WHMIS Quick Facts

Workplace Hazardous Materials Information System

Substitution

Chemical Substitution

Work Process Substitution

Physical Form Substitution

Whenever a very hazardous chemical or work process is being used, an ideal solution to reduce risk is to substitute a less hazardous material or process, where feasible. Substitution may not eliminate all potential hazards, but a substitute chemical or process should be less hazardous than the original.

Substitution Strategies

Chemical Substitution – using a safer chemical.

Examples of Chemical Substitution

Instead of:	Consider:
Carbon tetrachloride	1,1,1,-Trichloroethane
Benzene	Toluene, Cyclohexane, Ketones
Lead	Lead-free solders Lead-free paints
Organic solvents	Water-based solvents Liquid carbon dioxide
Sandstone grinding wheels (silica)	Synthetic grinding wheels such as aluminum oxide

Work Process Substitution – reducing the hazards of a process by changing the way it is done.

Example: Replace dry sweeping using a broom with an appropriate vacum or "wet method" to control dust and reduce the inhalation hazard. "Wet methods" involve spraying water over a dusty surface to keep dust levels down, or mixing material with water to prevent dust from being created. (Note: Never use a regular vacuum cleaner, especially for very toxic materials like lead and asbestos).

Example: Use electric motors rather than diesel motors.

Example: Floating balls on open-surface degreasing tanks containing solvent can reduce the surface area and decrease solvent loss.

Example: Use airless paint spraying, dip tank or brush application of paint to reduce the hazard of overspray inhalation when compressed air spray painting.

Physical Form Substitution – replacing a hazardous physical form with a less hazardous one.

Example: A dry powder may present a significant inhalation hazard. Substitution of pellets, flakes or granules may mean significantly less dust in the air.

Considerations for Making Substitutions

☑ ENSURE that one hazard is not being *exchanged* for another, especially a more serious one.

DETERMINE all of the hazards (health, fire, corrosivity, chemical reactivity, etc.) of the potential substitute before making any changes.

EVALUATE and COMPARE the hazards of different materials.

ENSURE that the substitute can still do the job effectively.

ASK chemical suppliers about safer substitutes.

OBTAIN and READ Material Safety Data Sheets (MSDSs) for information on possible substitutes.

CONSIDER the pros and cons of all substitutes and look at the "big picture". Determine if changes in the work process, equipment, ventilation, personal protective equipment, and even disposal methods will also be required.

REMEMBER that everyone who will be impacted by the substitution will need to be trained.

Although some substitutes may seem more costly, they may actually ***save money*** if they are safer to use. Additional savings may result from reduced requirements for ventilation, engineering controls and personal protective equipment.

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For additional information and resources visit www.whmis.gc.ca and/or www.ccohs.ca

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CCOHS Canadian Centre for Occupational Health and Safety

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