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Short Guide to the Safety, Health and Welfare at Work (Chemical Agents) Regulations, 2001

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Hazardous Substances (Safe Use of Chemicals in the Workplace)

SHORT GUIDE TO THE SAFETY, HEALTH AND WELFARE AT WORK (CHEMICAL AGENTS) REGULATIONS, 2001

CONTENTS

	Page
INTRODUCTION	4
WHAT IS A HAZARDOUS SUBSTANCE	5
WHERE ARE HAZARDOUS SUBSTANCES FOUND	5
WHAT HARM CAN HAZARDOUS AGENTS CAUSE TO WORKERS	5
HOW DO I RECOGNISE A HAZARDOUS AGENT	6
WHAT ARE THE LEGAL REQUIREMENTS	6
WHAT THE CHEMICAL AGENTS REGULATIONS REQUIRE	6
KEY FACTORS	7
RISK ASSESSMENT OVERVIEW	7
ASSESS THE RISK	7
1.0 Determine what hazardous substances are present	7
How to identify hazardous chemical agents	8
What labels tell you.....	9
1.1 Factors to be considered in determining the risk	9
How much of the substance is in use and how could people be exposed to it	9
1.2 Competence required to carry out the Risk Assessment	10
2.0 Decide what precautions are required	11
2.1 Specific protection and prevention measures	11
How to tackle the problem.....	11
Hierarchy of risk control measures.....	12
3.0 Record your findings	13
Review of risk assessment	14
Duties of employers.....	14
Employee duties	14
Chemicals with occupational exposure limit values (OELVs)	14
4.0 Information, Training and Consultation	14
4.1 Information to be provided to employees	15
4.2 What training is required.....	15
4.3 Consultation.....	16
Carry out appropriate health surveillance.....	16
5.0 Summary.....	16
6.0 Further Information.....	17
Appendix 1 – (Glossary & Explanatory Notes of Useful Terms)	18
Appendix 2 – Commonly seen symbols	22

INTRODUCTION

These short guidelines have been developed to assist employers control the potential for exposure to hazardous substances in the workplace. The use of chemicals or other hazardous substances at work can put people's health at risk. The law requires the employer to eliminate, where reasonably practicable, the risk of exposure to hazardous chemical agents or, if it is not possible to eliminate them, to reduce the potential for exposure and so control that exposure in order to prevent harm or ill health to the workers or others affected by the work activity.

In addition, the short guidelines should be of benefit to those workers who use hazardous chemical agents at their place of work. The guidelines should assist workers to know which chemicals are dangerous, what harm they can cause if exposure should occur, what to do if exposure occurs and the necessary control measures to keep themselves and their colleagues safe while at work.

WHAT IS A HAZARDOUS SUBSTANCE?

A hazardous substance is something that has the potential to cause harm. Such substances include those:

- Brought directly into the workplace and handled, stored and used for processing (e.g. solvents, cleaning agents, glues, resins, paints).
- Generated by a process or work activity (e.g. fumes from welding/ soldering, dust from machining of wood, flour dust, solvents).
- Generated as waste or residue.

Agents can be considered hazardous not only because of what they contain (i.e. in the shape of a constituent or chemical ingredient) but because of the form or way in which they are used at the workplace, e.g. hot water used as steam can cause severe burns and adequate control should be available to prevent such exposure.

WHERE ARE HAZARDOUS SUBSTANCES FOUND?

Hazardous substances can be found in nearly all work environments, such as:

- Factories
- Hairdressers
- Shops
- Construction Sites
- Farms
- Hospitals
- Printing Works
- Dry Cleaners
- Offices
- Mines
- etc.

WHAT HARM CAN HAZARDOUS AGENTS CAUSE TO WORKERS?

Examples of the effects of hazardous substances:

- Asthma as a result of exposure to a respiratory sensitiser such as flour dust or soldering flux.
- Skin irritation or dermatitis as a result of skin contact with a substance such as cement or some degreasing agents.
- Cancer, which may appear long after the exposure to the chemical that caused it such as asbestos, benzene, etc.
- Loss of consciousness as a result of being overcome by toxic fumes such as solvent vapours.
- Infection from bacteria and other micro-organisms (biological agents).
- Eye irritation from a splash of caustic/acid which may result in eye irritation/loss of eyesight in severe cases.

HOW DO I RECOGNISE A HAZARDOUS AGENT?

