



**Asia-Pacific  
Economic Cooperation**

**Advancing** Free Trade  
for Asia-Pacific **Prosperity**

# **Guideline of Products with Added Mercury**

**APEC Ocean and Fisheries Group**

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## **GENERAL INFORMATION**

### **– Purpose of this technical guideline**

This technical guideline is intended to educate and provide general information on everyday products that contain added mercury such as batteries, bulbs, thermometers, medical devices, creams, etc. In addition, the guideline provides information on products that fulfill the same function as the previous, but that are mercury-free. In order to reduce mercury releases into the ocean and its impacts in the marine environment.

### **– Who should read this guideline?**

The guideline should be read by people who wish to learn about Mercury in everyday consumer products.

### **– Sources of information**

This technical guideline has been prepared using public information available on the internet and websites of the United States Environmental Protection Agency (EPA), Ministry of Environment-Government of Japan, UN Environment, Secretary of the Minamata Convention, and non-profit organizations such as Zero Mercury Working Group.

# 1. INTRODUCTION

## 1.1 MERCURY

Mercury is a chemical element with the symbol Hg. Mercury is a metal found naturally in the earth's crust in the form of cinnabar (HgS) and as by product in coal, oil and natural gas deposits. It is the only metal that at room temperature can be found in its liquid state and easily forms alloys with other metals such as silver and gold producing amalgams.

Mercury has no known metabolic functions and is highly toxic to living organisms. In humans, it can cause negative effects on the central nervous system and other vital organs[1]

Mercury can be found mainly in three ways:

- Elemental Mercury (metallic).
- Inorganic mercury compounds.
- Methylmercury and other organic compounds,

Elemental mercury (Hg<sup>0</sup>) is a bright silver metal that can evaporate at room temperature and produce highly toxic vapors. It is produced by heating the cinnabar ore above 650 °C, where the ore decomposes into sulfur dioxide (SO<sub>2</sub>) and metallic mercury.

**Figure 1.1. Cinnabar (HgS)**

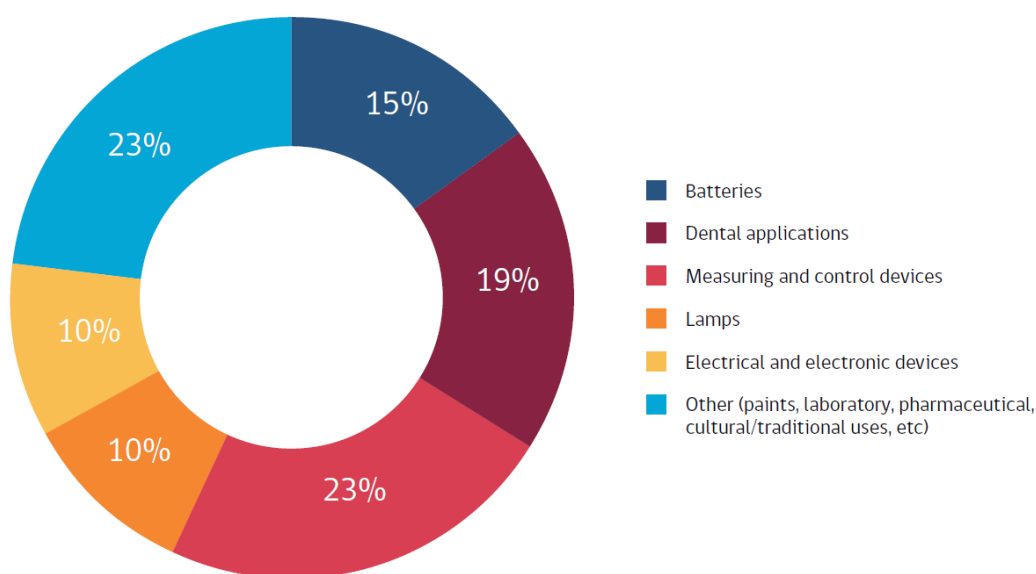


Source: JJ Harrison (<https://www.jjharrison.com.au/>)

## 1.2 GLOBAL MERCURY TRADE

Mercury is used in a wide variety of industrial activities such as artisanal and small-scale gold mining (ASGM), vinyl chloride monomer (VCM) production, measuring and control devices, industrial products, chlor-alkali production, dental amalgams and batteries (UNEP 2019). Approximately 57% of the world's mercury consumption is used in the sectors corresponding to the manufacture of measuring and control instruments, dental applications and in the manufacture of batteries[2].

Figure 1.2. Global Mercury consumption by sector, products (2015)



Although the Global Mercury Market is dynamic and dependent on variations in the global economy, since 2013 there has been a decrease in the supply of mercury from chlor-alkali industry, this may be due to the restrictions that have been introduced to its export as a result of the implementation of the Minamata Convention.

