

Switches and relays

Information provided by **Japan**, **Uganda**, **the USA**, **Canada**, and **Montenegro**

1. Category of mercury-added product	Switches and relays
2. Further description of the product	
3. Information on the use of the product	<p>Japan The major known mercury switches and mercury relays in Japan (classified according to the operating mechanism) are as follows:</p> <ul style="list-style-type: none"> • Type I Mercury reed relays • Type II Mercury displacement relays • Type III Mercury seismic switches <p>Although “<i>very high accuracy capacitance and loss measurement bridges and high frequency radio frequency switches and relays</i> in monitoring and control instruments with a maximum mercury content of 20 mg per bridge, switch or relay” are exempted from the requirements of Minamata Convention, survey conducted in Japan could not confirm the domestic manufacture of bridges, switches or relays for the stated purpose. In Japan, mercury switches/mercury relays are used by incorporating them in equipment.</p> <p>Uganda <u><i>In Uganda, estimated Mercury input in the environment (MIAs report, 2018)</i></u> At the disposal phase, electrical and electronic switches, contacts and relays with mercury batteries contribute to 439kg/Hg/yr <u><i>Product uses</i></u> Power devices may contain elemental mercury for making electrical contact in certain equipment, usually industrial applications.</p> <p>US Major types of elementary mercury-added switches and relays sold in and exported from the United States were</p> <ul style="list-style-type: none"> • Displacement Relay • Float switch • Pressure switch • Temperature switch

	<ul style="list-style-type: none"> • Tilt switch <p>The main type of elementary mercury-added switch imported to the US was temperature switch. The main type of mercury compound-added switch sold in and exported from the US was tilt switch.</p> <p>The US EPA, through the information submitted under the mercury inventory reporting rule, has identified additional use of mercury in 'Lead in water sensor', in which mercury-compound is added.</p> <p>Before the development of the publication of the 2020 mercury inventory (supported by the 2018 mercury inventory reporting rule), the U.S. EPA relied on IMERC data for the amount of mercury in many products sold in the United States. The most recent IMERC data (2010), listed the amount of mercury for switches, relays, sensors, and valves sold in the United States was 39,242 lbs.</p> <p>In designing the mercury inventory reporting requirements, EPA sought not only to collect more recent data, but also to differentiate between the amounts of mercury that such products are made in, imported into, and exported from the United States. Based on the data submitted in the 2018 reporting period:</p> <ul style="list-style-type: none"> • 23,216 lbs of elemental mercury was used to make switches, relays, sensors, and valves in the United States. • 19,723 lbs of elemental mercury was contained in switches, relays, sensors, and valves sold in the United States • 315 lbs of elemental mercury was contained in switches, relays, sensors, and valves exported from the United States • 1 lb of mercury compounds was contained in switches, relays, sensors, and valves imported into, distributed in, and exported from the United States <p>Montenegro Montenegro has no production of the mercury added products. It has information on quantities of imported products, including switches and relays, in 2019. However, most of these tariff numbers cover a wider range of product types which cannot be claimed with certainty to contain mercury. The country welcomes HS codes for mercury-added products.</p> <p>Comments from experts *on thermostats</p>
--	---

	<p>Mercury thermostats use mercury switches to sense and control room temperature through communication with heating, ventilating and air conditioning (HVAC) equipment. Mercury thermostats contain an average of 1.4 mercury switches (i.e. components), with a minimum of 2.8 grams of elemental mercury per switch – the total amount of mercury used in a single thermostat is more than four grams. Industrial-sized thermostats may have multiple switches and thus have reported higher amounts of mercury. Some examples of industrial thermostats reported by manufacturers include low-voltage multi-stage wall thermostats and heat pump thermostats.¹</p>
<p>4. Information on the availability of mercury-free (or less-mercury) alternatives</p>	<p>Japan</p> <ul style="list-style-type: none"> • In Japan, currently, mercury-free relays (reed relays, semiconductor relays) are available and for many applications new use of mercury-based reed relays is not required. • <u>Mercury overcurrent relay</u>: Manufacturers are carrying out replacement, not by mercury-free overcurrent relays, but by IMPs (Internal Motor Protector) which similarly provides the functionality of protecting against overcurrent. • <u>Mercury displacement relay manufactured outside Japan</u>: Mercury-free relay was being used, but the occurrence of a problem resulted in reverting to the use of this product. • <u>Seismic switch</u>: The manufacturer has developed a mercury-free seismic switch, and the manufacture of mercury seismic switch is scheduled to be discontinued by the end of 2020. <p>Uganda</p> <p><u>Switches & Relays containing less mercury</u> Switches & Relays used in high accuracy instruments with < 20 mg Hg per bridge</p> <p><u>Mercury free Switches & Relays</u> Mercury-free relays include solid-state relays, electro-mechanical, dry magnetic reeds, etc. Mercury-free switches include mechanical, solid-state, dry magnetic reeds, optical, thermal, etc.</p> <p>Comments from experts An expert referred to the exemption listed in Annex A, namely ‘<i>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</i>’, for which, according to the compilation paper, Japan has no domestic manufacture. The expert further informed that he himself contacted</p>

