

LABORATORY SAFETY DATA SHEET

University of North Carolina
Department of Environment, Health and Safety

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Reducing Mercury Use in Laboratories

Mercury Hazards

Mercury has been used in the measurement of atmospheric pressures and temperatures since the mid 1600's. Laboratories are often dependent upon the ability to measure temperatures and pressures. Unfortunately, this measurement is not without hazard. Broken mercury-filled thermometers and manometers pose a much greater hazard than merely the possibility of being cut by broken glass. Elemental mercury is the only liquid metal in the periodic table of the elements. Its liquid form is incredibly mobile and will skate across horizontal surfaces, easily becoming lodged in minute cracks and crevices along the way. Mercury gives off a colorless, odorless vapor that is highly toxic. The Threshold Limit Value (TLV) for mercury is 0.05 mg/m³ of air. The nervous system is very sensitive to all forms of mercury, but is especially sensitive to mercury vapors because of its ability to reach the brain more easily. Short-term exposure to high concentrations of mercury may cause nausea, abdominal pain, vomiting, diarrhea, and headache. Long-term exposure to small amounts may cause severe nervous disturbance (hand tremors, insomnia, memory loss, irritability, and depression), loosening of the teeth, excessive salivation, and kidney damage. Harmful effects can also be passed from the mother to a developing fetus.

Spill Clean-up and Disposal Costs

In addition to the toxic hazards of mercury there are also high costs for disposal and spill cleanup. The UNC Department of Environment, Health & Safety responds to approximately 3 mercury spills per month. This number doesn't account for the spills cleaned up by lab personnel. Significant costs are associated with the clean up and disposal of mercury. One lab at the University of California at Berkeley had to pay \$25,000 for clean-up of mercury contamination from a spill. When mercury is spilled inside heat-producing devices, such as incubators and ovens, the devices are extremely difficult to decontaminate, and the hazard is magnified because heat accelerates vaporization of any remaining mercury.

Reducing Mercury Use

Many universities and hospitals have instituted programs to reduce the use of mercury. In 1998, the American Hospital Association made a commitment with the Environmental Protection Agency to phase out mercury containing wastes in hospitals by 2005. There are several reasonable alternatives to mercury thermometers and manometers. Think before you purchase the next thermometer or manometer for your lab. Does it have to be mercury?

Thermometers: Electronic digital thermometers and thermometers filled with alcohol or mineral spirits now meet the calibration standards of the National Institute of Standards & Technology. Some digital thermometers feature high/low alarms, high/low memory, data printouts and chemical resistant cases. If you must purchase a mercury thermometer, use one with a Teflon coating to help prevent breakage.

Manometers and Other Pressure Gauges: There are digital electronic versions of most mercury dials and switches. Pressure transducers can substitute for manometers. Digital manometers measure a large vacuum, are portable, have clear digital readings, and measures positive, negative and differential pressures. Accuracy is 0.5% and most digital manometers can store up to 20 readings in memory.

Additional Information: To learn more about the University of North Carolina at Chapel Hill's mercury reduction program, please call 962-5507.