It should be noted that not all hazardous agents are conveniently packaged and labelled to indicate they are dangerous. They will not always be in packages, boxes, drums, bottles or other containers. Some chemicals, e.g. fumes, dust, aerosols, mists, vapours etc., will be released and spread throughout the workplace. These dangerous 'agents' must also be adequately controlled to prevent harm and yet cannot be labelled to warn workers that they are dangerous. Other hazardous agents are contained in pipework or large vats, slurry tanks and tankers, and should be labelled. However, as the containers are so large it is essential that the labels etc. are clearly visible to those using them or in the vicinity of them.

Remember the label is the first obvious/visible indication that a substance is dangerous BUT it may not always be visible at first glance and so it is important that every means of identifying and thus risk-assessing dangerous agents is known to all concerned who may potentially be exposed.

WHAT ARE THE LEGAL REQUIREMENTS?

Employers must ensure a safe working environment. The Chemical Agents Regulations place duties on employers, employees and other users of workplaces.

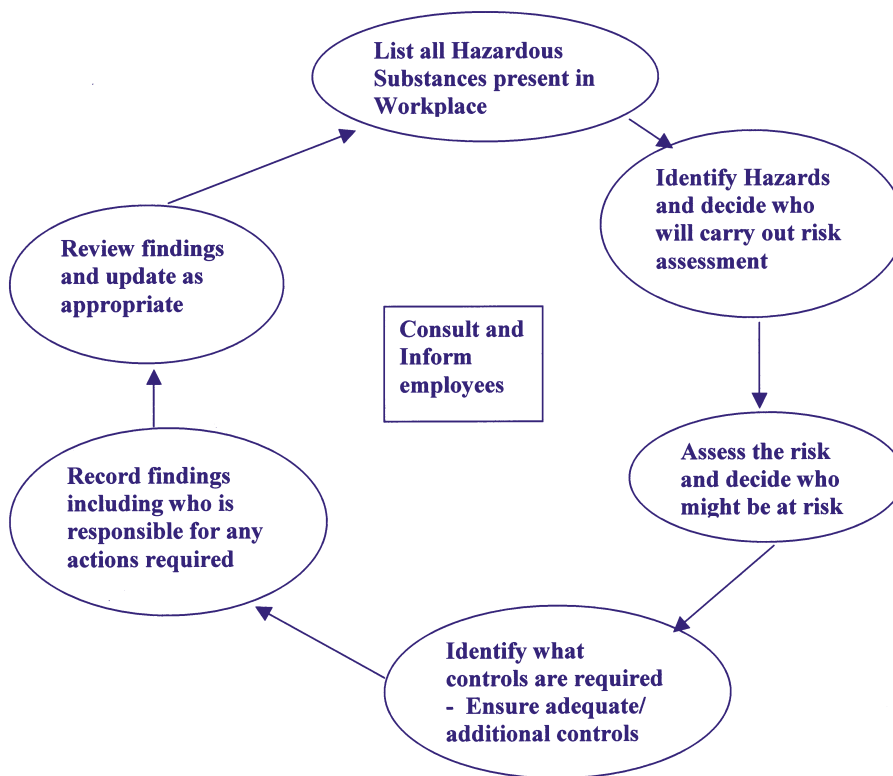
WHAT THE CHEMICAL AGENTS REGULATIONS REQUIRE

- (1) **Determine which hazardous substances are present** in the workplace and assess the risk to employees and others resulting from the presence of these chemical agents.
- (2) **Prevention and control of exposure to hazardous chemical agents.** The employer must prevent employees being exposed to hazardous substances. Where preventing exposure is not reasonably practicable then it must be reduced and adequately controlled.
- (3) **Specific protection and prevention measures.** The employer must identify specific control measures, after having assessed the risk, and ensure that the control measures identified are appropriate, used and properly maintained.
- (4) **Arrangements to deal with accidents, incidents and emergencies.** Every employer must draw up an action plan to be put into effect in the event of an accident, incident or emergency relating to the presence of hazardous chemicals in the workplace.
- (5) **Information, training and consultation.** Employers must ensure that employees are properly informed, trained and supervised.

KEY FACTORS

The most important thing about assessing the risk from exposure to chemicals is to know the chemicals in question, to adopt a step-by-step approach to identifying all the possible means of exposure, and to understand the effects that such factors as duration and frequency of exposure can have on the risk of harm being caused. It is essential that workers who know the work practices, systems and situations where things can go wrong are consulted and have an input to developing a site-specific risk assessment. Common sense is an essential ingredient when performing risk assessment.

Risk Assessment Overview



ASSESS THE RISK

1.0 Determine what hazardous substances are present

By law an employer must assess the risk if the potential for exposure to a hazardous chemical agent is possible at the workplace. In order to do this an employer must identify all chemical agents on-site. Then the employer must initially **identify what hazardous substances are present** in the workplace that present a risk to the safety and health of employees or others (this should take account of the full 'life-cycle' of the chemical from its arrival on site or to the gates of the premises until it is fully used or disposed of as waste/residue etc.):

- (i) Substances that are brought into the workplace and handled, stored or used in processing.

