



An introduction to dangerous substances in the workplace



Introduction

Dangerous substances are found in many workplaces. A recent survey found that 16 % of workers in Europe reported handling hazardous products and 22 % being exposed to toxic vapours⁽¹⁾. Exposure to dangerous substances can occur anywhere at work, on farms, in hairdressers' shops, in motor-vehicle repair shops, at chemical plants.

Dangerous substances can cause many different types of harm. Some cause cancer, others can affect the ability to reproduce or cause birth defects. Other substances may cause brain damage, harm to the nervous system, asthma, and skin problems. The harm done by dangerous substances can occur from a single short exposure or by the long-term accumulation of substances in the body.

The theme for the European Week for Safety and Health at Work 2003 is the prevention of risks from dangerous substances. The Agency is producing a series of factsheets focusing on the communication of occupational safety and health-related information on dangerous substances including biological agents. This factsheet introduces the key issues in this topic.

Legislation

European legislation aims to minimise the health risks from dangerous substances in the workplace. European Union law places elimination and substitution at the top of the hierarchy of control measures for protecting workers from dangerous substances. The most important pieces of European legislation in this field are regulations on the protection of workers⁽²⁾ from the risks related to chemical agents, ⁽³⁾ carcinogens ⁽⁴⁾ (including asbestos or wood dust), and biological agents. ⁽⁵⁾ Nevertheless, regulations on classification and labelling ⁽⁶⁾ are equally important, because they determine important information (safety labels, symbols and safety data sheets) available to the users.

These regulations have to be transferred into national legislation. Member States are entitled to include some additional or more stringent provisions for the protection of workers, such as restrictions on use of some work processes or lower limit values, since the corresponding directives only lay down minimum requirements.

It is therefore strongly recommended that you seek clarification of specific national legislation that may apply relating to the use of dangerous substances in the workplace.

It is important to be aware that these regulations on issues such as risk assessment, technical measures and exposure limits also apply to the dangerous substances generated by the work procedures used, examples of which are wood dust or welding fumes.

Prevention and control of exposure to dangerous substances

To protect workers' health from dangerous substances, employers are required to:

- assess the risks,
- take action to remove or reduce the risks,
- monitor the effectiveness of the preventive measures and review the assessment.

Risk assessment

Risk assessment is a requirement under European legislation enacted in all Member States. Risk assessment means identifying what may cause harm so that preventive measures can be taken. Proper risk assessment is the basis for successful risk management. Training workers on the basis of risk assessment for safe work practices is an important part of risk management. Trained workers can not only apply the rules but also work more efficiently and promote a healthy and safe working environment. The risk posed by a substance is determined by two factors, the substance's characteristics and the degree of exposure.

A four-step approach to risk assessment

1. **Make an inventory** of the substances used in the processes in the workplace and those generated by the process such as welding fumes or wood dust.
2. **Collect information** about these substances, i.e. the harm they can do and how this can happen. Safety data sheets (SDS), which must be provided by the supplier of a chemical, are an important source of information.
3. **Assess exposure** to the identified dangerous substances, looking at the type, intensity, length, frequency and occurrence of exposure to workers, including combined effects of dangerous substances used together and the related risk.
4. **Rank the severity** of the established risks. This list can then be used to draw up an action plan to protect workers.

⁽¹⁾ *Third European survey on working conditions 2000*, European Foundation for the Improvement of Living and Working Conditions.

⁽²⁾ Council Directive 89/391/EEC contains the basic provisions for health and safety at work where not covered by more specific legislation.

⁽³⁾ Council Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work.

⁽⁴⁾ Council Directive 90/394/EEC of 28 June 1990 on the protection of workers from the risks related to exposure to carcinogens at work and its amendments.

⁽⁵⁾ Directive 2000/54/EC of the European Parliament and of the Council of 18 September 2000 on the protection of workers from risks related to exposure to biological agents at work.

⁽⁶⁾ e.g. Council Directive 67/548/EEC of 27 June 1967 and its subsequent amendments presenting requirements for testing, classification, packaging and labelling of dangerous substances, Directive 1999/45/EC of the European Parliament and of the Council relating to the classification, packaging and labelling of dangerous preparations and their adaptations to technical progress.

It is important to include in the assessment foreseeable incidents and maintenance work and plan for measures to be taken in these circumstances, including first aid.

Preventing and controlling risks

EU legislation sets a hierarchy for exposure control measures to be applied if a risk assessment reveals risks.

