

Let's all aim for a mercury-free society!

# LEARNING FOR THE FUTURE

Minimize the use of  
products containing mercury  
and properly dispose  
of used products.

Ultimately, create a society where  
mercury is no longer used.  
That is mercury-free.



熊本県

Kumamoto Prefecture

# : A Message from Minamata



## “Lessons Learned from History” as Learnings for the Future

### Kumamoto Prefectural Minamata High School



#### Minamata High School's “Learning About Mercury” Initiatives

At Minamata High School, students have been engaged in mercury-related inquiry activities during the “Comprehensive Research Time” program launched in 2022. Starting in 2025, the school has introduced new off-campus learning experiences focused on studying the history of Minamata’s industrial development.

All first-year students visited the ruins of the Sogi Power Plant (Kagoshima Prefecture), which led to the establishment of Chisso Corporation (Minamata Plant), the company responsible for causing Minamata disease. There, they learned about the plant’s mechanisms and the circumstances surrounding its founding. They also visited the Minamata Manufacturing Plant of JNC Corporation, which succeeded Chisso’s operations, deepening their understanding of the current environmentally-conscious manufacturing processes.

Additionally, second-year students who selected mercury as their research theme are advancing their studies from a specialized perspective based on scientific analysis. This includes measuring mercury concentrations in fish caught in Minamata Bay, with cooperation from the National Institute for Minamata Disease (Minamata City)—the world’s only research institution dedicated to Minamata disease and mercury. The results of our inquiry-based activities have been presented not only within the school but also at research conferences hosted by academic organizations, where they have achieved outstanding results.

#### Participation in the Youth Program at the Sixth Conference of the Parties to the Minamata Convention on Mercury (COP6)

Furthermore, since 2021, Minamata High School has participated in the

“Youth Dialogue on Mercury,” an online event hosted by the Ministry of the Environment to exchange views with young people worldwide, including foreign high school and university students. Through this program, the school has engaged in repeated discussions. This achievement was recognized, and in November 2025, two students participated in the Youth Program at the Sixth Conference of the Parties to the Minamata Convention on Mercury (COP6) held in Geneva, Switzerland.

Two students had the opportunity to hear a detailed talk from Masami Ogata, Chairman of the Minamata Disease Museum Storytellers' Association, about his personal experiences and thoughts on the Minamata Convention. After deepening their understanding, they departed for the site.

At the event, we presented survey results on young people’s awareness of mercury during two presentation sessions. We conveyed to the world the need for initiatives to foster accurate understanding of Minamata disease and raise awareness about mercury. And we received enthusiastic applause from participants worldwide.

#### The Future of Minamata High School

Students at Minamata High School, the only high school in Minamata City, continue to learn about Minamata disease and mercury. They will carry forward the lessons learned, armed with accurate knowledge, into the future.

They will disseminate the results of our learning about mercury to the world and to the future. Soar high, Minamata High School students!!

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Minamata High School, founded in 1911, is a historic high school that has undergone several reorganizations and mergers before opening at its current location in 2012. As Minamata City’s only high school committed to environmentally conscious community development as an “SDGs Future City,” it places strong emphasis on environmental inquiry-based activities.

# From the Past to the Future



We believe that our experiences and suffering will lead to the happiness of people around the world through the Minamata Convention.

Masami Ogata



I believe the Minamata Convention is being challenged not only by the superficial issue of mercury reduction.

Is it not the human heart that is being questioned—the heart that cannot honestly admit its mistakes, the heart that does not consider the wounded and dying as family, the heart that seeks to forget and erase the countless lives taken—the people who fell without even raising their voices, the many children who should have been born into this world, the fish, the birds, and so many other lives stolen? Based on that reflection, through the Minamata Convention, we ourselves wish to promise you that we will never repeat such mistakes—not only regarding mercury, but concerning everything that lies behind our prosperity.

My life was profoundly altered by encountering the tragic Minamata disease. Yet, through the efforts of those responsible, the government, society, my own perseverance, and the support of countless people who have stood by me, I continue to live feeling true happiness for me.

This is my message to you all.

Many painful and sorrowful events contain seeds of happiness within them. Whether one recognizes this or not profoundly shapes their life. There is only one condition for recognizing it: facing the events head-on.

I believe our experiences and suffering will contribute to the happiness of people worldwide through the Minamata Convention. And as one human being, I pledge to share the lessons of Minamata disease with people across the globe.