- (ii) Substances used or generated by cleaning or repair work.
- (iii) Substances that are produced or given off and/or discharged by the process.
- (iv) Substances produced at the end of any process.
- (v) Substances which could potentially be released in the event of an accident or emergency.
- (vi) Substances produced, generated or remaining as waste.

HOW TO IDENTIFY HAZARDOUS CHEMICAL AGENTS

There are a number of useful **sources of information available** to the employer in identifying hazardous substances which may be present in the workplace. These include:-

- (i) Labels on the substance and Safety Data Sheets obtainable from the supplier for the substance.
- (ii) Guidance produced by the Health and Safety Authority or other authoritative organisations.
- (iii) Technical reference sources (textbooks, scientific and technical papers).
- (iv) Professional institutions, trade associations and specialist consultancy services.
- (v) The Internet.

In addition, the past experience of workers, other employers etc., should not be overlooked. There is no need to reinvent the wheel. If relevant data exists on the hazardous agents, especially relating to corresponding uses and possible associated adverse effects, then lessons should be learnt from those experiences so as not to repeat or mirror the same problems.

Having identified the hazardous agents in use/on-site, it is very important that the chemicals are considered with respect to use, work practice, work system etc. This means that the assessment must be relevant to *your* workplace, workers and work activities.

***THERE SHOULD BE NO 'UNKNOWN'S' REMAINING ONCE
THE IDENTIFICATION PROCESS IS COMPLETE***

WHAT THE LABELS TELL YOU! READ THEM FOR YOUR

Health and Safety

The container of all chemical products should have a label.
The label will tell you all you need to know to
be able to use the chemical safely.

TACTILE WARNING
Roughened or embossed areas which when touched by a blind or partially sighted person alerts them to the dangerous nature of the product.

S NUMBER SAFETY PHRASES
Show the safeguards necessary for your protection and what to do in case of an accident.

R NUMBERS RISK PHRASES
Show the special risks of the substance and how it gets into the body.

CHILD RESISTANT FASTENING
To prevent children from opening container which contains very toxic or corrosive product.

HAZARD WARNINGS

ENVIRONMENTAL HAZARDS

T+ - VERY TOXIC

E - EXPLOSIVE

T - TOXIC

O - OXIDISING

Xn - HARMFUL

F+ - EXTREMELY FLAMMABLE

C - CORROSIVE

F - HIGHLY FLAMMABLE

Xi - IRRITANT

DANGEROUS FOR THE ENVIRONMENT

REMEMBER! DO DISPOSE OF EMPTY CONTAINERS SAFELY

Some common technical terms which may sometimes be on labels

Sensitisation	May cause an allergy (allergic dermatitis or asthma)
Carcinogen	May cause cancer
Harmful or toxic for reproduction	May cause fertility problems or damage the developing baby

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1.1 Factors to be considered in determining the risk

Having identified what hazardous substances are present in the workplace, the employer must determine the risks these hazardous substances present to the health of employees and others. The following factors should be considered in determining the risk.

How much of the substance is in use and how could people be exposed to it?

- (i) **Hazardous substances can enter the body via a number of routes –**
- Inhalation: if you breathe in fumes, gas or vapours.
 - Absorption through the skin: hazardous substances come in contact with the skin and are absorbed.
 - Ingestion: if you swallow hazardous substances or transfer small amounts from the hands to the mouth.

(ii) **Who could be exposed to the substance?**

Consider the number and category of employees or others potentially exposed. Workers such as maintenance, cleaners, security, young persons, inexperienced workers and pregnant workers should all be considered. In addition, take into account others who may arrive on-site or work temporarily at the site, e.g. outside contractors, sub-contractors etc.

(iii) **The level and duration of exposure**

Are employees exposed to the same level of the hazardous substance throughout the workday or is there a short period of time when they are exposed to higher levels? Infrequent exposures, such as to maintenance workers carrying out activities on an annual basis which may bring them into contact with hazardous substances, should also be considered.

(iv) **Physical effort required to complete the work**

The greater the physical effort required, as a result of which employees may breathe faster (than 'normal'), consequently breathing in more air, the greater their exposure to any chemical agents which may be present in the air.

(v) **Existing control methods in place**

- Are there engineering controls in place which reduce/ eliminate the exposure?
- Is the process using the hazardous chemical in a closed, separated system/ vessel/container/room etc?
- Is there extraction in place which removes the hazardous substance at source?