- Elimination of the hazard by changing the process or product is at the top of the hierarchy.
- If elimination is not possible, then the dangerous substances or the process should be substituted with another, non-hazardous or less dangerous one.
- Where the risks to workers are not prevented, control measures should be implemented to remove or reduce the risks to workers' health. The following control hierarchy should be followed:
 - (1) Design work processes and controls, and use adequate equipment and materials to reduce the release of dangerous substances.
 - (2) Apply collective protection measures at the source of the risk, such as ventilation and appropriate organisational measures.
 - (3) Apply individual protection measures including personal protective equipment where exposure cannot be prevented by other means.

The number of workers being exposed should be reduced to a minimum, along with duration and intensity of exposure and the amount of dangerous substances used. Appropriate hygiene measures should also be adopted.

Monitoring and review

The risk assessment should be reviewed when there are changes in the work procedure, when new chemicals are introduced or a process is adapted, in case of accidents and health impairments and in any case on a periodic basis to ensure that its findings are still current.

Once a control measure has been implemented in the process, its effectiveness should be monitored. Regular evaluation of the situation is needed to detect slowly deteriorating situations (e.g. reduced effectiveness of ventilation systems) and changes in the work practices.

Occupational exposure limits

Occupational exposure limits (OELs) for hazardous substances are important information for risk assessment and management. However, OELs have only been set for a limited number of the substances currently used in the workplace. Binding (?) and indicative (°) limit values are laid down in European directives. Each Member State in the European Union establishes their own national OELs, usually including more substances than the directive. National OELs can be binding (which means that they must be met), or indicative limits (as an indication of what should be achieved). The employer shall ensure that the exposure of the workers does not exceed the national limits.

At the time of writing, no OELs have been set for biological agents in the workplace.

Dangerous substances — a European priority

The growing concern that the current system of regulating chemical safety for the protection of the environment and health does not provide sufficient protection has led to the development of a new European chemical policy, outlined in the White Paper on strategy for a future chemical policy. (°) This policy aims to ensure a high level of protection of human health and the environment for the present and future generations and includes a single system of registration, evaluation and authorisation of chemicals (REACH). The requirement to supply information down the production chain is one of the key elements of the REACH system for chemicals management. REACH intends to provide more information on the hazards of substances and how their potential risks can be handled. It also aims to strengthen the requirement for risk assessment, since manufacturers, importers and downstream users would have to carry out risk assessments for intended uses and propose risk management measures that can control the risks.

In 2002, the European Commission published *Adapting to change in work and society: a new Community strategy on health and safety at work 2002 – 2006* (1°). This publication notes that Europe needs to analyse new or emerging risks, particularly those risks associated with chemical, physical, and biological agents.

Further information

Other factsheets available in this series on dangerous substances and further information are also available at <http://osha.eu.int/ew2003/>. This source is being continually updated and developed.

Further information on occupational safety and health and dangerous substances can also be found on <http://europe.osha.eu.int/> under several headings, including:

- Occupational exposure limits: http://europe.osha.eu.int/good_practice/risks/ds/oe/
- Good practices: http://europe.osha.eu.int/good_practice/risks/ds/

Successful control brings benefits

It is commonly acknowledged that proper management of dangerous substances protects workers and the environment while ensuring the quality of the products and being good business for the company.

A printing facility in the United Kingdom installed covers on the older, high-solvent, printing machines. This required some thought but hardly any cash. Solvent vapour levels were halved, saving 5 000 litres of solvent per week or GBP 50 000 (EUR 74 400) a year. Fitting all the roto-gravure machines with covers will increase cash savings by a further 20 %.

A large manufacturer of arc welding systems replaced high-solid painting by powder coating. A powder booth and an environmental room were installed. Employee exposure to organic solvents has been drastically reduced, while dust exposure has been well controlled. Powder coating of parts improved corrosion resistance significantly and the surface finish quality is superior. Substantial reductions in air emissions of solvents and paint-related waste have been achieved. Capital investment was over EUR 500 000. However, total cost of painting is reduced by 25 % due to higher efficiency of the powder coating system. The payback period is 6.3 years.

(°) E.g. for lead in Directive 98/24/EC (chemical agents directive) or for wood dust and vinyl chloride in Directive 90/394/EEC (carcinogens directive).

(°) Commission Directive 2000/39/EC of 8 June 2000 establishing a first list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work.

(°) http://europa.eu.int/comm/environment/chemicals/0188_en.pdf

(1°) http://europa.eu.int/eur-lex/en/com/pdf/2002/com2002_0118en01.pdf