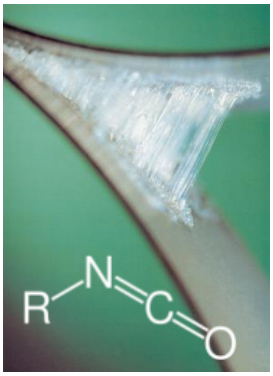
Laboratory Safety Bulletin

Phone: 519-253-3000 Ext. 3523 • E-mail: ccc@uwindsor.ca • Web: www.uwindsor.ca/ccc
Location: Essex Hall / B-37 • Hours: 8:30 am to 4:30 pm (M-F)

DESIGNATED SUBSTANCE: ISOCYANATES

What is interesting about Isocyanates?



Isocyanates are organic compounds; aromatic and aliphatic, containing the isocyanate group–NCO. An isocyanate may have more than one isocyanate group. Isocyanates are highly reactive chemicals. They react with water to produce insoluble polyureas, which are relatively non-toxic and inert. They react with compounds containing alcohol (hydroxyl) groups to produce polyurethane polymers. Isocyanates exist as liquids and are well known for their pungent odor. In fact their smell is so strong that historically chemists avoided research with isocyanates because they could not stand the smell in their laboratories. They are widely used in the production of paints and of chemical adhesives, such as glue. Isocyanates are TOXIC and heavily associated with the development of asthma in humans.

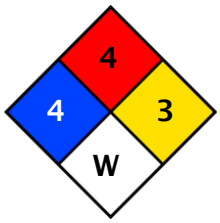
The most widely used industrial isocyanates are:

TDI - Toluene di-isocyanate
MDI - Diphenyl methane di-isocyanate
HDI - Hexamethylene di-isocyanate
NDI - Naphthalene di-isocyanate
MIC - Methyl isocyanate

Hazard Classification – Methyl Isocyanate

WHMIS

NFPA



Health: 4
Flammability: 4
Reactivity: 3
Specific: water reactive

How can Isocyanates affect your body?

Being exposed to isocyanates affects the respiratory system including nose, mouth and respiratory tract. Very serious symptoms can occur quickly and may even result in death. Symptoms often include breathlessness, chest pain/tightness, and coughing up of blood. Isocyanate liquid can cause permanent eye damage as well as swelling and redness of the skin. Isocyanates include compounds classified as potential human carcinogens and known to cause cancer in animals. They are toxic and are known to cause asthma in humans, both through inhalation exposure and dermal contact.

How do you work safely with Isocyanates?

Isocyanates are combustible chemicals and are very toxic to inhale. Never work alone with this chemical. Another person must be able to see you at all times and be prepared to handle a rescue if needed. If any isocyanate chemical is released into the air, immediately leave the area.

Working inside of a fume hood will protect you from the hazardous vapours of isocyanates. To avoid any personal contact the following should be worn at all times, a laboratory coat, safety goggles and chemically resistant gloves (latex and polyvinyl chloride gloves are suitable when working under careful control). Skin should not be uncovered if exposure to isocyanates is possible.

Do not mix isocyanates with water. Cold water will react with isocyanate slowly and warm water will react quickly to produce gases. Closed containers contaminated with water can rupture spontaneously. Strong oxidizing agents may react violently with isocyanates.

First Aid Procedures:

Inhalation: Remove the isocyanate source and move the victim to fresh air. If breathing is difficult, oxygen may be given under the supervision of trained personnel. Immediately seek medical advice. Symptoms of isocyanate poisoning may be delayed by 48 hours.

Skin and Eye Contact: Remove any contaminated clothing and immediately store in a sealed plastic waste pail. Quickly and gently remove excess chemical from skin or eyes by blotting chemical. Wash skin with soapy water or flush eyes with lukewarm water for 20 minutes. Seek medical attention immediately.

Where do you store Isocyanates and its empty containers?

Store isocyanates in a cool flammable cabinet and keep them away from ignition sources. Make sure that incompatible materials are not stored in the same location. In general isocyanates react violently with water, strong acids, bases, oxidizing agents, and alcohols, amines, steel iron and iron salts, zinc, tin/tin oxides, copper, and their alloys.

What happens if Isocyanates is spilled?

Evacuate the area immediately. Call the Campus Community Police by dialing 911 from a campus phone. Only trained personal are allowed to clean up the spill. Wearing the proper personal protective equipment (PPE), including a self contained breathing apparatus, heavy rubber boots, and thick rubber gloves absorb the material with either vermiculite or an absorbent from a chemical spill kit. Place the material inside of a disposable waste pail, sealed it and bring to the Chemical Control Centre (CCC) for disposal.

This lab safety bulletin is not a complete source on the safe handling of isocyanates at the University of Windsor. You should always check the SDS of isocyanate containing product at www.uwindsor.ca/msds before you work.
For more information on isocyanates please, visit the Chemical Control Centre's University of Windsor Designated Substance Program at www.uwindsor.ca/ccc or contact the CCC by phone (ext. 3523).

For more information on spills please see the University of Windsor's Spill Response Manual at www.uwindsor.ca/ccc.

References:

1. (S)- (-)-ALPHA-METHYLBENZYL ISOCYANATE, Material Safety Data Sheet, Sigma-Aldrich, Aldrich – 220566, Oakville ON 2006.
2. Cheminfo, *Chemical Profile – Phenyl Isocyanate,* Canadian Centre for Occupational Health and Safety, Hamilton ON 2007.
3. *Hazardous Materials Spill Response Guidelines,* Chemical Control Centre, University of Windsor ON 2008.