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Masami Ogata / Born December 28, 1957. Applied for medical benefits under the government's 1996 final settlement plan but was deemed ineligible. Despite rejections of Minamata disease certification, he filed appeals and administrative review requests, and was finally certified as a Minamata disease patient in 2006. Became a "storyteller" at the Minamata City Minamata Disease Museum in September 2007. Served as Chairperson of the Minamata Disease Museum Storytellers' Association from April 2013. Operates a joinery shop. Certified as a Minamata City Environmental Meister in 2011. In 2018, he was certified as a national "Manufacturing Meister" and is also working to pass on his skills to younger generations. Resides in Tsukinoura, Minamata City.



# Toward a Mercury-Free Society (Kumamoto Prefecture's Initiatives)

Kumamoto Prefecture that experienced the severe environmental disaster known as Minamata disease, has continued to convey to the world the difficulty of restoring a destroyed environment and the preciousness of life and health. In 2013, at the opening ceremony of the Minamata Convention Diplomatic Conference, Governor Kabashima (at the time) announced the “Mercury-Free Kumamoto Declaration,” clearly demonstrating the prefecture’s commitment to realizing a society independent of mercury. Since this declaration, Kumamoto Prefecture has advanced various initiatives. While opportunities for exposure to mercury in daily life have significantly decreased within Japan, the proper disposal of mercury-containing products and contributing to international mercury countermeasures remain important challenges that should be sustained going forward.

## Kumamoto Prefecture's Key Initiatives Toward a Mercury-Free Society

### Study Group on Reducing Mercury Use and Collecting and Treating Mercury Waste (FY2014)



A proposal document outlining matters that each entity should address regarding the reduction of mercury-containing products and the collection and treatment of mercury-containing waste was compiled (February 2015).

### Promoting the Proper Disposal of Mercury-Containing Waste

- ◎Mercury-Containing Product Collection Program (Collection of mercury-containing products stored at prefectural and municipal facilities)
- ◎Training sessions for municipalities and businesses, and lectures for residents
- ◎Supervision and guidance of mercury-containing waste treatment facilities (facility inspections, verification of treatment status, analysis of working environments, etc.)

### Support for Training Overseas Mercury Experts

- ◎Scholarship and other support for international students conducting mercury research at the joint graduate school of the Kumamoto Prefectural University and the National Institute for Minamata Disease

### Information dissemination domestically and internationally

- ◎Information dissemination via panels, flyers, etc.
- ◎Diplomatic conference anniversary events
- ◎Outreach lectures for junior high and high school students,

### Proactive Measures by the Prefecture

- ◎Introduction of LED lighting in prefectural facilities, roads, tunnels, etc.
- ◎To prevent mercury from being exported, the prefecture will, in cooperation with Kumamoto City, purchased an amount of mercury equivalent to that extracted from fluorescent tubes and other products collected within the prefecture until the fiscal year preceding 2020 (FY2019), when the import and export of mercury-containing products will be prohibited in principle under the Minamata Convention.



▲Courtesy Visit by Foreign Students Conducting Mercury Research to the Governor of Kumamoto Prefecture

▼Kumamoto Prefecture's Mercury-Free Promotion Awareness Flyer

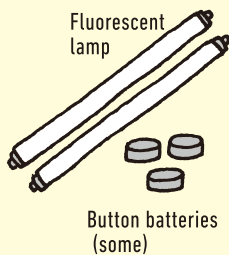


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## A step toward a mercury-free society we can take

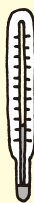
### Learn, reduce, and dispose properly!

1 Use mercury-containing products correctly



Fluorescent lamp

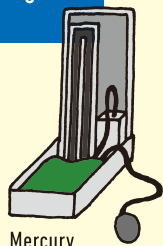
Button batteries (some)



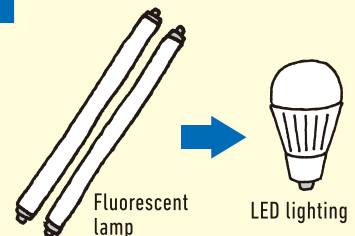
Mercury thermometer

2 Reduce the use of products containing mercury

3 Properly dispose of products containing mercury.



Mercury sphygmomanometer



Fluorescent lamp

LED lighting

When disposing of these items, proper disposal in accordance with the rules stipulated by law is required to prevent mercury leakage.

