety of workers Ensure that the control measures highlighted in the risk assessment are adequate to the risk and are also being implemented;
- Ensure that all workers are properly trained, are aware of the risks involved and have good knowledge on every substance being used;
- The workers' health and safety representative appointed shall be consulted and informed of all occupational health and safety measures to be taken at their place of work;
- Ensure that both monitoring and health surveillance are provided when necessary;
- Ensure that in case of emergency all the necessary procedures are in place.

The proper implementation of these steps will aid in controlling risks to the workers' health from exposure to hazardous substances and thus creating a healthy and safe environment for everyone to work in.

Locally, S.L 424.24, which is the national transposition of the EU Directive on the Protection of the Health and Safety of Workers from the Risks related to Chemical Agents at Work, incorporates the main principles of chemical safety at work.



Substances Hazardous to Health

Chemical substances exist in various states, can form as a product of a mixture of substances or as a by-product from a particular process. The different forms that a chemical substance may take, include:

- Chemical liquids
- Dusts
- Fumes
- Mists
- Vapour
- Gases and asphyxiating gases
- Products with chemical content
- Biological agents
- Nanotechnology

Chemical Risk Assessment

To control and mitigate risks at every workplace, it is crucial that a risk assessment is carried out. To concentrate on the risks associated with workers' exposure to hazardous substances, a chemical risk assessment is an essential tool.

A chemical risk assessment must be prepared carefully giving particular attention to every chemical in use. To do this, a number of steps must be followed. These include:

1. Identify the processes or substances that, upon workers' exposure, have the potential to cause harm to human health.
2. Identify the ways that the substances can harm human health. Consult the chemicals' safety data sheets (SDS).
3. Identify the tasks or jobs that lead to exposure. Determine whether the control measures already in place are enough or not. Estimate the likelihood that harm to workers' health occurs.

4. Consult previous accidents that may have happened and determine what needs to be done so prevent reoccurrence.
5. In case of vulnerable workers, such as pregnant workers, those who have recently given birth, breastfeeding workers and young persons, a specific risk assessment must be carried out and more superior means of control measures need to be implemented to prevent exposure to harmful chemicals.

It is imperative that such assessment is carried out by a competent person and any activity involving hazardous chemical agents shall only commence after an assessment of the risk of that activity has been made and any preventive measures identified have been implemented.

Routes of Entry

Workers may be exposed to hazardous substances in different ways. One should always bear in mind the following routes of entry:

- Exposure through **inhalation** – This is the most significant route of entry into the body. Such exposure can cause irritation and damage to the mucous membrane (upper respiratory tract & passages within the lungs) and eventually lead to that chemical entering into the blood stream.
- Exposure through **skin (or eye) absorption** – Absorption can occur through the skin or eyes. The layers of the skin act as a barrier against such entry, however broken skin, cuts or abrasions, simplify entry. Chemical solubility also eases entry of chemicals into the body.
- Exposure through **ingestion** – Chemicals may enter the body through accidental or intentional swallowing, or when one consumes contaminated food. Lack of hygiene, especially before eating, increases the possibility of such exposure.
- Exposure through **skin puncture** – Although rare, exposure from skin puncture such as butchery or needlestick injuries, can also occur and can involve very harmful substances, including drugs.



- Exposure through **placental transfer** – In certain cases a pregnant worker can be exposed to chemicals. This happens since a small amount of chemicals can be absorbed into the blood stream, once absorbed this can pass through the placenta and to the unborn baby.

Exposure Monitoring

Exposure to a substance is uptake into the body through the exposure routes explained in the previous section. This brings along the necessity to perform exposure monitoring. Exposure monitoring is not an alternative to other control measures, but an essential addendum to determine whether the existing control measures already in place, are enough or need certain improvements.

Exposure monitoring is essential for a number of reasons. These include:

- Aids in selecting the appropriate control measures for the chemical risk assessment;
- Ensures that the exposure limits are not exceeded;
- Checks whether existing control measures need improvements, and what, if any, other new control measures are required;
- Aids in choosing the right type of personal protective equipment;
- Ensures that exposure limits are not exceeded after a change in procedures occurs;
- Determines whether there is the need for health surveillance of workers.