Table 1.1. Global Mercury Supply

Mercury Source	Min.Mercury Supply (tonnes)	Max.Mercury Supply (tonnes)
Primary (mined) mercury	1630	2150
By-products mercury	440	775
Chlor-alkali residual mercury	370	450
Mercury recycling	1040	1410
<b>Total Supply</b>	<b>3,480</b>	<b>4,785</b>

Source: Global mercury supply, 2015 (UNEP 2017, p.21)

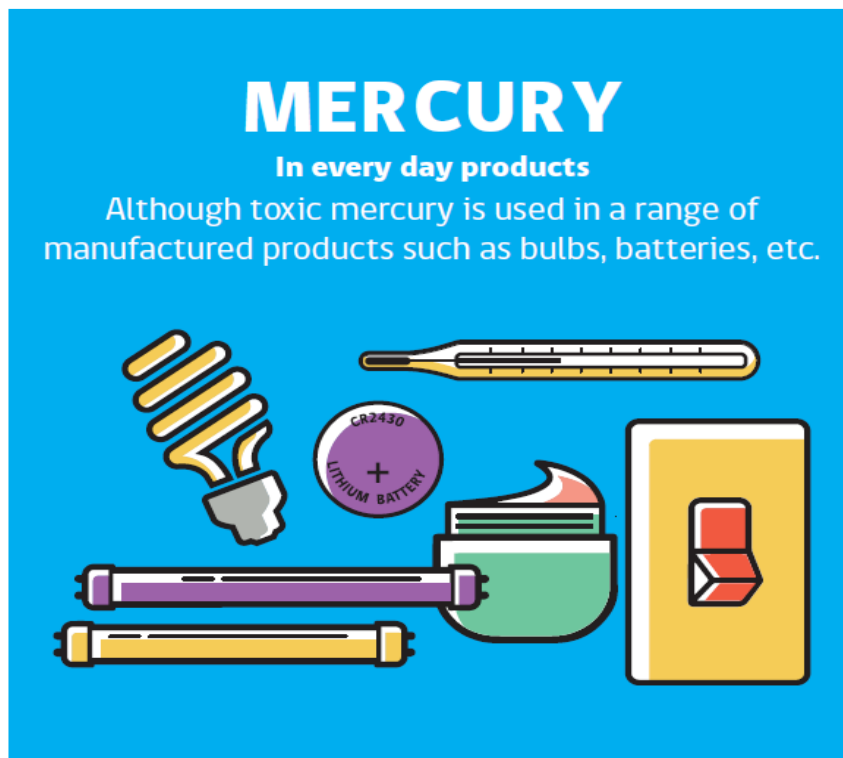
## 2. PRODUCTS WITH ADDED MERCURY

A large number of traditional products make use of mercury's properties to support their function. The major products groups in which mercury is added intentionally are thermometers, fluorescent light bulbs, some battery types, some traditional types of electrical switches, and traditional manometers and pressure gauges[3].

The mercury contained in these products can be released to the environment in the following stages of the life cycle of these products:

1. During production of these products depending on how closed manufacturing systems are, and on the handling and workplace procedures in the individual production units;
2. By breakage of a product (to air, water, soil) during use;
3. During disposal of the products after their use (directly to soil, to landfills or waste incineration and subsequently to water and air), closely depending on types and efficiency of employed waste collection and handling procedures.





Figure 2.1. Mercury in everyday products [4].



## 2.1 LAMPS (LIGHT SOURCES WITH MERCURY)


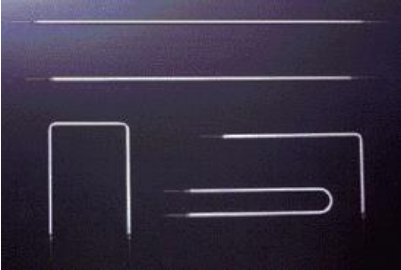



Mercury is used in small amounts per lamp in a number of different types of discharge lamps, with fluorescent tubes and compact fluorescent lamps (CFLs) as the most common examples. Other light sources reported to contain mercury include: high-pressure mercury vapour lamps, high-pressure sodium lamps, UV light for tanning, metal halide lamps, specialty lamps for chemical analysis, and backlights for computer and TV flat-screens.






**Table 2.1. Light sources with mercury [5]**

Type	Product	Example of products in which the products in the left column are used and assembled
<p>Fluorescent lamps including straight tube type, circular type, square type, compact type, and self-ballasted type</p>	<p style="text-align: center;">Straight tube type (10 – 20W)</p>  <p style="text-align: center;">Circular type</p>  <p style="text-align: center;">Square type</p>  <p style="text-align: center;">Compact type (Not more than 27W)</p> 	<p>General lighting equipment</p>

Type	Product	Example of products in which the products in the left column are used and assembled
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<p>Fluorescent lamps including straight tube type, circular type, square type, compact type, and self-ballasted type</p>	<p style="text-align: center;">Self-ballasted type</p> 	<p>General lighting equipment</p>
<p>Cold Cathode Fluorescent Lamps (CCFL) and External Electrode Fluorescent Lamps (EEFL)</p>	<p style="text-align: center;">CCFL and EEFL</p>  <p>Note: CCFL and EEFL are disposed of as assembled into products such as liquid crystal display televisions.</p>	<p>Liquid crystal display televisions, liquid crystal displays, scanners, copiers, car navigation equipment</p>
<p>Fluorescent lamps including straight tube type, compact type, electrodeless fluorescent type, and specially shaped type straight tube type</p>	<p style="text-align: center;">For general lighting purposes (4-8W) (30-110W)</p>  <p>Lamps for cleaning rooms of semiconductor factories</p>  <p style="text-align: center;">Black lights</p> 	<p><u>For general lighting purposes</u></p> <p>General lighting equipment</p> <p><u>For special purposes</u></p> <p>Lighting for art museums and museums, lighting for goods and food display, fluorescent lighting, insect traps, medical devices, tanning machines, lighting for semiconductor factories, lighting for agricultural cultivation facilities such as glass greenhouses, printing machines for diazo papers and blueprint sensitized papers, emergency lights, guiding lights, aeronautical lights</p>