# Mercury is present everywhere on Earth.

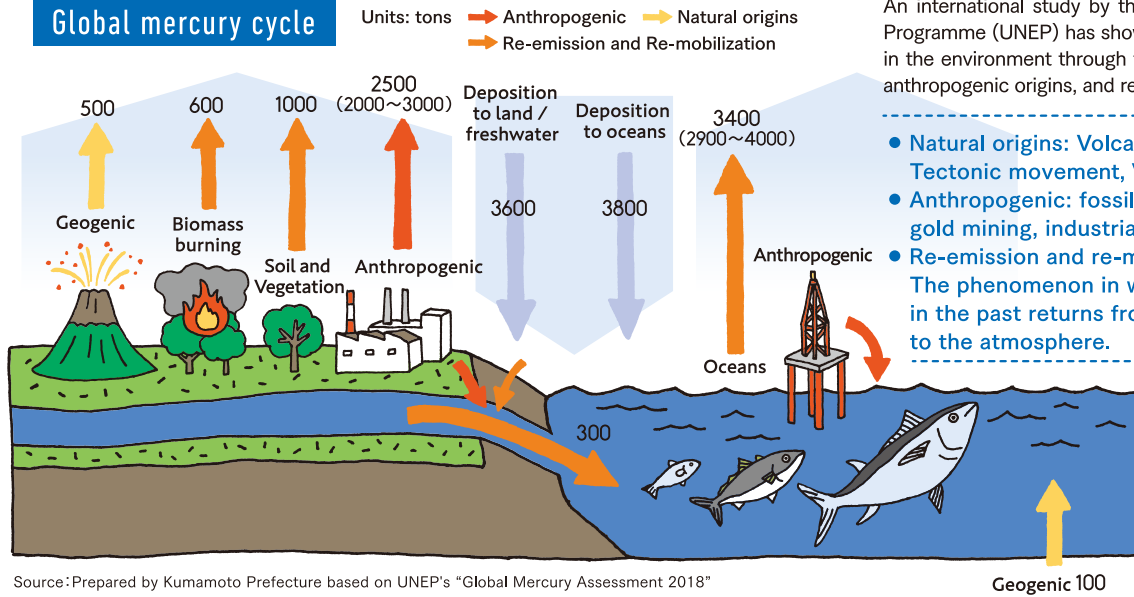
Mercury (element symbol: Hg) is a metallic element widely distributed in the Earth's crust. In nature, it exists primarily as cinnabar, a red sulfide. Heating this produces mercury vapor, and resulting mercury is obtainable by cooling and condensing. Mercury was originally contained in rocks and soil, but has been released into the atmosphere over the Earth's long history of 4.6 billion years, due to volcanic activity and crustal movement. Mercury released into the atmosphere returns to the earth's surface with rain and is carried into rivers and oceans, continuing to circulate in nature. Mercury is highly volatile and not decomposed once released into the environment, so it travels between the air, water, and soil, and is sometimes even absorbed into the bodies of marine life.



**Cinnabar**

Cinnabar, valued since ancient times for its vivid vermilion color, has been used as a pigment and decoration in the world. Its unique color has been highly valued, and throughout history it has been deeply intertwined with people's lives and art.

## Global mercury cycle



An international study by the United Nations Environment Programme (UNEP) has shown that mercury being released in the environment through three pathways: natural origins, anthropogenic origins, and re-emission and re-mobilization.

- **Natural origins:** Volcanic eruption, Tectonic movement, Volatilization from the soil
- **Anthropogenic:** fossil fuel burning, gold mining, industrial processes
- **Re-emission and re-mobilization:** The phenomenon in which mercury accumulated in the past returns from the oceans and soil to the atmosphere.

Source: Prepared by Kumamoto Prefecture based on UNEP's "Global Mercury Assessment 2018"

## Increased mercury emissions due to human activities

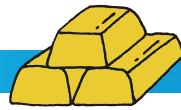
Since the Industrial Revolution in the 18th century, in addition to natural releases, mercury has been emitted from gold smelting, the use of fossil fuels such as coal, nonferrous metal manufacturing and waste incineration. Mercury has not only been used as a pigment and preservative since ancient times, but it has also been used in the smelting of gold and silver, taking advantage of its ability to easily form alloys (amalgams) with other metals. It has also had a history of use in various aspects of everyday life, such as in thermometers, blood pressure monitors, and fluorescent lights.

