



Risk Assessment of Chemical Hazards

All employers and self-employed people have duties under health and safety law to assess risks in the workplace. The risk assessment forms the basis of the Safety Statement that is required for all workplaces. The Safety, Health and Welfare at Work (Chemical Agents) Regulations, 2001 specifically obliges employers and self-employed persons to assess the risks arising from the use or presence of chemical agents in the workplace.

This leaflet is intended to help employers in assessing the risks that relate to chemical agents in the workplace and in determining adequate precautions or control measures to safeguard health and safety.

What is risk assessment?

A risk assessment is simply a careful examination of whatever, in your work or workplace, could cause harm to people, so that you can determine what precautions or controls are necessary to prevent harm. The intention is to prevent accidents or work-related ill-health in the workplace. The **Control Measures**, that are determined to be necessary to adequately safeguard against accidents or ill-health **must be specified in writing**. This is the outcome of the risk assessment and it is your duty to ensure that it is fully implemented. In specifying the control measures, the risk assessment provides the practical and detailed roadmap to help you manage health and safety in your workplace.

What chemical agents are hazardous?

Hazardous chemical agents include:

- Substances brought into the workplace and handled, stored and used for processing (e.g. raw materials, solvents, cleaning agents, glues, resins, paints);
- Substances generated by a process or work activity (e.g. fumes from welding/soldering, dust from machining of wood, solvent vapours from painting, dust from quarrying);
- Substances or mixtures produced by the work process including by-products, residues or waste.

Chemical agents can be considered hazardous not only because of what they contain, i.e. as 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 very severe burns and control measures need to be specified to prevent harm.

Why control the risks of hazardous chemical agents?

Thousands of people are exposed to hazardous chemical agents at work. If the exposure is not prevented or properly controlled, it can cause serious illness, sometimes even death. The effects of hazardous chemicals may be immediate or long-term and range from mild eye irritation to chronic lung disease.

Some examples of the effects of hazardous chemicals include:

- Skin burns or irritation caused by contact with a corrosive liquid;
- Being overcome or losing consciousness following inhalation of toxic fumes;
- Suffering acute symptoms such as headache or nausea within hours of inhalation;
- Poisoning by absorption through the skin of a toxic substance;
- Asthma;
- Dermatitis;
- Cancer occurring years after exposure to a carcinogenic substance;
- Genetic damage to offspring occurring years after exposure to a mutagenic substance.

What do you need to do?

You need to:

- **Assess the risks** from hazardous chemical agents at your workplace;
- **Decide what control measures are needed.** These control measures must be identified and specified in writing as a record of the risk assessment;
- **Ensure that the control measures are fully implemented.**

How do you assess the risks?

When you are carrying out a chemical hazards risk assessment, a number of key questions need to be asked:

What substances are workers exposed to?

- Think about raw materials, substances generated or emitted by the process and final products.
- Consider all persons who may be affected: plant operators, maintenance workers, cleaners, contractors, visitors.

What harm can they cause?

- Information on health hazards can be found on packaging labels. Information may also be obtained from Safety Data Sheets or other information provided by the supplier, from trade magazines, from plant/equipment suppliers or from specialists working in your industry. Useful information is also often available on the Internet.
- Is fire or explosion a risk?

What activities can give rise to exposure?

- When is it possible for spills or splashes to occur?
- Under what circumstances might substances be breathed in, swallowed or absorbed through the skin?

What risks need to be controlled?

- Are exposures likely to be significant? This depends on the duration and frequency of exposure as well as the concentration of the substance involved.
- What malfunction or accident could result in a serious exposure?
- The threat of fire or explosion needs to be guarded against.

If good practice for dealing with these risks is well established, you only need to identify the relevant measures in writing and check that they are in place (see next item).

How do you specify the Control Measures?

What measures or precautions are necessary to control these risks?

- You need to find out what is established good custom and practice in your industry for managing these risks and check that you meet this standard.
- Advice on good work practices and standards used by, or recommended for your industry may be available from trade associations or from other employers in the same business, from plant/equipment suppliers, from industry specialists and from published authoritative guidance.
- If your workplace process is unique and authoritative guidance on good health and safety practice is not available, you will need to formulate a regime of Control Measures that will reliably prevent any adverse health effects. The regime may draw on the following hierarchy of measures, in order of preference:
 - Elimination: change the process or activity so that the hazardous substance is not used or is not generated;
 - Substitution: replace it with a safer alternative;
 - Isolation: separate the hazardous substances from workers;
 - Engineering controls: use physical measures to minimise workplace contamination, e.g. extraction at source by LEV (local exhaust ventilation);
 - Administrative controls: use of safe work practices and procedures to minimise contamination, e.g. good hygiene procedures;
 - Personal Protective Equipment (PPE): provide face-masks, gloves, protective clothing, etc., but only as a last resort or "belt and braces" measure.
- The Control Measures themselves must also be checked and maintained at regular intervals. For example, local exhaust ventilation equipment should be examined at suitable intervals against its specification to ensure its continued effectiveness. Sometimes it is necessary to monitor worker exposure at regular intervals (e.g. by measuring concentrations in air) to ensure exposure limits are not exceeded. Health surveillance may also be required in certain circumstances. All these measures must be fully specified in writing.

- Plans and procedures to deal with accidents and emergencies are considered to be Control Measures. These and other operating procedures may be referenced, rather than included, in the record of the risk assessment.