The only way to make sure that exposure of chemicals does not exceed the Occupational Exposure Limit Value (OELV), air sampling, for airborne contaminants, must be carried out. Air sampling in the workplace is required when a risk assessment indicates that monitoring is necessary. It also aids to ensure compliance with the appropriate legislations and to evaluate control measures. Regulation 5(4) of S.L 424.24 states that if it can be shown that existing preventive or control measures



adequately reduce the risk, then monitoring may not be required. There are different techniques to measure dangerous substances in air, ranging from simple passive sampling techniques to sophisticated remote sensing devices.

Biological monitoring for chemical exposure aids in preventing unacceptable health risks by providing information on the control of occupational exposure. It can give you an indication of absorption by all routes of exposure, consequently, it is often used to complement workplace air monitoring for airborne contaminants. Thus, this type of monitoring may be particularly useful for those chemicals that are easily absorbed through the skin or taken in by ingestion, or where exposure is controlled by the use of personal protective equipment (PPE). Example of biological monitoring includes analysis of breath, urine or blood samples collected from workers.

Health Surveillance

Health surveillance is the regular assessment of the worker's health to detect early signs of ill health effects resulting from exposures to dangerous substances at the place of work. S.L 424.24 obliges the employer to make the necessary arrangements to carry out appropriate health surveillance of workers for whom the results of the risk assessment reveal a risk to health. The main objectives of health surveillance are:

- Early detection of an adverse change or disease;
- Collection of data in order to detect or evaluate health hazards;
- Evaluation of the existing control measures.

Health surveillance is appropriate when:

1. The exposure of the worker to a hazardous chemical agent is such that an identifiable disease or adverse health effect may be related to the exposure;
2. There is a likelihood that the disease or effect may occur under the particular conditions of the worker's work;
3. The technique of investigation is of low risk to workers;

4. Furthermore, there shall be valid techniques for detecting indications of the disease or effect.

Although the outcomes from the health surveillance are personal, it is important that the employer is given a general overview of the results, to take the necessary action to eliminate or further control exposure. In certain cases, the doctor or the competent person or the Occupational Health and Safety Authority, may propose that exposed persons undergo a medical examination.

Safety Data Sheets

By law, it is the obligation of the supplier to provide up-to-date safety data sheets (SDS) for every dangerous chemical in stock. The SDS is an essential document as it provides safety information on the chemical, including what the dangers are (Sections 2 & 16), and information about emergencies, storage and handling (Sections 4-8). Although a safety data sheet is not a risk assessment, it provides vital information about the chemical in question, which helps the risk assessor to compile an adequate risk assessment. It is important that SDSs are kept at the workplace and are made available to all workers who may be exposed to chemicals.

Exposure Control Measures

The main aim of the chemical risk assessment is to prevent, or control exposure to hazardous substances, so as to prevent harm to the workers' health. This can be achieved by:

- Using the right **control equipment** – This may include adequate ventilation including both general and local exhaust ventilation, extraction systems, enclosure, decontamination, or personal protective equipment (PPE) such as respiratory protective equipment (RPE) amongst others;

- Implement adequate **controlling procedures** – This may include ways of working, operating procedures and emergency procedures, permits-to-work when needed, training and supervision of workers, maintenance and testing of existing control measures;
- Adopting the right **workers' behaviour** – It is important to instil a health and safety culture at the workplace and ensure that all workers follow all the control measures in place.

Choosing Control Measures – Hierarchy of Control

When choosing the appropriate control measures it is important that one follows, what is known as the 'hierarchy of control'. These steps should be followed, in order of priority:

- **Elimination** – Physically removing the hazard by removing the need to use those substances by changing the process or product in which the substance is used;
- **Substitution** – If elimination is not possible, then the hazardous substance, or process, must be substituted with a less dangerous one, under its condition of use;
- **Isolation** – Separate the worker from the substance, for example by using closed systems or restricting access only to properly protected personnel;
- **Engineering Controls** – Reduce exposure to hazardous substances by ensure that proper ventilation and extraction systems are in place, or by use of robots;
- **Administrative Controls** – Implement work practice controls such as job rotation, written safety policies and rules, regular housekeeping and training of all workers;
- **Personal Protective Equipment (PPE)** – As a last resort, when residual risk is still present, the appropriate personal protective equipment should be provided.