1.2 Competence required to carry out the Risk Assessment

Beginning the process of Risk Assessment

Having gathered this information the risk per chemical can be assessed. In addition, the assessment should take account of interaction/reaction of different chemicals when performing a risk assessment. The employer is responsible for carrying out this assessment. It is essential that he/she is a competent person to do it. However, in this case, it does not always imply that a competent person must be a chemist/analyst/outside expert/consultant etc. The employer and employees have the greatest familiarity with and knowledge of what really happens in the workplace and may have the expertise to complete the risk assessment. However, if such expertise is not available in the company, then they will need to obtain the services of a competent person to assist with the task of Risk Assessment. Even when recruiting a competent person from outside to perform the risk assessment it is essential that workers and supervisors etc. are involved. These workers know how things operate normally, at weekends, when people are sick or on annual leave, when there is pressure to complete orders, when machinery breaks down, during maintenance operations etc. The person who carries out the assessment should:

- (i) Have adequate knowledge, training, and expertise in understanding the hazard.
- (ii) Know how the work activity uses or produces the hazardous substance.
- (iii) Be familiar with statutory regulations/requirements.
- (iv) Possess the knowledge, skills and experience to make the right decision about the risk and the precautions that are needed.

Most importantly the person must be or become familiar with the site, the work, the workers, the systems, the patterns of use etc.

2.0 Decide what precautions are required

Having determined the risk you now need to decide whether the controls in place are adequate or whether further action is required to reduce the risk. Employers should evaluate whether they have reduced the risk to as low a level as is reasonably practicable.

- Are good work practices and the standards recommended for your industry in place?
- Have exposure levels been reduced to as low a level as is reasonably practicable and well below the Occupational Exposure Limit Values (OELVs) where they exist?
- Is there a system for checking the on-going effectiveness of any control system/extraction systems that may be in place? Are they part of the preventive maintenance programme?
- Where additional controls are required, put an action plan in place detailing what action is required, who is responsible for its implementation and the expected completion dates. ***(Until completion you must ensure that other means are in place to adequately protect those who may be exposed in the interim).***

2.1 Specific protection and prevention measures

How to tackle the problem

In considering the control measures to be put in place the employer must take into account the following hierarchy of control measures:

- (i) Is it possible to change the process or activity so that the hazardous substance isn't needed or generated?
- (ii) Is it possible to replace the substance with a safer alternative?
- (iii) Is it possible to use the substance in a safer form, e.g. pellets instead of powder?

If prevention (by elimination or substitution) is not reasonably practicable then review the engineering controls available:

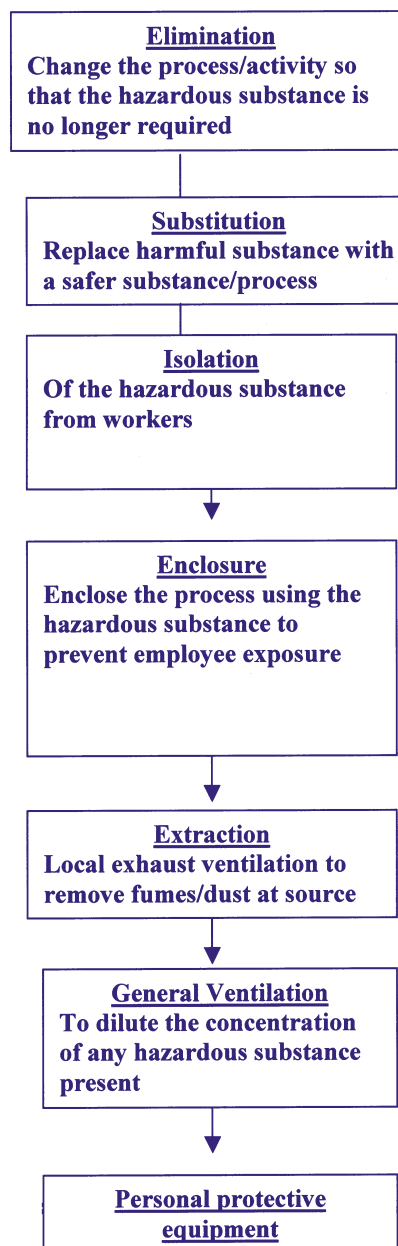
- (i) Can the process be totally enclosed?
- (ii) Is partial enclosure and/or use of extraction such as Local Exhaust Ventilation (LEV) possible?
- (iii) Is General Ventilation provided?
- (iv) Can systems of work and handling procedures which minimise the chances of hazardous materials leaking or otherwise escaping, e.g. using a dosing pump to add material as opposed to pouring, be used?
- (v) Can the number of employees potentially exposed be reduced or can the duration of exposure be reduced?

