

MANAGING RISKS OF EXPOSURE TO SOLVENTS IN THE WORKPLACE INFORMATION SHEET

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This Information Sheet provides advice on managing risks associated with exposure to solvents in the workplace. More information about specific solvents is in the relevant safety data sheet (SDS).

If you are using solvents in the workplace, you should have access to the relevant SDS. You should always read the SDS before using any type of solvent as it will provide important information about health and safety risks.

Further information including storage requirements and assessing storage risks is in the *Code of Practice: Managing risks of hazardous chemicals in the workplace*.



What is a solvent?

A solvent is a substance that dissolves a different substance to form a solution. It is usually a liquid but it can be a solid or gas.



Who can be exposed to solvents?

Solvents are widely used in workplaces. For example, workers can be exposed to solvents when cleaning and degreasing materials or when using paints, lacquers and varnishes, adhesives, inks or pesticides.

Industries where solvents are commonly used include engineering, construction, printing, rubber, plastics, footwear, textiles, foodstuffs, woodworking, dry cleaning, pharmaceutical and paint and ink manufacturing.

Solvents may include:

- toluene, xylene, methyl ethyl ketone in paints and lacquers
- cyclohexane, acetone in adhesives
- trichloroethylene, perchloroethylene in degreasing solutions
- perchloroethylene in dry cleaning fluids, and
- turpentine, white spirits and xylene in used in printing.



What are the hazards?

Solvent vapours can be inhaled or absorbed through the skin, passing into the blood stream. Contaminated food or hands can also lead to solvents being swallowed.

Short term exposure to solvents can irritate eyes, lungs and skin and may cause headaches, nausea, dizziness and light-headedness.

Chronic effects can include dermatitis, toxicity to the nervous system, reproductive damage, liver and kidney damage, respiratory impairment and cancer.¹

Exposure to high concentrations of solvent vapours can result in loss of consciousness or may be fatal.

Solvents can be highly volatile and may explode or catch fire if stored or handled incorrectly.

Welding near solvents can present a risk of fire and explosion. Toxic gases like phosgene may be generated in the presence of halogenated solvents.

Further information about welding is in the *Code of Practice: Welding processes*.

Information about other health effects (if any) can be found in the relevant SDS.



How do you control the risks?

Elimination is always the best control. If possible, use solvent-free materials or modify the task so it no longer requires the use of solvents. If elimination is not possible then exposure can be minimised by:

- using chemicals with less toxic ingredients
- using low-volatility solvents or water based solvent substitutes, or
- changing the way the task is conducted e.g. applying the solvent at a lower temperature so less vapour is released.

A combination of control measures is usually required.

Engineering controls

Engineering controls include:

- using automated systems
- separating the solvent and workers by enclosing or isolating the task, and
- using ventilation to minimise the vapour concentration in a worker's breathing zone including:
 - local exhaust ventilation e.g. capture hoods and duct systems to remove vapours
 - dilution ventilation to increase the amount of fresh air supplied to a work area

1 OSHA. [Safety & Health Topics: Solvents](https://www.osha.gov/SLTC/solvents/index.html).
www.osha.gov/SLTC/solvents/index.html

- natural air flow—this may be improved by opening windows and doors or working in open air, or
- mechanical ventilation to introduce fresh air to the work area, particularly in small rooms and basements.

Other controls

Exposure to solvents can be minimised further by:

- preventing solvents evaporating by keeping lids on containers
- using only the minimum amount of solvent required for the work
- using barriers or splashguards and restricting access to non-essential workers
- using tools rather than hands to prevent skin contact
- scheduling work using solvents when the smallest number of workers are nearby
- disposing solvent-contaminated rags in sealed containers
- cleaning up spills immediately
- washing thoroughly before eating or smoking after working with solvents
- never using solvents to remove paints or grease from skin, and
- using appropriate personal protective equipment (PPE).

Personal Protective Equipment

PPE is the least effective method of controlling exposure to solvents and should only be used as a last resort. Always check the relevant SDS for the recommended PPE to be used with a particular solvent.

If respirators are used they must be:

- suitable for the type of solvent being used, and
- fitted, cleaned and maintained properly.

They should also be inspected and stored correctly. Disposable dust masks (P1 or P2) are ineffective against solvents. A combination air purifying respirator that protects against gases, organic vapours and particles is required.



Further information on respiratory devices is in:

- AS/NZS 1715:2009: *Selection, use and maintenance of respiratory protective equipment*, and

- AS/NZS 1716:2012: *Respiratory protective devices*.

Overalls and gloves may be required to prevent skin contact.

Solvent resistant barrier creams may also be appropriate when used with other PPE like impervious gloves.

Selecting the correct glove is important. This will depend on the concentration of the solvent, whether there is a risk of splash and if the gloves are going to be fully immersed in the solvent.

The relevant SDS should also be checked for recommendations on which type of glove to use.



Further information is in:

- AS/NZS 2161.1:2000: *Occupational protective gloves – Selection, use and maintenance*, and
- AS/NZS 1336:2014: *Eye and face protection – Guidelines*.

Working in enclosed or partially enclosed spaces

Solvent vapours cannot escape easily in an enclosed or partially enclosed space like a pit, small room or inside a vehicle. Dangerous and even fatal concentrations can build up very quickly. Some of these spaces may be 'confined spaces' therefore appropriate controls should be applied.



Further information is in the Code of Practice: Confined spaces.

A build-up of vapours or gases in enclosed and partially enclosed spaces can be explosive, flammable or poisonous. Solvent vapours can also displace air and cause asphyxiation.

Where possible try to avoid using solvents in enclosed or partially enclosed spaces. If using solvents in these spaces is unavoidable, you must follow a safe system of work including emergency procedures.



Further information

For further information see the Safe Work Australia website (www.swa.gov.au).