Type	Product	Example of products in which the products in the left column are used and assembled
<p>Fluorescent lamps including straight tube type, compact type, electrodeless fluorescent type, and specially shaped type Straight tube type</p>	<p style="text-align: center;">Color lamps</p>  <p style="text-align: center;">Compact type fluorescent lamps (equal to or more than 28W) (The first alphabet of the item number is "F".)</p>  <p style="text-align: center;">Electrodeless fluorescent lamps</p> 	<p><u>For general lighting purposes</u></p> <p>General lighting equipment</p> <p><u>For special purposes</u></p> <p>Lighting for art museums and museums, lighting for goods and food display, fluorescent lighting, insect traps, medical devices, tanning machines, lighting for semiconductor factories, lighting for agricultural cultivation facilities such as glass greenhouses, printing machines for diazo papers and blueprint sensitized papers, emergency lights, guiding lights, aeronautical lights</p>
<p>HID lamps such as high-pressure mercury lamps, metal-halide lamps, high pressure solid lamps, and mercury-xenon lamps (including medium pressure and ultra-high pressure lamps)</p>	<p style="text-align: center;">HID lamps for general lighting purposes</p> <p style="text-align: center;">High pressure mercury lamps</p>  <p style="text-align: center;">High pressure mercury lamps (ballastless)</p> 	<p><u>For general lighting purposes</u></p> <p>Lighting for road, park, stadium, and gymnasium, portable lighting</p> <p><u>For special purposes</u></p> <p>Lighting for art museums and museums, lighting for goods and food display, medical devices, tanning machines, lighting for squid fishing, fluorescent microscopes, ultraviolet curing/drying/bonding apparatus, semiconductor inspection apparatus, DNA analysis devices, semiconductor exposure apparatus, printed board exposure apparatus, headlight units (for automobiles, motorcycles, agricultural tractors, and railway vehicles), working lights (machines for construction and agriculture), sign lights, projectors, aeronautical</p>

Type	Product	Example of products in which the products in the left column are used and assembled
<p>HID lamps such as high-pressure mercury lamps, metal-halide lamps, high pressure sodium lamps, and mercury-xenon lamps (including medium pressure and ultra-high-pressure lamps)</p>	<p style="text-align: center;">Metal-halide lamps</p>  <p style="text-align: center;">High pressure sodium lamps</p>  <p style="text-align: center;">HID lamps for industrial use</p> <ul style="list-style-type: none"> <li>- Ultra-high-pressure UV lamps</li> </ul>  <ul style="list-style-type: none"> <li>- Lamps for projectors</li> </ul> 	<p><u>For general lighting purposes</u></p> <p>Lighting for road, park, stadium, and gymnasium, portable lighting</p> <p><u>For special purposes</u></p> <p>Lighting for art museums and museums, lighting for goods and food display, medical devices, tanning machines, lighting for squid fishing, fluorescent microscopes, ultraviolet curing/drying/bonding apparatus, semiconductor inspection apparatus, DNA analysis devices, semiconductor exposure apparatus, printed board exposure apparatus, headlight units (for automobiles, motorcycles, agricultural tractors, and railway vehicles), working lights (machines for construction and agriculture), sign lights, projectors, aeronautical lights, landscape lighting, stage lighting</p>

Type	Product	Example of products in which the products in the left column are used and assembled
<p>HID lamps such as high-pressure mercury lamps, metal-halide lamps, high pressure solid lamps, and mercury-xenon lamps (including medium pressure and ultra-high pressure lamps)</p>	<p>Lamps for stage lighting</p>  <p>Lamps for floodlighting</p>  <p>Mercury-xenon lamps</p> 	<p><u>For general lighting purposes</u></p> <p>Lighting for road, park, stadium, and gymnasium, portable lighting</p> <p><u>For the special purposes</u></p> <p>Lighting for art museums and museums, lighting for goods and food display, medical devices, tanning machines, lighting for squid fishing, fluorescent microscopes, ultraviolet curing/drying/bonding apparatus, semiconductor inspection apparatus, DNA analysis devices, semiconductor exposure apparatus, printed board exposure apparatus, headlight units (for automobiles, motorcycles, agricultural tractors, and railway vehicles), working lights (machines for construction and agriculture), sign lights, projectors, aeronautical lights, landscape lighting, stage lighting</p>
<p>Low pressure mercury lamps other than fluorescent lamps including ultra violet radiation lamps, hollow cathode lamps, penray lamps, and electrodeless discharge lamps)</p>	<p>Germicidal lamps</p>  <p>Low pressure ultraviolet lamps</p>  <p>Ultraviolet radiation lamps</p>	<p>Food production lines, water sterilizers, tanning machines, surface of glass plate for semiconductors and liquid-crystal displays, rinse.</p> <p>Water recycling equipment, ultrapure water making machines, ultraviolet curing apparatus, sterilizers, cleaners for decontamination of equipment, mercury measuring devices, atomic absorption photometry, atomic fluorospectro-photometers, TOC meters, measuring devices for the environmental monitoring (including total nitrogen meters, total phosphorus meters, ultraviolet absorption spectrophotometers, water contamination analyzers, and ozone concentration meters), emission spectrophotometric analyzers, high-performance liquid</p>

