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Occupational Health Pathfinder

Working with solvents

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Overview

By definition, solvents are liquids or gases that can dissolve (or disperse) other substances to form a solution - water is the most abundant solvent on earth. Solvents are used in many industries due to the usefulness of these dissolving properties. For example, they are commonly found in cleaning materials, adhesives (eg. acetone, methyl acetate, ethyl acetate), printing materials, dry cleaning (eg. tetrachloroethylene) and paint thinners (eg. toluene, turpentine). They are also used by workers to clean tools and specialist equipment. As a consequence, millions of employees across the US are exposed to solvents on a regular, and often daily, basis.

Solvents are either organic (contain carbon in their chemical structure) or inorganic (don't contain carbon in their structure, eg. water). The latter are likely to be used in specialist laboratory based research or chemical engineering processes. Organic solvents are widely used and are often toxic (cause harm to your body). They are mostly flammable or highly flammable - especially those which are highly volatile (cause vapors).

What are the health effects of exposure to solvents?

There are three main ways in which solvents can enter the body: (i) inhalation of vapors or sprays, (ii) absorption through skin or (iii) accidental swallowing. Solvents that are volatile produce vapors that workers may inhale into the lungs with subsequent entry into the bloodstream. Industrial processes often use sprays that cause mists of solvents to become airborne thus irritating the nose, throat and bronchial tubes of the exposed worker. Solvents are often absorbed through the skin on contact causing dryness, redness and irritation. Once through the skin, solvents can travel to other parts of the body via the bloodstream. Although accidental swallowing of solvents is rare, eating food with contaminated hands must be avoided. Toxic effects depend on the solvent used, amount and length of exposure but can include toxicity to the nervous system, reproductive damage, liver and kidney damage, respiratory impairment, dermatitis and cancer.

Regulatory issues

Employers are required to ensure that employees have access to Materials Safety Data Sheets (MSDS) to give guidance on safe handling, storage, use and disposal of solvents. Employees should work in well ventilated areas (or fume hoods) and away from environments that could potentially cause fire risk. Solvents should be stored correctly and with appropriate labeling. Employers should refer to the OSHA website (www.osha.gov/SLTC/solvents/standards.html) for standards associated with use of solvents in the workplace setting.

KEY POINT SUMMARY:

- Solvents are liquids or gases that can dissolve (or disperse) other substances to form a solution
- Solvents are used in many industries due to the nature of their dissolving properties
- They are commonly found in cleaning materials, adhesives, printing materials, dry cleaning and paint thinners
- Organic solvents (chemically contain carbon) are widely used and are generally toxic and flammable
- There are three main ways in which solvents can enter the body (1) by inhalation of vapors or sprays, (2) absorption through skin on contact, or (3) by accidental swallowing
- General effects include toxicity to the nervous system, reproductive damage, liver and kidney damage, respiratory impairment, cancer, and dermatitis
- Employers should refer to the OSHA website for regulations concerning use of solvents

FIND OUT MORE...

OSHA

www.osha.gov/SLTC/solvents/index.html

National Institute for Occupational Safety and Health

www.cdc.gov/niosh/topics/organsolv/

Business Owner Briefing

"The importance of controlling short term exposures to solvents"
(Stear, 2002)

www.noiseandhealth.org/temp/NoiseHealth4149-22658_061738.pdf

Medical Director Review

"Exposure to solvents and risk of non-Hodgkin lymphoma: clues on putative mechanisms" (Vineis et al. 2007)

<http://cebp.aacrjournals.org/cgi/content/full/16/3/381>

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