If exposure cannot be adequately controlled by any of the above measures then personal protective equipment should be provided. Personal protective equipment (PPE) is the last line of defence and should only be used to achieve adequate control if other means

of control cannot be used. It must be remembered that PPE (including respiratory protective equipment (RPE)) will only protect the person wearing it (subject to its being appropriate, suitable and the person is trained etc.). It will not reduce the exposure to the work environment or protect those in the vicinity of the exposure who may **not** be wearing PPE (including RPE). Generally PPE should not be the primary means of protection used for workers. PPE is a 'last resort' and other means of control must be considered before its use. Frequently, to achieve adequate control, an employer must implement a number of different control measures collectively.

The Regulations require the employer to control exposure to hazardous chemical agents to as low a level as is reasonably practicable.

Hierarchy of Risk Control Measures



3.0 Record your findings

The employer must record the results of the risk assessment in either written or electronic format.

- (i) The risk assessment should demonstrate that the employer has systematically considered all the hazards, assessed the risks, and must detail the actions/control measures required to protect the health of employees and others who may be affected by the work.
- (ii) The risk assessment should be detailed enough to explain the decisions that have been taken about whether the risks are significant and outline the controls required. The amount of information recorded should be proportionate to the risks posed by the hazardous substance.

For hazardous substances that pose little or no risk the employer need only record:-

- the substance to which employees are likely to be exposed
- the measures taken to adequately control exposure
- a statement that the risk is minimal and so further detailed assessment is deemed unnecessary. Similar low-risk materials may be assessed together.

Where the substance poses a **more significant risk** to safety and health, the risk assessment should consist of a more detailed record. It should contain enough detail to explain the decisions taken. The need for control measures should be recorded. The risk assessment must clearly identify the measures that have been taken in relation to the regulations, including the dates for such actions or measures to be in place and made operational. In addition to those specific factors outlined in the Regulations the following items should be considered as appropriate:

- The quantity of the hazardous substance stored in the workplace.
- The hazards and risks present under normal conditions of use and in emergency/accident situations.
- The extent to which elimination/substitution of the substance/ process with less hazardous materials has been considered. For substances with an Occupational Exposure Limit Value (OELV) consider whether controls really reduce exposure as far as is reasonably practicable or merely just below it.
- The preventive measures in place to achieve adequate control, including the use of any personal protective equipment.
- The reasons for selecting particular types of personal protective equipment where appropriate.
- Is it necessary to carry out personal/air monitoring in relation to employee exposure to a particular substance?
- The conclusions reached on the risks to which employees and others are exposed, based on the preventive measures in place.
- Is health surveillance required? Consider the results of any health surveillance undertaken.
- Monitoring and maintenance regimes to ensure on-going effectiveness of control measures.
- Frequency at which the risk assessment will be reviewed.

REVIEW OF RISK ASSESSMENT

The risk assessment should be a 'living' document. It should be reviewed whenever there is reason to think it is no longer valid, e.g. based on results of health surveillance/air monitoring, reports from safety representatives, employers, or supervisors indicating a potential problem, etc.

It should always be reviewed where there have been significant changes in the circumstances of work, such as new work activities/processes involving hazardous substances or changes in the system of work.

DUTIES OF EMPLOYERS

- The determination and assessment of the risk to employees and others regarding exposure to hazardous chemical agents.
- The adequate prevention and control of exposure to hazardous chemical agents.
- Arrangements to deal with accidents, incidents and emergencies.
- Information, training and consultation.
- Arrangements for health surveillance (if required depending on the outcome of the risk assessment).

EMPLOYEES HAVE DUTIES IN RELATION TO THE REGULATIONS TO:

- Co-operate with their employers, e.g. by following procedures which minimise the risk of exposure.
- Make full and proper use of control measures, including personnel protective equipment, and to report any defects.
- Report any defects in plant/equipment immediately to the employer as appropriate.
- Report any accident or incident which may have resulted in the release into the workplace of a dangerous chemical or substance.

Where there is more than one employer at a workplace they should all co-operate and collaborate to ensure that all the duties imposed by the Chemical Agents Regulations are fulfilled. This co-operation should be clearly outlined and planned with a clear understanding as to where responsibilities lie between each employer, contractor etc.

CHEMICALS WITH OCCUPATIONAL EXPOSURE LIMIT VALUES (OELVs)

Occupational Exposure Limit Values (OELVs) are available for a number of chemicals and are listed in the Health and Safety Authority Code of Practice issued in accordance with the Safety, Health and Welfare at Work (Chemical Agents) Regulations, 2001 (S.I. No. 619 of 2001).