		<p>chromatography, ultraviolet visible spectrophotometry</p>
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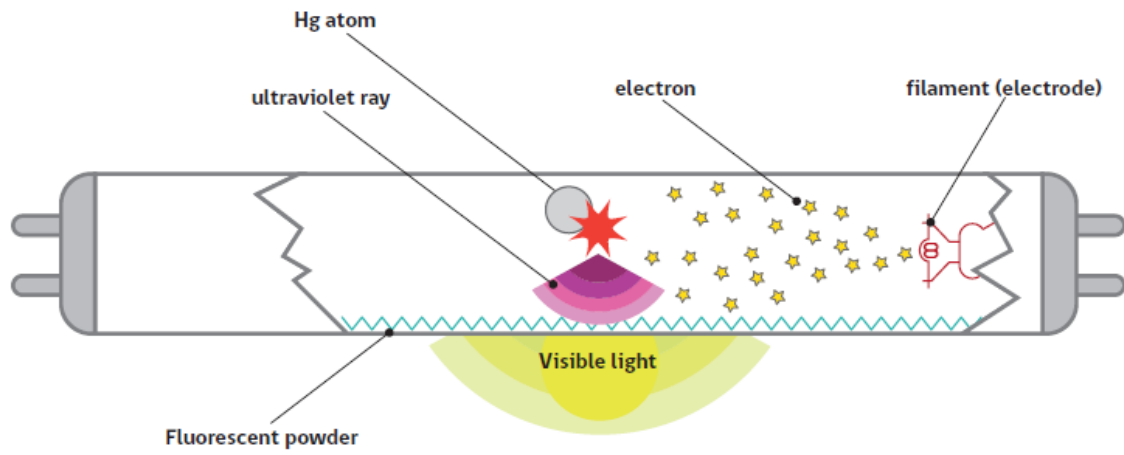
Type	Product	Example of products in which the products in the left column are used and assembled
<p>Low pressure mercury lamps other than fluorescent lamps including ultra violet radiation lamps, hollow cathode lamps, penray lamps, and electrodeless discharge lamps)</p>	<p>Mercury-xenon lamps</p>  <p>— Pen-ray lamps</p> 	<p>Food production lines, water sterilizers, tanning machines, surface of glass plate for semiconductors and liquid-crystal displays, rinse.</p> <p>Water recycling equipment, ultrapure water making machines, ultraviolet curing apparatus, sterilizers, cleaners for decontamination of equipment, mercury measuring devices, atomic absorption photometry, atomic fluorospectro-photometers, TOC meters, measuring devices for the environmental monitoring (including total nitrogen meters, total phosphorus meters, ultraviolet absorption spectrophotometers, water contamination analyzers, and ozone concentration meters), emission spectrophotometric analyzers, high-performance liquid</p>

Figure 2.2. Example of the mercury use in a fluorescent lamp.







Source: <http://nkcl.jp/mercury/mercury-in-products/>


## 2.2 ELECTRICAL SWITCHES AND RELAYS WITH MERCURY

Mercury has been used (and continues to be used) in a variety of electrical switches and relays. In some economies mercury in electrical components has been phased out and substituted by alternative non-mercury materials. However, the status and extent of substitution probably varies considerably between economies. Moreover, regardless of status of substitution, mercury switches and relays will likely be present in waste for years to come due to very long service life of these items.

**Table 2.2. Electrical switches with mercury [5]**

Type	Product	Example of products in which the products in the left column are used and assembled
Electrical Switches and relays	Inclination switches 	<ul style="list-style-type: none"> <li>• Outdoor gas fan heaters</li> <li>• Medical devices (equipment for peritoneal dialysis)</li> </ul>
	Temperature switches 	Temperature sensors for petrochemical plants “A typical use is in a thermostat. A glass mercury switch is mounted to a bimetallic spring which expands and contracts with temperature.”
	Electronic acceleration switches (G sensors) 	Seismoscopes
	Overcurrent protection switches 	Large-scale industrial equipment including railway vehicles, air-conditioners in commercial facilities, outdoor fan heaters, ultraviolet medical treatment devices, and mercury rectifiers
	Switches and relays for measurement, control, and transmission	Electronic measuring instruments, monitoring and control equipment, noise simulators, signal generators, signal switches, medical






		devices (such as laser surgery devices, sterilizers, and dental units), modem, remote control and supervisory equipment, automatic system switching equipment, automatic train stop
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### 2.3 MEASURING DEVICES (EXCEPT FOR MEDICAL AND HOUSEHOLD USE)

Mercury thermometers have traditionally been used for most medium temperature range measurements. Today they are increasingly substituted by electronic and other thermometer types, but the degree of substitution probably varies among economies. Major remaining uses are medical thermometers (body temperature in hospitals, households, etc.), in chemical laboratories, ambient air temperature thermometers, in controls of some machines (large diesel engines) and industrial equipment. Mercury thermometers may contain between approximately 0.6 and several 100 grams of Hg/unit, depending on the type of thermometer.

