Alternatives of Mercury & its Products.

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Mercury has been used in a variety of consumer products because it exhibits properties of both a metal and liquid at room temperature. It is a good conductor of electricity and it reacts precisely to temperature and pressure changes.

Mercury Containing Products/ Products Categories

- Appliances
- Automobiles
- Button Cell Batteries
- Chemical Compounds
- Computer
- Dental Amalgam
- Electronics-Miscellaneous
- Film
- Heating/ Cooling Equipment
- Industrial Machinery
- LCDs/ Monitors/ Projectors
- Lights Bulbs

Conti…….

- Light Fixtures
- Measuring Devices
- Office Equipments
- Pumps
- Sensors
- Thermometers
- Toys
- Transducers
- Valves

Mercury Components Within Products

- Buttons Cell Batteries
- Leveling Systems
- Light bulbs
- Mercury- Compounds
- Mercury – Elemental
- Relays
- Sensors
- Switches
- Thermostats
- Transducers
- Values

Industrial Sectors

- Chemical Manufacturing
- Computer and Electronics Manufacturing
- Electrical Equipment, Appliance, and Component Manufacturing
- Electronics and Appliance Stores
- Fabricated Metal Products Manufacturing
- Furniture and Home Furnishing Stores
- Machinery Manufacturing
- Miscellaneous Manufacturing
- Motor Vehicle and Parts Dealers

Conti…….

- Nonmetallic Mineral Products Manufacturing
- Printing and Related Support Activities
- Professional, Scientific, and Technical Services
- Transportation Equipment Manufacturing
- Wholesale Trade, Durable Goods
- Wholesale Trade, Nondurable Goods
- Power Sector

Lighting

Fluorescent Lamps/tubes/ High Intensity Discharge Lamps

(10-50 mg Hg, 20-250 mg Hg)

Alternatives:

Ordinary glow lights; LEDs

low sodium vapor tubes (yellow);

optical, high-energy, long-lasting lights

Clinical

Thermometers:

(0.5-3.0 g Hg)

Alternatives:

- Liquid-in-glass thermometers
- Dial thermometers
- Electronic thermometers
(thermocouple and resistance thermometers)
- Infrared thermometers

Examples

Gas Filled Thermometer

Digital Thermometer

Manometers

Alternatives:

- Bourdon tube manometers
- Electronic manometers (or digital manometers)
- Pressure gauges with diaphragm elements

Examples

Dwyer Magnehelic Difference Manometer

Dwyer Handheld Digital Manometer

Dental amalgams
Alternatives:
Gold, ceramics, porcelain and Polymers

Batteries
Defibrillators, Hearing aids
Pacemakers
Alternatives:
Lithium, zinc-air, alkaline

Appliances

Gas Range
Freezer
(Switch, Flame Sensor)

Alternatives:
Electronic (digital)

Blood Pressure Measuring Equipment

Alternatives:

- Aneroid Sphygnomanometers for manual reading
- Semiautomatic devices for clinical use
- Automatic blood pressure devices for hospital use

Example

Welch Allyn Maxi Stabil 3 aneroid sphygmomanometer.

Greenlight 300 electronic sphygmomanometer

Barometers

(40-100 g Hg)

Alternatives:

- Electronic barometers based on vibrating cylinder air pressure transductors
- Electronic resistance or capacitance barometers
- Aneroid mechanical barometers

Example

Vaisala PTB220 Series Digital Barometer

Thermostats

(3 g Hg)

Alternatives

Programmable electronic thermostat

Electrical equipments:
Alternatives:
Fiber optics, solid state devices, mechanical switches

Flame sensors

(1-2 g Hg)

Alternatives

Electronic flame sensors

Switches

(3.5 g Hg, Industrial switches upto 8 pound Hg)

Alternatives

Hard-contact switches, solid state switches, electro-optical switches, inductive sensors, capacitive sensors, photoelectric sensors, and ultrasonic sensors.

Laboratory

- Mercury (II) chloride
  Zenker's solution
  Histological fixatives

Alternatives:
Zinc formalin, Freeze drying

Staining solutions and
preservatives:

Thimerosal, Immu-sal, Carbol-fuchin stain,
Gram iodine stain, Phenolic mercuric,
Acetate, Alum, Hematoxylin "Solution A"

Alternatives:
Replace with a variety of chemical compounds

Mercury (II) oxide	Copper catalyst
Mercury oxide	None identified
Mercury (II) chloride	Magnesium chloride/sulfuric acid
Mercury (II) sulfate	Silver nitrate/potassium sulfate/chromium-(III) sulfate
Mercury iodide	Phenate method
Mercury nitrate (for corrosion of copper alloys)	Ammonia/copper sulfate
Colorimetric chloride analysis	Ion-selective electrode method

Power sector

- Coal Burning

  An individual cement plant is emitting an average 50 kg of mercury in the environment. A recent study shows that coal being used contains mercury in the range of 20-200 ppb
- Alternatives

  Coal Cleaning, Hydro, Hydrogen, nuclear, etc.

Thank you

Environmetal/ Analytical Laboratory