4.0 Information, Training and Consultation

The employer is required under Regulation 9 of the Chemical Agents Regulations, 2001 to adequately consult with his or her employees and to provide them with information and training in relation to the safe use of chemicals in the workplace.

4.1 Information to be provided to employees

Employees should be provided with the following information as appropriate:-

- (i) The hazardous substances that are present in the workplace.
- (ii) How employees may be exposed to the hazardous substances and the risks associated with any such exposure.
- (iii) The precautions employees must take.
- (iv) The control measures that are in place to protect employees and how to use them. If an employee is required to wear specific personal protective equipment or follow a specific procedure then he or she must be trained to do so.
- (v) What to do in the event of an accident, incident or emergency involving a hazardous substance.
- (vi) What health surveillance, if any, is appropriate.
- (vii) The importance of employees reporting any faults that they are aware of or observe at the workplace.

The level of detail required will be dependent on the results of the risk assessment. Information to employees should be updated at regular intervals and, in particular, where there have been significant changes to work activities involving the use of hazardous substances.

4.2 What training is required?

In completing the risk assessment the employer may have identified specific training needs to ensure that employees can safely carry out their work activities. The level of training required will depend on the hazards of the task being undertaken and the knowledge and experience of the employee. Some areas in which training may be required are outlined below.

- (i) How and when to use the control measures.
- (ii) The defined safe systems of work.
- (iii) How to use personal protective equipment (PPE) and especially, if provided, respiratory protective equipment (RPE). The correct method of removing and refitting gloves and masks.
- (iv) How to determine when PPE should be replaced.
- (v) The correct cleaning, storage and disposal procedures to be followed in relation to personal protective equipment.
- (vi) Procedures to be followed in the event of an emergency.

A **training record** should be kept of any training provided to employees (including refresher training at regular intervals) and a follow-up system should be put in place to check the effectiveness of the training provided.

4.3 Consultation

In addition to the requirements under the Chemical Agents Regulations, 2001 employers must consult with their employees in accordance with Section 13 of the 1989 Act. Also, employers must make information available to employees or their representatives as per the Safety, Health and Welfare at Work (General Application) Regulations, 1993 (as amended) and relevant guidelines.

CARRY OUT APPROPRIATE HEALTH SURVEILLANCE

Health surveillance should be carried out as appropriate, based on the outcome of a risk assessment. Where health surveillance is required it should be made available 'under the responsibility of an occupational healthcare professional'. Health surveillance might involve examination by a doctor or a trained nurse. In some cases trained supervisors could, for example, check employees' skin for dermatitis. However, decisions on the outcome of the health surveillance will be made by the healthcare professional. Health surveillance may be appropriate/required for employees when:-

- (i) They work with substances that have been assigned a Biological Limit Value. Mandatory health surveillance applies currently only to work involving exposure to lead.
- (ii) The exposure of an employee to a hazardous chemical agent is such that an identifiable disease or adverse health effect may be related to the exposure.
- (iii) There is a reasonable likelihood that the disease or effect may occur under his or her particular conditions of work.

A record must be kept of all health surveillance carried out. The risk assessment may need to be reviewed based on the results of the health surveillance to ensure that the control measures are adequate and effective.

5.0 Summary

- Employers must ensure that their employees and others are not adversely affected or put at risk as a result of the need to use hazardous chemical agents at the workplace.
- Employees must co-operate, understand and comply with all specified control measures implemented, provided and required to protect themselves and others against exposure to hazardous chemical agents at their place of work.
- Having identified all hazardous chemical agents and assessed the risk to workers should exposure occur, this information and the required controls must be recorded in writing (or electronically) in a site-specific Risk Assessment document which must be available/accessible on-site.
- The Risk Assessment document must be reviewed regularly and revised/updated as necessary and appropriate.

Appendix 1: *contains a Glossary of Terms and Definitions which may arise when considering the issue of chemical agents and risk assessment at workplaces.*

Appendix 2: *illustrates 'Commonly Seen Symbols' on the containers etc. of chemical agents.*

6.0 Further Information

The Authority has also published comprehensive Guidelines to the Chemical Agents Regulations (2001). These detailed Guidelines can be downloaded from the publications section of our website www.hsa.ie or can be ordered in hard copy by contacting our publications office (please see reverse cover for HQ and regional offices).

APPENDIX 1

(Glossary & Explanatory Notes of Useful Terms)

Exposure Limits (or Occupational Exposure Limits (OELs))

An exposure limit is the concentration of a chemical in the workplace air to which most people can be exposed without experiencing harmful effects. Exposure limits should not be taken as sharp dividing lines between safe and unsafe exposures. It is possible for a chemical to cause health effects, in some people, at concentrations lower than the exposure limit.