**Table 2.3. Measuring devices with mercury [5]**

Type	Product	Example of products in which the products in the left column are used and assembled
Mercury thermometers	Double-pipe precisión Thermometers 	Diesel engines, medical devices (gas sterilizers), pycnometers, flashing point testers
Mercury thermometers	Mercury-filled pressure thermometers 	Diesel engines, machines for chemical fibers and chemical resin fibers, molding machines of gas generators
	Assmann psychrometers 	Assmann psychrometers




<p>Mercury hydrometers</p>	<p>Mercury column manometers</p> 	<p>Machines for chemical fibers and chemical resin fibers, resin injection molding machines</p>
<p>Mercury manometers</p>	<p>Diaphragm manometers for high temperature</p> 	
<p>Electric diaphragm transmitters for high temperature</p>		<p>Machines for chemical fibers and chemical resin fibers, resin film and sheet manufacturing equipment, resin material and synthetic rubber manufacturing equipment</p>
<p>Mercury coulometers</p>		
<p>Float type densitometers</p>		

Mercury Tensiometer		The Mercury Tensiometer is particularly well suited for lighter or semi-heavy soils and/or water-sensitive crops because of its extreme rapid responses to changes in water-availability. The Mercury Tensiometer is also very accurate and provides refined reading values.”
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## 2.4 DENTAL MERCURY-AMALGAM FILLINGS

Dental amalgam fillings consist of an alloy of mercury, silver, copper and tin (typically about 44-51% mercury by weight). The alloy is typically supplied to the dentists either: 1) as pure mercury along with a powder mix of the other metals, which are weighed and mixed in an agitator in the clinic; or 2) as small capsules where mercury and the metal powder are present in the right formula and only need to be mixed (in the capsule before opening) in the clinic, prior to filling the cavity in the tooth. Other variants of the same principles may occur.






**Table 2.4. Dental mercury-amalgam [5].**

Type	Product	Example of products in which the products in the left column are used and assembled
Dental amalgam		Dentistry

## 2.5 BATTERIES WITH MERCURY

The use of mercury in various types of batteries has been extensive and it has been among the largest product uses of mercury. Mercury has mainly - or perhaps solely - been used in primary (that is, non-rechargeable) batteries. Mercury is used in high concentrations (about 30-32% w/w) in mercury oxide batteries (sometimes called zinc-mercury batteries). In other battery types, any mercury use is usually in lower concentrations. The use of mercury in other batteries has been gradually reduced over the last decades in global brands, but may be still used in some national/regional brands. Button-cell shaped batteries of alkaline, silver oxide, and zinc/air types normally still contain mercury in most cases, though mercury-free alternatives are now available. Note that besides plain battery sales, batteries may be imported and exported in substantial amounts in the package of other products like electronics, toys, greeting cards with sounds, etc.

**Table 2.5. Batteries with mercury [5]**

Type	Product	Example of products in which the products in the left column are used and assembled
Batteries	Alkali button batteries (The first two alphabets of the item number are “LR” among button cells.) 	Quartz clocks (watch, clock), toys, pedometers, calculators, crime prevention buzzers, timers, household remote controllers, lightning ornaments and shoes, small lights, medical devices such as digital thermometers
	Silver-oxide batteries (The first two alphabets of the item number are “SR”.) 	Quartz clocks (watch), medical devices such as digital thermometers
	Zinc-air batteries (The first two alphabets of the item number are “PR”, or those have an air hole.) 	Hearing aids, pagers
	Mercury batteries (The first two alphabets of the item number are “NR” or “MR”.) 	Hearing aids, exposure meters of silver halide camera
	Dry cells 	Imported toys

## 2.6 COSMETICS AND RELATED PRODUCTS

Mercury has been used in skin lightening creams, soaps, and as preservatives in some eye cosmetics. These products are rare or non-existent in some economies. The production

and use has decreased significantly in the developed economies over the past decades. However, in other economies production and use continue.

Mercury is used in cosmetics as a skin lightening agent and preservative. Cosmetics with mercury are often marketed as skin lightening creams and anti-aging treatments that remove age spots, freckles, blemishes and wrinkles. Adolescents sometimes use these products as acne treatments[7].

Manufacturers selling products that contain mercury often do not label their products appropriately. Companies that do so may use any of the following names: mercury, Hg, mercuric iodide, mercurous chloride, ammoniated mercury, amide chloride of mercury, quicksilver, cinnabaris (mercury sulfide), hydrargyri oxydum rubrum (mercury oxide), or mercury iodide. Directions to avoid contact with silver, gold, rubber, aluminum, and jewelry could also indicate the presence of mercury. Marketers of these products tend to target the Asian, African, Latino and Middle Eastern communities.