## How has Mercury been used?



### Gold plating of Buddhist Statues and Temples

In the past, gold plating was achieved by applying an amalgam of gold and mercury, then heating it to evaporate the mercury. Presently some parts of the world are still using it.



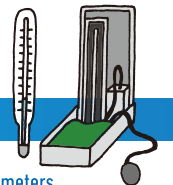
### Gold mining and smelting

The method of mixing gold ore with mercury, dissolving it to form an amalgam, and then heating it to extract the gold has been practiced around the world. Even today, in some regions, particularly developing countries, mercury-based gold mining and smelting continues, posing health hazards.



### Dental Amalgam

In the past it was used as a filling material in treating cavities, but with the spread of safe alternative materials, the use of dental amalgam has decreased worldwide. However, in some parts of the world, it is still used due to cost and equipment issues.



### Thermometers and blood pressure monitors

In the past mercury thermometers were once the norm, but electronic thermometers are now more common. However, some electronic thermometers contain button batteries that contain trace amounts of mercury, so care must be taken when disposing of them.



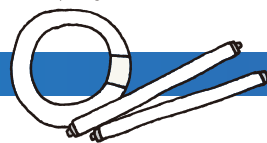
### Caustic soda production

In the past in order to produce the strongly alkaline chemical, "caustic soda (sodium hydroxide)," a method that uses a large amount of mercury was practiced. In Japan, the production using mercury method was completely abolished by 1986, but in some parts of the world, it is still used.



### Pharmaceuticals, cosmetics, and pesticides

Mercury was once found in disinfectants and pesticides, but it is now removed from most products. Regarding cosmetics, mercury continues to be used in some regions overseas.



### Fluorescent lamps

Fluorescent lamps contain small amounts of mercury, but it has significantly reduced the amount of mercury in each lamp in recent years. The manufacture and import/export of all fluorescent lamps for general lighting purposes will be prohibited after January 1, 2028.



### Vaccine preservatives

In the past Thimerosal (a type of organic mercury) has been used as a preservative in vaccines, but presently the amount of thimerosal in them has decreased, and the number of vaccines without thimerosal is increasing.



### Dry cell batteries and button batteries

The transition to mercury-free batteries was completed in Japan in the 1990s, but even now some button batteries still contain trace amounts of mercury.

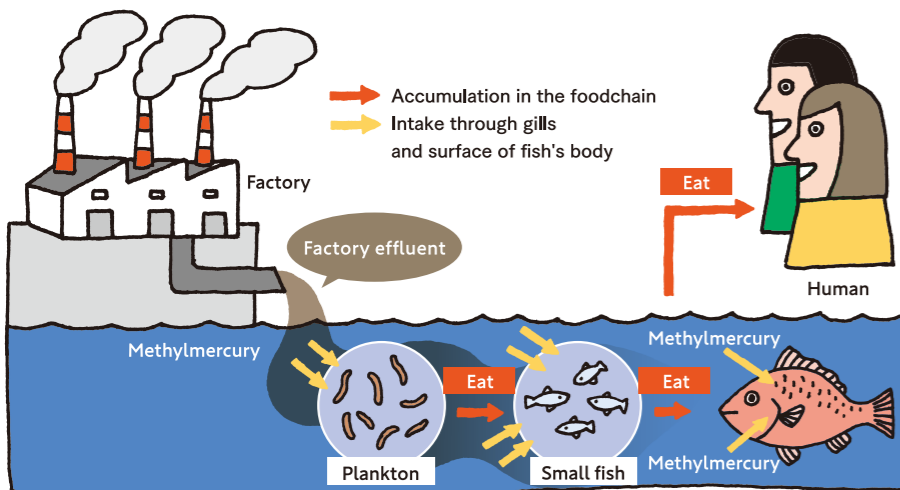
# Why is mercury-free necessary? What should we do?

## Types of mercury and their toxicity

Mercury's properties and toxicity vary greatly depending on its chemical form. Broadly speaking, there are three types: metallic mercury, inorganic mercury, and organic mercury, each of which has different degrees of effect on the human body. While some forms show little toxicity, other forms show high toxicity.