Exposure limits have not been set for many chemicals for many different reasons. For example, there may not be enough information available to set an exposure limit. Therefore, the absence of an exposure limit does not necessarily mean the material is not harmful.

Occupational Exposure Limit Value (OELV) – is defined in S.I. No. 619 of 2001 as meaning, unless otherwise specified, the limit of the time-weighted average of the concentration of the chemical agent in the air within the breathing zone of a worker in relation to an 8 hour or 15 minute reference period as specified in the Code of Practice approved by the Authority.

'8 hour reference period' – relates to the procedure whereby the occupational exposure in any 24-hour period is treated as equivalent to a single uniform exposure for eight hours.

'15 minute reference period' – means the short-term exposure reference period and is the sampling period used for assessing compliance with the associated short-term exposure limit (STEL).

STEL – Short-Term Exposure Limit, defined as the concentration to which workers can be exposed for short periods of time, usually 15 minutes, 4 times a day without suffering adverse effects.

Hazard, Hazardous

Hazard is the potential to cause harmful effects. Hazardous means potentially harmful. The hazards of a material are evaluated by examining the properties of the material, such as toxicity, flammability and chemical reactivity, as well as how the material is used. How a material is used can vary greatly from workplace to workplace and, therefore, the same agents can be more hazardous at one site compared to another site depending on the use pattern employed.

Acute

Acute means sudden or brief. Acute can be used to describe either an exposure or a health effect. An acute exposure is a short-term exposure. Short-term means lasting for minutes, hours or days. An acute health effect is an effect that develops either immediately or a short time after an exposure.

Chronic

Chronic means long-term or prolonged. It can describe either an exposure or a health effect. A chronic exposure is a long-term exposure. Long-term means lasting for months or years. A chronic health effect is an adverse health effect resulting from long-term exposure or a persistent adverse health effect resulting from a short-term exposure. The Canadian Controlled Products Regulations describe technical criteria for identifying materials which cause chronic health effects.

Toxic, Toxicity

Toxic means able to cause harmful health effects. Toxicity is the ability of a substance to cause harmful health effects. Descriptions of toxicity (e.g. low, moderate, severe, etc.) depend on the amount needed to cause an effect or the severity of the effect.

Synergistic, Synergism

Synergism means that exposure to more than one chemical can result in health effects greater than expected when the effects of exposure to each chemical are added together. Very simply, it is like saying $1 + 1 = 3$. When chemicals are synergistic, the potential hazards of the chemicals should be re-evaluated, taking their synergistic properties into consideration.

Carcinogen, Carcinogenic, Carcinogenicity

A carcinogen is a substance which can cause cancer. Carcinogenic means able to cause cancer. Carcinogenicity is the ability of a substance to cause cancer.

C1 – *Substances known to be carcinogenic to man (Category 1 carcinogens), to which the Safety, Health and Welfare at Work (Carcinogens) Regulations, 2001 (S.I. No. 78 of 2001) apply.*

C2 – *Substances which should be regarded as if they are carcinogenic to man (Category 2 carcinogens), to which the Safety, Health and Welfare at Work (Carcinogens) Regulations, 2001 (S.I. No. 78 of 2001) apply.*

Mut1 – *Substances known to be mutagenic to man (Category 1 mutagens), to which the Safety, Health and Welfare at Work (Carcinogens) Regulations, 2001 (S.I. No. 78 of 2001) apply.*

Mut2 – *Substances which should be regarded as if they are mutagenic to man (Category 2 mutagens), to which the Safety, Health and Welfare at Work (Carcinogens) Regulations, 2001 (S.I. No. 78 of 2001) apply.*

Engineering Controls

Engineering controls help reduce exposure to potentially hazardous chemical agents either by isolating the hazard or by removing it from the work environment. Engineering controls include mechanical ventilation and process enclosure. They are important because they are built into the work process.

Engineering controls are usually preferred to other control measures such as the use of personal protective equipment. Substitution of a less hazardous material or industrial process is the best way to reduce a hazard and is often considered to be a type of engineering control.

Process Enclosure

Process enclosure means that the operation in which the material is used is completely enclosed. A physical barrier separates the worker from the potential health or fire hazard. Process enclosure is usually recommended if the material is very toxic or flammable.

Ventilation

Ventilation is the movement of air. One of the main purposes of ventilation is to remove contaminated air from the workplace. There are several different kinds of ventilation.

Natural Ventilation

Natural ventilation is a type of general ventilation which depends on natural rather than mechanical means for air movement. Natural ventilation can depend on the wind or the difference in temperature between one area and another to move air through a building. Therefore, it can be unpredictable and unreliable.