The FDA banned the use of mercury in most cosmetics at levels higher than 1 ppm in 1973. The agency has investigated skin lightening creams and also created an import alert for skin whitening creams containing mercury, which allows FDA agents to detain certain products at the border.

**Table 2.6. Skin creams with mercury [5]**

Type	Product	Example of products in which the products in the left column are used and assembled
Skin creams		Skin lightening creams and soaps



## 2.7 MEASURING DEVICES (FOR MEDICAL AND HOUSEHOLD USE)

Mercury has been widely used in medicine in instruments for measuring temperature and blood pressure such as thermometers and sphygmomanometers. Currently, this type of instrument is still being used, especially in developing economies.

There are two general types of mercury thermometers that measure body temperature: Oral/

rectal/baby thermometers, containing about 0.61 grams of mercury. Basal temperature thermometers (used to track slight changes in body temperature), containing about 2.25 grams of mercury[13].


**Table 2.7. Measuring devices with mercury for medical and household use [5]**

Type	Product	Example of products in which the products in the left column are used and assembled
Measuring devices for medical and household use)	Mercury thermometers 	Thermometers
	Mercury sphygmomanometers 	Sphygmomanometers

## 2.8 PHARMACEUTICAL PRODUCTS

Mercury has been used in pharmaceutical products as a preservative to extend the life of these products. And in some cases mercury was used as a treatment for certain types of diseases.

**Table 2.8. Pharmaceutical products with mercury [5]**

Type	Product	Example of products in which the products in the left column are used and assembled
Pharmaceutical products containing mercury (II) chloride	Pharmaceutical products including merbromin 	Products containing merbromin (adhesive plaster) Used as Merbromin solution

## 2.9 BIOCIDES AND PESTICIDES

Many mercury compounds are toxic to microorganisms, and so these compounds have been used in biocides in paper industry and on seed grain and other agricultural applications. These uses have been discontinued or banned in many economies.


## 2.10 PAINTS AND VARNISHES

Phenyl mercuric acetate (PMA) and similar mercury compounds were formerly widely added as biocide to water based paints and may still be used in some economies. These compounds were used to extend shelf-life by controlling bacterial fermentation in the can (in-can preservatives) and to retard fungus attacks upon painted surfaces under damp conditions (fungicides).

## 2.11 POLYURETHANE WITH MERCURY CATALYSTS

Polyurethane elastomer products are used for a wide range of end-products including rollers, flooring, gaskets, encapsulation of electronic components, shoe soles, shock absorption and repair of industrial installations. Without chemical analysis, it can be hard to distinguish mercury containing from mercury-free elastic polyurethane (also called PU or PUR), so importers and producers need to be asked, if more detailed estimates are desired

**Table 2.11. Polyurethane elastomer products [5]**

Type	Product	Example of products in which the products in the left column are used and assembled
Polyurethane elastomer products	Pharmaceutical products including merbromin 	Rollers, flooring, gaskets, encapsulation of electronic components, shoe soles, shock absorption and repair of industrial installations

## 2.12 LABORATORY CHEMICALS AND EQUIPMENT

Mercury is used in laboratories in instruments, reagents, preservatives, and catalysts. Some of this mercury is released to air, primarily through lab vents. However, most of the mercury may be released in wastewater or disposed of as hazardous waste or municipal waste. The total use of mercury for laboratory purposes is probably very low when compared with the quantity of other chemicals. Mercury may have been substituted in some of the equipment and for some of the mentioned analytical methods. Some standard analyses seem, however, difficult to substitute in practice - even though substitutes are in many cases available – because standards are there to improve reproducibility of the analysis practices and therefore favour the well-known, and they are often also required in public regulation.

**Table 2.12. Laboratory chemicals with mercury [5]**

Type	Product	Example of products in which the products in the left column are used and assembled
Laboratory reagents		Laboratory reagents to research and educational activities

## 2.13 OTHER PRODUCTS WITH MERCURY ADDED

There is a wide variety of other products for industrial and domestic use that contain added

mercury and that are still used today. A general detail of these products is given on the following page.

**Table 2.13. Other products with mercury added [5]**

Type	Example of products in which the products in the left column are used and assembled
Mirrors for large telescopes	Equipment for astronomy
Rotary connectors	Production equipment, aeronautical lights
Mercury ion frequency standards**	Electronic measuring devices (signal generators and frequency meters)
Infrared detectors (those mercury, cadmium, and tellurium are mixed)	Electronic measuring devices including thermometers and densitometers, thermal image display devices, night vision devices, infrared spectrophotometers, Fourier transform infrared spectrophotometers

Gyrocompasses	Ships
Strain gauge sensors	Plethysmographs
Cumulative energizing time indicators	Medical devices
Radiation detectors	X-ray sensors
Mercury diffusion pumps	Vacuum chambers
Pressure relief devices	Pressure containers
Vermillion (pigment)	Vermillion inkpads
Jewelry	Gold and silver necklace, rings and earrings







### 3. PRODUCTS WITHOUT MERCURY

Mercury-free products are more environmentally friendly and fulfill the same technical function as those products that do have added mercury. The use of mercury-free products eliminates the risk of exposure and the health effects of the people that mercury can cause.