<b>Metallic mercury</b> Hg	<p>It is the only metal that exists as a liquid at room temperature. It has a silvery-white luster, and is a dense substance for a metal.</p> <ul style="list-style-type: none"> <li>It has been used in fluorescent lamps, mercury thermometers, mercury sphygmomanometers.</li> <li>In some part of the foreign country, it has used as amalgam and dental materials, etc.</li> <li>Inhaling metallic mercury vapor in high concentrations for a long period of time can affect the central nervous system.</li> </ul>
<b>Inorganic mercury</b>	<p>It is a compound in which mercury is combined with sulfur, oxygen, chlorine, etc. The toxicity varies greatly depending on the type of compound.</p>
e.g.	<p><b>Mercury sulfide HgS</b></p> <ul style="list-style-type: none"> <li>In the past it was used in vermilion ink-pad, pigments, etc.</li> <li>It is not easily absorbed by the body and is relatively non-toxic.</li> </ul> <p><b>Mercury oxide HgO</b></p> <ul style="list-style-type: none"> <li>In the past it was used in mercury batteries, disinfectants, eye drops, etc.</li> <li>It may affect kidneys and other organs if ingested.</li> </ul> <p><b>Mercuric chloride HgCl<sub>2</sub></b></p> <ul style="list-style-type: none"> <li>In the past it was used in vinyl chloride manufacturing and disinfectants.</li> <li>It is highly toxic, and is dangerous if ingested.</li> </ul>
<b>Organic Mercury</b>	<p>Mercury is bound to compounds containing carbon, especially methylmercury is the most toxic form of mercury.</p>
e.g.	<p><b>Methyl Mercury CH<sub>3</sub>HgX</b></p> <ul style="list-style-type: none"> <li>It affects the central nervous system severely.</li> <li>It is the compound that caused Minamata disease.</li> </ul> <p><b>Phenylmercuric acetate CH<sub>3</sub>COOHgC<sub>6</sub>H<sub>5</sub></b></p> <ul style="list-style-type: none"> <li>In the past it was used as a pesticide.</li> <li>It may cause kidney damage.</li> </ul>

## Tragedy caused by Mercury - Minamata Disease



Environmental Pollution by mercury affects local communities seriously, and threatens the health of people. A symbolic case of such environmental pollution is Minamata disease and it is considered the origin of pollution in Japan. Minamata disease, officially confirmed in 1956 in Minamata City, Kumamoto Prefecture, was caused by methylmercury compounds contained in wastewater from the (then) Chisso Co. (Minamata Factory). Factory wastewater flowed into the sea, causing methylmercury to accumulate in seafood. It is an addictive neurological disorder caused by consuming them regularly and in large quantities. The size of environmental pollution and health damage around Minamata Bay was unprecedented in the world. Even now, after having the efforts to restore the polluted sea, the suffering of those affected persists. In 1965, similar health damage occurred in the Agano River basin in Niigata Prefecture. This disease was caused by methylmercury contained in wastewater from the (then) Showa Denko Co. (Kanose Factory), and is known as Niigata Minamata disease.

### What is fetal Minamata disease?

It is a disease that occurs when a pregnant mother eats seafood contaminated with methylmercury, causing the fetus to be affected

### Development of Eco Park Minamata

Eco Park Minamata was built by dredging up mercury-containing sludge and safely containing and burying it in a stable form. It took 13 years and cost approximately 48.5 billion yen, a "tremendous amount of time and cost."



### Key points for proper understanding

- Minamata disease is not a contagious disease.
- Minamata disease is not hereditary.

## Japan's efforts and the importance of mercury countermeasures in the international community

As a country that experienced the serious pollution resulting in Minamata disease, Japan has been working to strengthen environmental conservation and promote mercury countermeasures. The national government, local governments, businesses, and citizens have collaborated to implement a wide range of initiatives, including reducing emissions and introducing alternative technologies.

### Japan's main countermeasures against mercury before the Minamata Convention was concluded

In Japan, the following measures have been implemented in stages to prevent health damage and environmental pollution caused by mercury.

- Establishment of standards for air, water, and soil quality and emission control**  
A system has been established to set environmental standards and guidelines, and require factories and businesses to reduce emissions.
- Reducing the use of mercury in products**
  - Mercury-free batteries
  - Mercury reduction in fluorescent lamps
  - Promoting the spread of LED lighting
- Closure of domestic mercury mines**  
By 1974, all mercury mines had ceased operation.
- Mercury-free manufacturing process**  
Manufacturing processes that previously used mercury (e.g., caustic soda production) were completely replaced by alternative methods by the 1980s.