Local Exhaust Ventilation

Local exhaust ventilation is the removal of contaminated air directly at its source. This type of ventilation can help reduce worker exposure to airborne materials more effectively than general ventilation. This is because it does not allow the material to enter the work environment. It is usually recommended for hazardous airborne materials.

Mechanical Ventilation

Mechanical ventilation is the movement of air by mechanical means (for example, a wall fan). There are two kinds of mechanical ventilation: general ventilation and local exhaust ventilation.

Reproductive Effects

Reproductive effects are problems in the reproductive process which may be caused by a hazardous substance. Possible reproductive effects include reduced fertility in the male or female, menstrual changes, miscarriage, embryotoxicity, fetotoxicity, teratogenicity, or harmful effects to the nursing infant from chemicals in breast milk.

Many chemicals can cause reproductive effects if an extremely high exposure occurs. In these cases, the exposed person would experience other noticeable signs and symptoms caused by the exposure (normally at an earlier stage). Therefore these earlier signs and symptoms can act as a warning of toxicity. Chemicals, which cause reproductive effects in the absence of other significant harmful effects, are regarded as 'true reproductive hazards'. Very few workplace chemicals are known to be true reproductive hazards.

Repro 1 – Substances known to be toxic for reproduction for man (Category 1 reproductive toxins)

Repro 2 – Substances which should be regarded as if they are toxic for reproduction for man (Category 2 reproductive toxins)

Teratogen, Teratogenic, Teratogenicity

A teratogen is a substance which can cause birth defects. Teratogenic means able to cause birth defects. Teratogenicity is the ability of a chemical to cause birth defects. Teratogenicity results from a harmful effect to the embryo or the fetus/foetus.

Respiratory Sensitization, Skin Sensitization

Sensitization is the development, over time, of an allergic reaction to a chemical. The chemical may cause a mild response on the first few exposures but, as the allergy develops, the response becomes worse with subsequent exposures. Eventually, even short exposures to low concentrations can cause a very severe reaction.

There are two different types of occupational sensitization: skin and respiratory. Typical symptoms of skin sensitivity are swelling, redness, itching, pain and blistering. Sensitization of the respiratory system may result in symptoms similar to a severe asthmatic attack. These symptoms include wheezing, difficulty in breathing, chest tightness, coughing and shortness of breath.

Sen – Chemical agents which following exposure may cause sensitisation of the respiratory tract and lead to asthma, rhinitis or extrinsic allergic alveolitis.

Personal Protective Equipment (PPE)

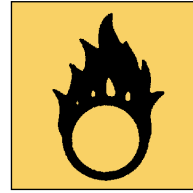
Personal protective equipment is clothing or devices worn to help isolate a person from direct exposure to a hazardous material or situation. Recommended personal protective equipment is often listed on the Safety Data Sheet (SDS) for that chemical. PPE can include protective clothing, respiratory protection and eye protection. The use of personal protective equipment is the least preferred method of protection from exposure to hazardous chemical agents. It can be unreliable and, if it fails, the person can be left completely unprotected. PPE also only provides protection for the worker wearing it and does not reduce the levels in the working environment or protect others in the vicinity of the emission. This is why engineering controls are preferred. Sometimes, personal protective equipment may be needed along with engineering controls. For example, a ventilation system (an engineering control) reduces the inhalation hazard of a chemical, while gloves and an apron (personal protective equipment) reduce skin contact. In addition, personal protective equipment can be an important means of protection when engineering controls are not practical: for example, during an emergency or other temporary conditions such as maintenance operations.

APPENDIX 2

Commonly seen symbols



E – EXPLOSIVE



O – OXIDISING



**F – HIGHLY
FLAMMABLE**



**F+ – EXTREMELY
FLAMMABLE**



T – TOXIC



T+ – VERY TOXIC



C – CORROSIVE



Xn – HARMFUL

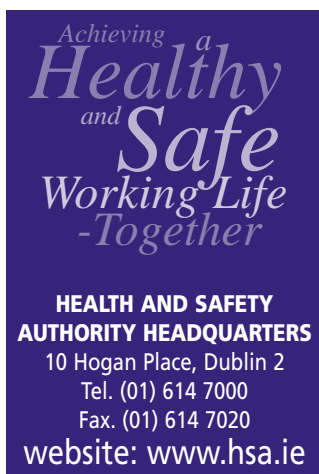


Xi – IRRITANT



**DANGEROUS FOR
THE ENVIRONMENT**

Short Guide to the Safety, Health and Welfare at Work (Chemical Agents) Regulations, 2001



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