Although in some cases it may happen that these products are slightly more expensive than those that do contain mercury. The reduction of environmental impacts and risks to the health of people should be an incentive to use this type of mercury-free products.

Table 3.1. Examples of mercury free products

Product	Example
Aneroid barometer	 A circular aneroid barometer with a white face, black markings, and a black needle, mounted on a gold-colored base.
Aneroid sphygmomanometer	 A blue aneroid sphygmomanometer with a black cuff and a black tube connected to a small circular gauge.
Mercury-free dental fillings	 A close-up photograph of a person's teeth showing several white, tooth-colored dental fillings.
Digital thermometer	 Three digital thermometers with white bodies and colored tips (green, blue, and pink).

<p>Digital barometer</p>	
<p>Digital manometer</p>	
<p>LED Light Bulbs</p>	
<p>Lithium button-cell batteries</p>	
<p>Cylindrical alkaline batteries</p>	

## 4. INTERNATIONAL REGULATION ON MERCURY PRODUCTS

### 4.1 MINAMATA CONVENTION

In 2003, the Governing Council of UNEP decided that there was sufficient scientific evidence on the harmful consequences of mercury worldwide, which justified the adoption of measures to revert their effects at the global level. On January 19, 2013, 140 governments agreed on the text of this Multilateral Environmental Agreement whose objective is to protect human health and the environment from the adverse effects of anthropogenic emissions and releases of mercury and mercury compounds. The Convention entered into force on August 16, 2017 and to date has been signed by 128 economies and ratified by 114 economies (as of September 2019).

### 4.2 MATTERS REGULATED BY THE MINAMATA CONVENTION

The Minamata Convention addresses all the aspects and activities associated with mercury that can generate impacts on the environment and human health. The highlights of the Convention include i) the prohibition of new mercury mines, ii) the phasing out of existing mines, iii) the reduction of the use of mercury in a series of products and processes (eg in ampoules, batteries, paints and cosmetics), iv) the promotion of measures to control emissions to the atmosphere and releases to water and soil (such as those produced by coal-fired thermoelectric plants), v) the environmentally sound interim storage of mercury as a commodity and its disposal once it becomes waste; vi) contaminated mercury sites; and vii) other sanitary issues.

### 4.3 PRODUCTS WITH ADDED MERCURY

The Minamata Convention establishes in Article 4 that each party must take actions to not allow the manufacture, import and export of products with added mercury that are listed in Part I of Annex A of the agreement. Below are the products with added mercury that are regulated by the agreement.

**Table 4.1. Products subject to Article 4, paragraph 1[11]**

<b>Mercury-added products</b>	<b>Date after which the manufacture, import or export of the product shall not be allowed (phase-out date)</b>
Batteries, except for button zinc silver oxide batteries with a mercury content < 2% and button zinc air batteries with a mercury content < 2%	
Switches and relays, except very high accuracy capacitance and loss measurement bridges and high frequency radio frequency switches and	

relays in monitoring and control instruments with a maximum mercury content of 20 mg per bridge, switch or relay	2020
Compact fluorescent lamps (CFLs) for general lighting purposes that are $\leq 30$ watts with a mercury content exceeding 5 mg per lamp burner	
Linear fluorescent lamps (LFLs) for general lighting purposes: (a) Triband phosphor $< 60$ watts with a mercury content exceeding 5 mg per lamp; (b) Halophosphate phosphor $\leq 40$ watts with a mercury content exceeding 10 mg per lamp	
High pressure mercury vapour lamps (HPMV) for general lighting purposes	
Mercury in cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for electronic displays: (a) short length ( $\leq 500$ mm) with mercury content exceeding 3.5 mg per lamp (b) medium length ( $> 500$ mm and $\leq 1\ 500$ mm) with mercury content exceeding 5 mg per lamp (c) long length ( $> 1\ 500$ mm) with mercury content exceeding 13 mg per lamp	
Cosmetics (with mercury content above 1ppm), including skin lightening soaps and creams, and not including eye area cosmetics where mercury is used as a preservative and no effective and safe substitute preservatives are available	
Pesticides, biocides and topical antiseptics	
The following non-electronic measuring devices except nonelectronic measuring devices installed in large-scale equipment or those used for high precision measurement, where no suitable mercury-free alternative is available: A. barometers; B. hygrometers; C. manometers; D. thermometers; E. sphygmomanometers	

**Table 4.2. Products subject to Article 4, paragraph 3[11]**

Mercury-added products	Provisions
Dental amalgam	<p>Measures to be taken by a Party to phase down the use of dental amalgam shall take into account the Party's domestic circumstances and relevant international guidance and shall include two or more of the measures from the following list</p> <ul style="list-style-type: none"> <li>A. Setting national objectives aiming at dental caries prevention and health promotion, thereby minimizing the need for dental restoration;</li> <li>B. Setting national objectives aiming at minimizing its use;</li> <li>C. Promoting the use of cost-effective and clinically effective mercury free alternatives for dental restoration;</li> <li>D. Promoting research and development of quality mercury-free materials for dental restoration;</li> <li>E. Encouraging representative professional organizations and dental schools to educate and train dental professionals and students on the use of mercury-free dental restoration alternatives and on promoting best management practices;</li> <li>F. Discouraging insurance policies and programmes that favour dental amalgam use over mercury-free dental restoration;</li> </ul>

	<p>G. Encouraging insurance policies and programmes that favour the use of quality alternatives to dental amalgam for dental restoration;</p> <p>H. Restricting the use of dental amalgam to its encapsulated form;</p> <p>I. Promoting the use of best environmental practices in dental facilities to reduce releases of mercury and mercury compounds to water and land.</p>
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Figure 4.1. Mercury in products [4].