Source: UNEP Global Mercury Assessment 2018

### Progress in Japan's Mercury Countermeasures and International Challenges

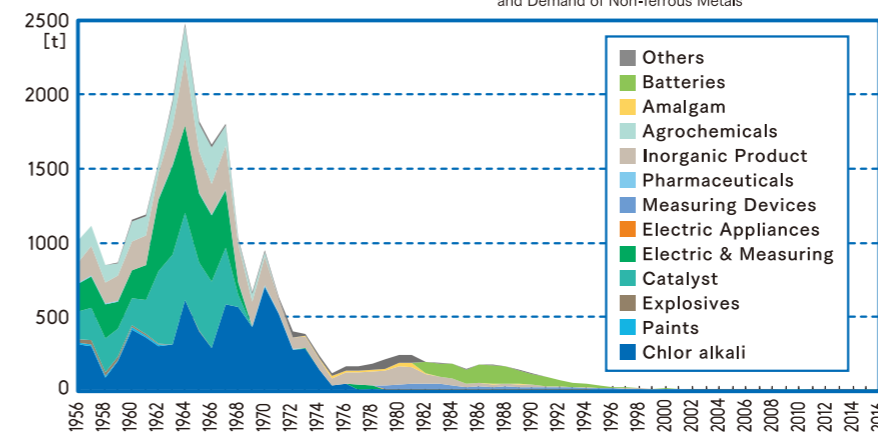
These efforts have significantly reduced domestic mercury demand in Japan.

- 1964: Approximately 2,500 tons/year
- 2016: Reduced to approximately 3 tons/year

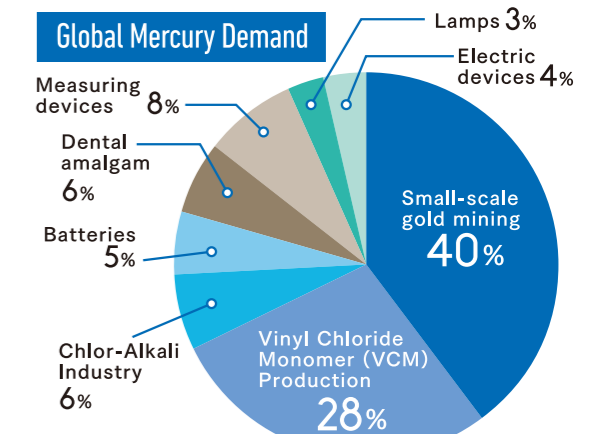
Furthermore, in 2016 mercury emissions are 16 tons, which is about 1/100 of the global total (excluding natural sources). However, mercury is still used in many countries around the world, with major sources of emissions being artisanal and small-scale gold mining (ASGM), and the use of raw materials and fuels containing mercury.

### Trends in Japan's Mercury Demand

Source: Yearbook of Mineral Resources and Petroleum Products Statistics - Current Survey of Supply and Demand of Non-ferrous Metals



### Global Mercury Demand



Source: Prepared by Kumamoto Prefecture from UNEP "Global Mercury Supply, Trade and Demand" (UNEP 2017)

## Minamata Convention on Mercury

The publication of the Global Mercury Assessment by the United Nations Environment Programme (UNEP) in 2002 led to widespread recognition of the importance of global mercury countermeasures, and as a result, international negotiations on this topic began in 2009.

Japan has contributed to the progress of negotiations by hosting relevant international conferences, and sharing its experience and lessons learned in mercury countermeasures with the world. Kumamoto Prefecture has also worked to host diplomatic conferences in the prefecture. This is done to share the lessons learned from Minamata disease with the world and to encourage people from around the world to visit Minamata City, the birthplace of Minamata disease, which is said to be the origin of pollution in Japan.

Then, in October 2013, a treaty on international mercury countermeasures was adopted at a diplomatic conference held both in Kumamoto City and Minamata City. The treaty is called the Minamata Convention on Mercury. The fact that it is named after the city of Minamata reflects the determination that tragedy like Minamata disease must never be repeated.



### Main steps leading up to the treaty's entry into force

2002	The United Nations Environment Programme (UNEP) published the "Global Mercury Assessment"
2009	International negotiations on mercury countermeasures began
2010-2013	1st to 5th Intergovernmental Negotiating Committee (INC) meetings were held
2013	Diplomatic conference was held in Kumamoto City and Minamata City, and the treaty was adopted
2016	Japan signed the Minamata Convention
2017	Minamata Convention came into force

# Main Provisions of the Minamata Convention and Domestic Initiatives

The Minamata Convention establishes comprehensive regulations to reduce the risks mercury poses to the environment and human health, covering from mercury mining to the use of mercury-containing products, emissions to the atmosphere, and waste management.