Personal Protective Equipment (PPE)

It is the duty of the employer to ensure that adequate PPE is provided to all workers and replaced as necessary. The provision of PPE should always be considered as the last resort, in the presence of residual risk, after all other control measures, as per the hierarchy of control mentioned in the section above, have been followed. This is because the PPE protects only the wearer, and if it fails, no further protection is given. There are different types of PPE. These include:

- Respiratory Protective Equipment (RPE)
- Eye protection
- Protective gloves
- Protective clothing
- Protective footwear

It is crucial in ensuring that the right PPE is chosen according to the work conditions of the tasks or jobs to be performed. Proper training must be provided to all workers to ensure proper usage, maintenance and cleaning of the PPE, and all workers should be able to identify when the PPE has to be replaced.

Safe disposal of Chemicals

Like any other hazardous waste, chemical waste, need to be treated, disposed of, or recycled, safely. Chemical waste can be categorised into three different sections, that are: **always hazardous** - for example, lead acid batteries or fluorescent tubes, **never hazardous** - for example edible oil, or, **may, or may not, be hazardous and need to be assessed** for example, ink or paint. Some chemicals might also lead to fire hazards; these include petrol and paint thinners. It's imperative that to ensure proper disposal of chemicals, the presence of other materials like packaging and sawdust, is considered, since if not properly managed, they will help to spread fire rapidly.

Thus, workplaces dealing with hazardous waste materials must identify the hazards and make a proper assessment of the risks, as well as ensure to understand the



properties of hazardous waste and how to store, handle and dispose of it correctly. Waste-treatment sites handling chemicals must also prevent accidents arising from the unintentional or inadequately planned mixing of incompatible chemicals, or from the disposal of unstable chemicals.

Training of Workers

As per Regulation 8 of S.L 424.24, the employer shall ensure that all workers are properly trained and informed and that they are provided with:

- The results of the risk assessment highlighting the hazards and risks involved;
- Information regarding the hazardous chemical agents at the workplace, including the identity of these agents, the health and safety risks, relevant occupational exposure limit values, and other legislative provisions;
- Training and information on appropriate precautions and actions to be taken in order to safeguard themselves and other workers at the workplace;
- Access to any SDS provided by the supplier.

It is essential that all information is provided in a matter appropriate to the outcome of the risk assessment and must be regularly updated to take into account any changing circumstances.

Emergencies

The employer must ensure that an Emergency Action Plan is prepared, in order to plan and practice to cope with foreseeable accidents, incidents or emergencies. This entails:

- The choice of the suitable equipment to deal with the emergency. This includes the use of both PPE as well as decontamination products;
- Adequate procedures to deal with a casualty;
- Suitably trained personnel to enter the area and take the necessary action;



- Suitable arrangements to clean up any created waste and to decontaminate, inspect and monitor the area by qualified, competent persons.

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The information provided in this Guidance does not, and is not intended to, constitute legal advice; the information is for general purposes only and to serve as a guidance for duty holders to ensure a safe system of work and a safe place of work. The information provided in this Guidance may also be cited as examples of good practice by the Occupational Health and Safety Authority during workplace inspections and in Law Courts. In addition, every effort has been made to ensure that the information in this document is correct and provided in good faith according to regulations and current best practice - it is also strongly recommended that one should consider all relevant regulations related to this subject.

References

- Chemical Risk Assessment: Overview and Examples. [online] Available at: http://www.chemsafetypro.com/Topics/CRA/introduction_to_chemical_risk_assessment_overview_principles.html
- S.L 424.24 – Protection of the Health and Safety of Workers from the Risks related to Chemical Agents at Work Regulations.

Further Information

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