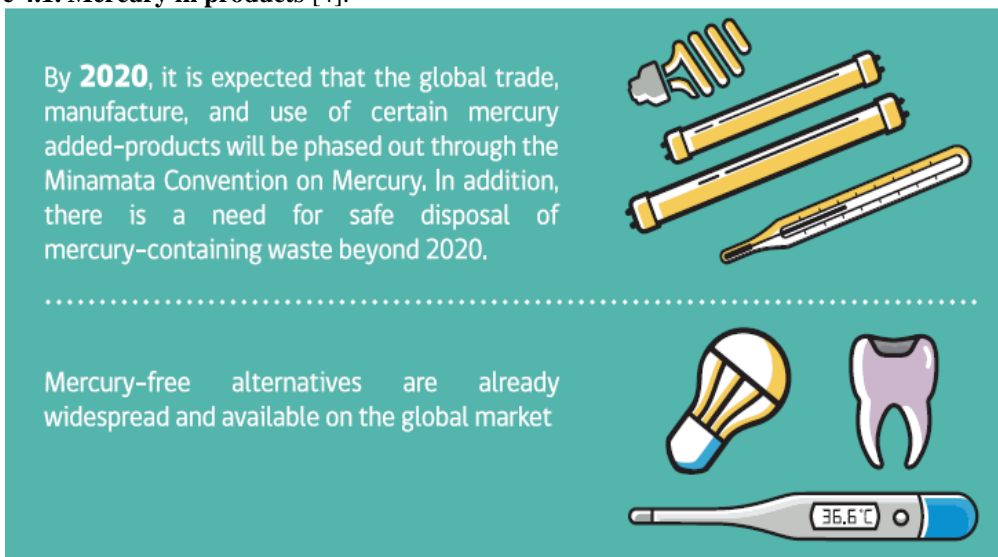
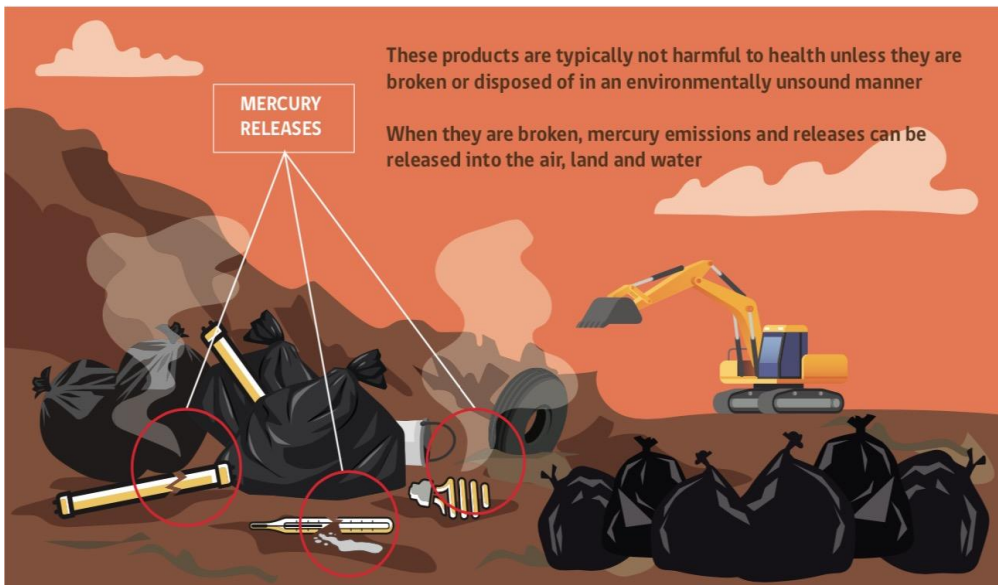


Figure 4.2. Mercury releases [4].



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## 6. ABBREVIATIONS AND ACRONYMS

CFLs:	Compact Fluorescent Lamps
CCFLs:	Cold Cathode Fluorescent Lamps
EEFL:	External Electrode Fluorescent Lamps
EPA:	Environmental Protection Agency
FDA:	Food and Drugs Agency
LED:	Light-emitting diode
LFLs:	Linear Fluorescent Lamps
PPM:	Parts per million
UN:	United Nations
UNDP:	United Nations Development Programme
USGS:	United States Geological Service
UV:	Ultra Violet Light
W:	Watts
W/W:	Weight of solute/weight of solvent
WHO:	World Health Organization