¹ IMERC Fact sheet: Mercury Use in Thermostats

	<p>one of the leading manufacturers of such devices and was confirmed that mercury is no longer used in those devices.</p> <p>An expert from Semiconductor Equipment Association of Japan (SEAJ) responded that there are three companies of SEAJ that use mercury switches and relays for semiconductor manufacturing equipment. He also responded that companies under SEAJ have been trying to find mercury-free alternatives, but there are no alternatives to date that meet their technological and economic requirements.</p> <p>Thermostats There are non-mercury alternatives that are suitable for replacing mercury thermostats. These include electromechanical (i.e. air-controlled, read switch, vapor-filled diaphragm, snap switch) and electronic programmable thermostats (i.e. digital).²</p>
<p>5.(i) Information on the technical feasibility of alternatives</p>	<p>Japan</p> <ul style="list-style-type: none"> • Currently, in Japan, there are products (end use) that are difficult to replace with mercury-free relays due to performance and cost issues, and the necessity to change the circuit when using a mercury-free relay. Due to these reasons, there is still a demand for mercury relays for the maintenance of existing (not easily replaceable) products. • Relevant industrial associations, on their websites, have published a list of uses that should be excluded from regulation by the Act on Preventing Environmental Pollution of Mercury of Japan for products commonly recognized by the Association to currently have no mercury free alternatives. <p>Uganda</p> <ul style="list-style-type: none"> • There is limited knowledge by consumers in Uganda on existence of alternatives • There is limited policy restrictions on importation of listed Switches and relays • There are no incentives on use/importation of alternatives • There is an institutional framework for promoting adoption of alternatives • The alternatives usually cost higher than the more toxic ones • Alternatives are mainly imported, hence transferring taxation costs to the consumer
<p>5.(ii) Information on the economic feasibility of alternatives</p>	<p>NA</p>

² IMERC Fact sheet: Mercury Use in Thermostats

<p>6. Information on environmental and health risks and benefits of alternatives</p>	
<p>7. If any, additional information being submitted on mercury-added products pursuant to Article 4.4 of the Convention not addressed above (e.g. manufacture, general trade information, etc.)</p>	<p>Japan</p> <ul style="list-style-type: none"> • In Japan, 1 company currently manufactures mercury switches (mercury seismic switches) and 4 companies manufacture mercury relays (mercury reed relay : 3, mercury displacement relay : 1). • There are cases where mercury relays manufactured outside Japan are imported and incorporated in equipment.
<p>8. Other relevant information pursuant to Decision MC-3/1</p>	<p>Japan</p> <p>In Japan, mercury switches and mercury relays will be regulated by the Act on Preventing Environmental Pollution of Mercury of Japan after the phase-out deadline of the Minamata Convention (end of 2020). Switches and relays for which no feasible mercury-free alternative for replacement is available are excluded from Annex A of Minamata Convention and will also be excluded from the Act on Preventing Environmental Pollution of Mercury of Japan (scope of the exemption will be judged based on the availability of mercury free alternatives)</p> <p>US</p> <ul style="list-style-type: none"> • US EPA will carefully consider the reporting results in light of such factors as quantities of use and availability of safer, cost-effective alternatives and, as appropriate, will not hesitate to recommend future legal or regulatory actions in accordance with the statute. • On October 5, 2007, EPA issued a final significant new use rule (SNUR) for elemental mercury used in convenience light switches, anti-lock braking system (ABS) switches, and active ride control system switches in certain motor vehicles. <p>Canada</p> <p>Canada is considering removing the exemption in the Products Containing Mercury Regulations for <i>high frequency radio frequency switches and relays</i> due to the fact that there were no imports of these products in 2016.</p> <p>Uganda</p>

	<p>In terms of waste management in Montenegro, the Decree on the procedure for establishing a system for collection and treatment of electrical and electronic waste ("OG of MNE", No. 24/12) prescribes pre-treatment of electrical and electronic waste and Rulebook on the limit values of the hazardous substances in electrical and electronic equipment ("OG of MNE", No. 067/18) prescribes the limit values for the presence of hazardous substances (mercury, among the others) in electrical and electronic products, the designation of the type of waste and the method of waste management arising from these products.</p>
<p>9. References</p>	<p>Japan Information is collected through interviews with domestic manufacturers of mercury switches/mercury relays and through questionnaire survey targeting recipients of shipments from the relevant manufacturers and member companies of healthcare/measurement/analysis/control equipment related industrial associations.</p> <p>Uganda Developing National Strategies for Phasing Out Mercury Containing Thermometers and Sphygmomanometers in Health Care, Including in the Context of the Minamata Convention on Mercury, World Health Organization, 2015. Available at http://www.who.int/ipcs/assessment/public_health/WHOGuidanceReportonMercury2015.pdf?ua=</p> <ul style="list-style-type: none"> • UNEP (2013): Minamata Convention on Mercury. Available at http://www.mercuryconvention.org • Minamata Initial Assessments report, 2018 • Mercury Learn - HS codes (2015); COMTRADE database <p>EPA. (2020). Inventory of Mercury Supply, Use, and Trade in the United States – 2020 Report</p>