How do you record the risk assessment?

The key outcome of the risk assessment is the **specification of adequate control measures**. The law requires that the control measures are identified in writing (paper or electronic format). All control measures that are important in safeguarding against adverse health effects should be specified, but you can organise them into whatever order suits your business.

The control measures must be described in sufficient detail so that they are fully specified. For example, "*Wear Suitable Respiratory Protection*" is not satisfactory. The full type specification of the respiratory protection should be provided in this instance. Similarly, "*Use Local Exhaust Ventilation*" is insufficient if proper control involves careful specification of the extraction required and necessitates regular testing.

Who should do the assessment?

In many cases, you and your employees have the best knowledge and understanding of your work processes and are best placed to carry out the risk assessment. If specification of the control measures is not straightforward, or if complex risks have to be assessed, you may need to engage competent specialist expertise to assist in the task.

Implementing the outcome of the risk assessment

It is your duty to ensure that the outcome of the risk assessment is fully implemented. If the assessment has concluded that the existing control measures need to be supplemented, the additional measures should be implemented as soon as is reasonably practicable, taking into consideration the level of risk involved. If the implementation of the additional measures is a complex task, a programme or plan for implementation needs to be drawn up. In specifying all the necessary measures to safeguard workers from the effects of hazardous substances, the risk assessment will be a useful tool for you in managing safety in your workplace. It should be brought to the attention of employees and appropriate instruction and training should be provided. Control measures cannot be effective if workers do not know how to use them properly.

When should the risk assessment be reviewed?

The risk assessment should be a "living document" that is reviewed if situations change or if there is reason to think that it is no longer valid.

Examples:

An excerpt from the Record of a Risk Assessment for a "Corrosive Liquids Store" at a medium-sized company

Risk: Burns due to contact of corrosive liquid with skin or eyes

Control Measures

- Safety Data Sheet (SDS) to be available in Warehouse Office and consulted as appropriate;
- Only trained, authorised persons allowed in storage area; notices posted at entrance;
- Corrosives to be stored in designated, hazard labelled area (location specified); natural ventilation provided via building design; floor bunding designed to accommodate vessels up to 1 cubic metre capacity;
- Acidic and alkaline corrosives to be kept in separate zones as per local notices;
- Spill control materials to be kept in designated siding at store entrance; minimum quantities (specified) to be maintained; storeman to monitor and re-order as required;
- Storeman to inspect corrosives storage area daily for signs of damaged, bulging or leaking containers and for poor housekeeping;
- Storeman to inspect incoming containers to ensure they are compatible, properly labelled and not damaged or corroded (in line with training provided);
- Minor spills to be handled by storeman as per Emergency Procedure EP01;
- Damaged or leaking containers to be handled as per Operating Procedure OP01;
- In event of spill of greater than 10 litres, supervisor to be alerted; Emergency Procedure EP02 to be followed;
- All 200 litre drums to be moved with drum trolley provided; edge or side rolling of drums not permitted (company policy);
- Dispensing to be carried out only at designated area as per Operating Procedure OP02;
- Personal Protective Equipment for storeman/operatives:
 - Safety footwear, protective clothing, acid-resistant gloves and goggles, all standard plant issue (further detail in Purchasing Specification PS01); use is mandatory while in warehouse area;
 - Powered full-face respirator with combined filter type A2B2E1-P3 available in designated container in storeroom for use with Emergency Procedures EP01 and EP02; respirator to be used/stored/maintained as per Operating Procedure OP50;
- Emergency eye-wash station and safety shower to be checked daily by storeman; record to be maintained in store log;
- Hygiene measures: eating and drinking not permitted.

An excerpt from the Record of a Risk Assessment for "Dispensing Flammable Solvents" at a Printing Plant

Risk: Fire and health effects due to skin/eye contact with solvents, inhalation of vapour

Control Measures

Dispensing to be carried out only by trained operative in accordance with Operating Procedure OP01 and using the following safety measures:

- Dispense only at designated location (well ventilated location, spill tray fitted for spill collection, free of fixed ignition sources, earthing and bonding facilities provided, warning notices posted);
- ALL IGNITION SOURCES TO BE EXCLUDED; use of mobile phone or other portable electrical equipment prohibited;
- When dispensing from 210 litre drum, use hand-pump provided, fitted with electrically-conducting flexible hose;
- Only dispense into special safety containers provided for flammable liquids, suitably labelled and fitted with self-closing spring-loaded cap and flame arrestor; dispensing into open-topped cans/buckets not permitted!
- Metal containers to be earthed and bonded before commencing;
- Dispense from only one container at a time;
- Open containers must not be left unattended;
- Ensure both containers are securely closed when dispensing is complete;
- Liquid spills to be cleaned up immediately as per Spill Procedure SP01; spills must not be allowed to accumulate in spill tray;
- Mandatory Personal Protective Equipment (PPE) for operative as follows –
 - Anti-static safety footwear;
 - protective chemical-resistant clothing (type/code specified);
 - solvent-resistant gloves (type/code specified); and
 - goggles (type/code specified);
- Respiratory Protective Equipment (RPE) for use with Spill Procedure SP01 –
 - Half-face respirator fitted with A1 filter. See separate RPE instructions.

REMEMBER:

The 'Key to Safety' is the specification and implementation of adequate control measures.

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AUTHORITY**

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