



Mercury-Free Alternatives for Schools



Your school may contain mercury and other hazardous materials that have been used in the past or may still be used for teaching and other purposes. Hazardous materials can be found in many areas, including science labs, art rooms, maintenance areas, nurse's offices and home economics rooms. They may be dangerous because of their toxic, flammable or reactive properties. If these materials are being handled, stored or disposed of improperly, they can pose a risk to students, staff and the environment.

Mercury in particular is a persistent and toxic pollutant that accumulates in the environment, in wildlife and in humans. Lowered intelligence, impaired hearing and poor coordination are some of the effects in children with elevated mercury levels. While the most significant route of exposure to mercury is through the consumption of contaminated fish, breathing vapor from spilled liquid mercury is also a significant route of exposure. This could occur at schools. Accidental mercury spills and breakages have proven expensive to clean up, in some cases, costing tens of thousands of dollars.

The purpose of this fact sheet is to help schools identify and find alternatives to mercury and other hazardous materials that may be present in your facilities. It focuses primarily on mercury compounds and mercury-containing equipment used in curriculum activity. Many adequate substitutes exist for devices used in schools that contain mercury. When purchasing new equipment or replacing any mercury containing devices, check to make sure that any new items do not contain mercury. If no alternative is available, choose the product containing the least amount of mercury for that particular device.

If you would like more information about mercury and hazardous materials management at schools, please contact Becky Lockart, Illinois EPA's Office of Pollution Prevention, at (217) 524-9642 or Becky.Lockart@epa.state.il.us.



Autobody Class, Industrial Arts Class, and Wood and Metal Shops

Item	Alternative
Mercury Gauges	Electronic or aneroid gauges
Manometers, Carburetor Synchronizers, Other Pressure-Measuring Devices	Aneroid and electronic manometers and analog gauges (also known as vacuum gauges)
Switches in Electrical Equipment, Relays, Boilers, Cooling and Heating Equipment, Mercury-Containing Wall-Mounted Light Switches Manufactured Before 1991 ("silent" switches)	Mercury-free switches, temperature devices, and relays, and gas equipment with electronic ignitions
Solvent based products	Water-based or bio-based solvents
Lubricants	Bio-based lubricants
Wood preservatives with pentachlorophenol	Untreated wood and non-wood alternatives



Biology, Chemistry, Physics and Science Rooms

Item	Alternative
Elemental Mercury	
Mercury Barometer	Aneroid and digital; new liquid one is being developed
Mercury Compounds Mercury (II) chloride Mercury Iodine Mercury Nitrate Mercury Oxide Mercury (II) Sulfate	Magnesium Chloride/Sulfuric Acid or Zinc Formalin Freeze Drying Phenate method Ammonia/Copper Sulfate, Neosporin, Mycin Copper Catalyst Silver Nitrate/Potassium/Chromium (III) Sulfate
Mercury Gas Law Apparatus	A simple Charles' Law Apparatus may suffice.
Mercury Hydrometer	
Mercury Hygrometer	Spirit-filled glass bulb, digital and aneroid
Mercury Lab Thermometer	Alcohol and mineral spirits glass bulbs, and digital
Mercury Molecular Motion Device	
Mercury Sling Psychrometer	Mineral spirits glass bulb thermometers, some can fit in old frames.
Hg Spectral Tube	16 alternative gases are available
Mercury Vacuum Gauge	Needle or Digital Gauge
Zenker's Solution (Mercury Chloride)	Zinc Formalin
Colormetric Chloride Analysis	Ion-selective electrode method
Residual mercury may be present in drains traps and catch basins	Properly clean traps and basins. Recycle mercury.
Formaldehyde or Formalin	Formaldehyde-free preservatives
Solvents	Water-based or bio-based solvents



Heating, Ventilation and Air Conditioning Laboratories/Classrooms

Item	Alternative
Mercury Thermostats	Air-controlled, reed switch, vapor-filled diaphragm, snap-switch and programmable electronic
Mercury U-Tubes	Electronic and aneroid gauges
Mercury Switches	Hard-contact switches, solid-state switches, electro-optical switches, inductive sensors, capacitive sensors, photoelectric sensors, and ultrasonic sensors
Mercury Thermostat Probes	Electric flame sensors, electronic ignition
Float Switches	Magnetic dry reed switches, optic sensors, and mechanical switches