## ① Mercury mining

Prohibit mercury mining (mining is already not conducted in Japan)

## ② Import and Export of Mercury

The import and export of specified mercury, and mercury-containing products is regulated (requiring approval for import and export by the government in Japan).

## ③ Use of mercury in manufacturing processes

Processes using mercury as a catalyst or electrode are prohibited (Japan has already transitioned to alternative technologies)

## ④ Regulation of mercury-containing products

Prohibition of manufacturing products containing mercury exceeding specified standards (In Japan, manufacturing of specified mercury-containing products is prohibited by law)

## ⑤ Management of Mercury Waste

Manage mercury waste in an environmentally sound manner (Require compliance with standards for the proper disposal of mercury waste by law in Japan)

## ⑥ Reduction of Emissions into the Environment

Implement emission reduction measures based on best available techniques and practices for emissions to air, water, and soil. (In Japan, compliance with emission regulations and environmental standards is mandated by law. Specifically for air emissions, a new notification system has been established to strengthen regulations.)

## Specific Mercury-Containing Products Subject to Manufacturing and Import/Export Restrictions in Japan (Examples)

※This does not prohibit the use of products already in your home.

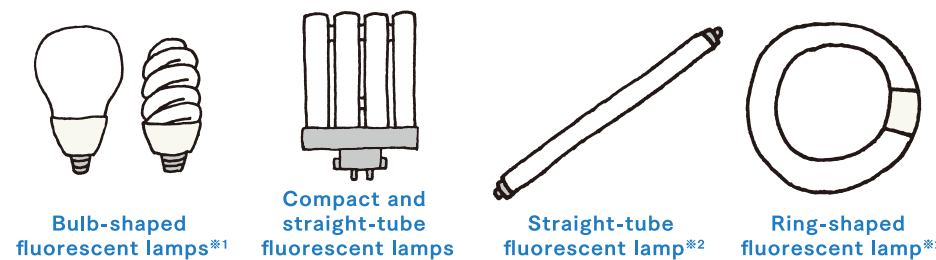
Products Containing Specific Mercury	Effective Date
① Cosmetics	January 1, 2018
② Batteries (excluding ③ and ④ )	January 1, 2018
③ Button battery (alkaline manganese battery)	December 31, 2020
④ Silver oxide batteries (being button batteries) and zinc-air batteries (being button batteries)	January 1, 2026
⑤ All fluorescent lamps for general lighting purposes	January 1, 2028

## Developments at the Conference of the Parties to the Minamata Convention (COP)

COP1 (2017)	Matters concerning the operation of the Secretariat's organizational structure and other operational aspects, as well as discussions on technical matters related to mercury regulation, such as effectiveness evaluations
COP2 (2018)	Guidelines for the environmentally sound interim storage of mercury adopted. Discussions on draft guidance for managing mercury-contaminated sites, etc.
COP3 (2019)	Adoption of Guidelines for the Management of Mercury-Contaminated Sites, etc.
COP4 (2021~2022)	The ban on manufacturing products such as compact fluorescent lamps by the end of 2025 has been decided.
COP5 (2023)	The productions of fluorescent lamps will be banned by the end of 2025 to the end of 2027, depending on the type. It was agreed that the treaty's threshold for mercury-contaminated waste (the reference level) would be set at 15 milligrams of mercury per kilogram.
COP6 (2025)	The production and import/export of dental amalgam will be banned by the end of 2034.

## Plan replacement of fluorescent lamps with LED lighting!

Prohibited activities are manufacturing and import/export. The sale, purchase, use of existing inventory and possession is not prohibited. However, please replace them according to the schedule.



Even after the treaty entered into force in 2017, meetings of the parties (COP) have continued to be held, and detailed rules regarding mercury regulation are still being developed. In response to treaties and decisions made at conferences of the parties, necessary legal reforms and other measures are being advanced domestically. In 2023 following the outcome of the Fifth Conference of the Parties (COP5), the manufacture and import/export of all fluorescent lamps for general lighting purposes have been phased out, with a complete ban taking effect on January 1, 2028.