Home Economics Classrooms

Item	Alternative
Mercury Cooking Thermometer	Spirit-filled glass bulb, and digital
Washing Machine (power shut off)	Mechanical switch
Freezer Light	Mechanical Switch
Flame Sensor on gas oven	Electronic ignition
Steam Iron with 15 minute Shut-off (tilt switch contains mercury)	Iron with non-mercury switch



Art Classrooms*

Item	Alternative
Cadmium Vermillion Red Paint	Mercury-free and cadmium-free paint
Ceramic Glazes	Lead and cadmium free glazes
Dyes (cold water and commercial)	Vegetable dyes
Inhalation Hazards (e.g., clay in dry form, powdered paints, glazes, pigments, wheat paste and aerosol products)	Wet or liquid non-aerosol products
Instant Paper-mache	Paper-mache made from black and white newspaper and library or white paste or flour and water paste
Solvent-based glues	Water-based glues
Solvent-based paints	Water-based paints
Permanent markers	Water-based markers
Polymer clay (designed to harden at conventional oven temperatures)	Paper-based, flour-based or wax-based clays
Low-temperature modeling clays (may contain glycol ethers or primary phthalate ethers)	Paper-based, flour-based or wax-based clays
True Vermillion Paint (contains Mercury sulfide)	Mercury-free paint
Wood stains	Water-based wood stains
Moth repellants (for textiles)	Cedar chips, eucalyptus oil
Pigments used in printing inks, oils paints, and other media	Cadmium-free, lead-free and mercury-free alternatives are available
Solders for silver jewelry	Cadmium-free solder for silver jewelry
Stained-glass solders	Lead-free solder

*Art or craft materials used in Illinois schools must meet the requirements of 105 Illinois Compiled Statutes 135 and 77 Illinois Administrative Code 848.



Medical Technology Classrooms and School Medical Offices

Item	Alternative
Fever Thermometers	Digital, gallium-indium-tin thermometers, dot matrix thermometers
Blood Pressure Devices	Digital or aneroid
Topical Disinfectants containing mercurochrome or tincture of meriolate*	Alcohol or hydrogen peroxide
Contact Lens Solution containing thimerosal, phenylmercuric acetate or phenylmercuric nitrate*	Thimerosal-free, phenylmercuric acetate-free or phenylmercuric nitrate-free contact lens solution
Nasal Sprays containing thimerosal, phenylmercuric acetate or phenylmercuric nitrate*	Thimerosal-free phenylmercuric acetate –free or phenylmercuric nitrate-free nasal sprays

*Note: The primary concern is the disposal and not the exposure to mercury. No studies have confirmed any health risk associated with the identified mercury applications.



Non-educational Mercury-Containing Items

Item	Alternative
Thermostats	Air-controlled, reed switch, vapor-filled diaphragm, snap-switch and programmable electronic
Fluorescent Lamps	No alternative; properly recycle
Mercury Vapor Lamps	No alternative; properly recycle
Metal Halide Lamps	No alternative; properly recycle
High-Pressure Vapor Sodium Lamps	No alternative; properly recycle
Mercury Gauges	Electronic or aneroid gauges
Light Switches (“silent” switches)	New light switches don’t contain mercury
Mercury Switches and Relays	Switches and relays with electronic
Mercury thermostat probes and flame sensors	Hard-contact switches, inductive sensors, capacitive sensors, photoelectric sensors, and ultrasonic sensors
Old Latex Paint (purchased prior to 1992)	Properly dispose
Fungicides (purchased prior to 1994)	Properly dispose
Pesticides (purchased prior to 1994)	Properly dispose

Sources:

“Mercury-Containing Products and Alternatives”, INFORM Inc., 2002

“Identification of Mercury Devices in School Medical, Home Economic, Art and Other Rooms”, Revised Draft Checklist, Northeast Waste Management Officials Association, 2002

“Guidelines for the Safe Use of Art and Craft Materials”, California Office of Environmental Health Hazard Assessment, August 2002

“Mercury in Science Laboratories and Classrooms”, Massachusetts Department of Environmental Protection and Northeast Waste Management Officials Association

“Mercury in School Buildings and Maintenance Areas”, Massachusetts Department of Environmental Protection and Northeast Waste Management Officials Association

“Mercury in the Medical Office and in Medical Technology Classrooms in Vocational Technical Schools”, Massachusetts Department of Environmental Protection and Northeast Waste Management Officials Association

“Mercury in the Heating, Ventilation and Air Conditioning Laboratories in Voc-Tech Schools”, Massachusetts Department of Environmental Protection and Northeast Waste Management Officials Association

“Mercury Awareness for School Teachers”, Ohio EPA, Office of Pollution Prevention, June 2001