

Treatment of Mercury Sphygmomanometers

Background

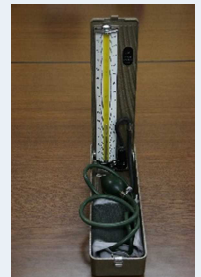
Requirement of the Minamata Convention on Mercury

Article 4 of the Minamata Convention requires the phase out of mercury added product including sphygmomanometers containing mercury by 2020.

Mercury contained in these devices needs to be recovered to the extent possible, in order to prevent contamination of the environment from improper handling of these products. However, mercury is a chemical element, and unlike other organic pollutants, cannot be treated easily with conventional treatment measures.

Furthermore, Article 11 of the Convention requires each Party to take appropriate measures so that mercury waste is managed in an environmentally sound manner. Sphygmomanometers contain about 50 grams of mercury. Hence, mercury should be extracted from these devices and treated/disposed in an environmentally sound manner.

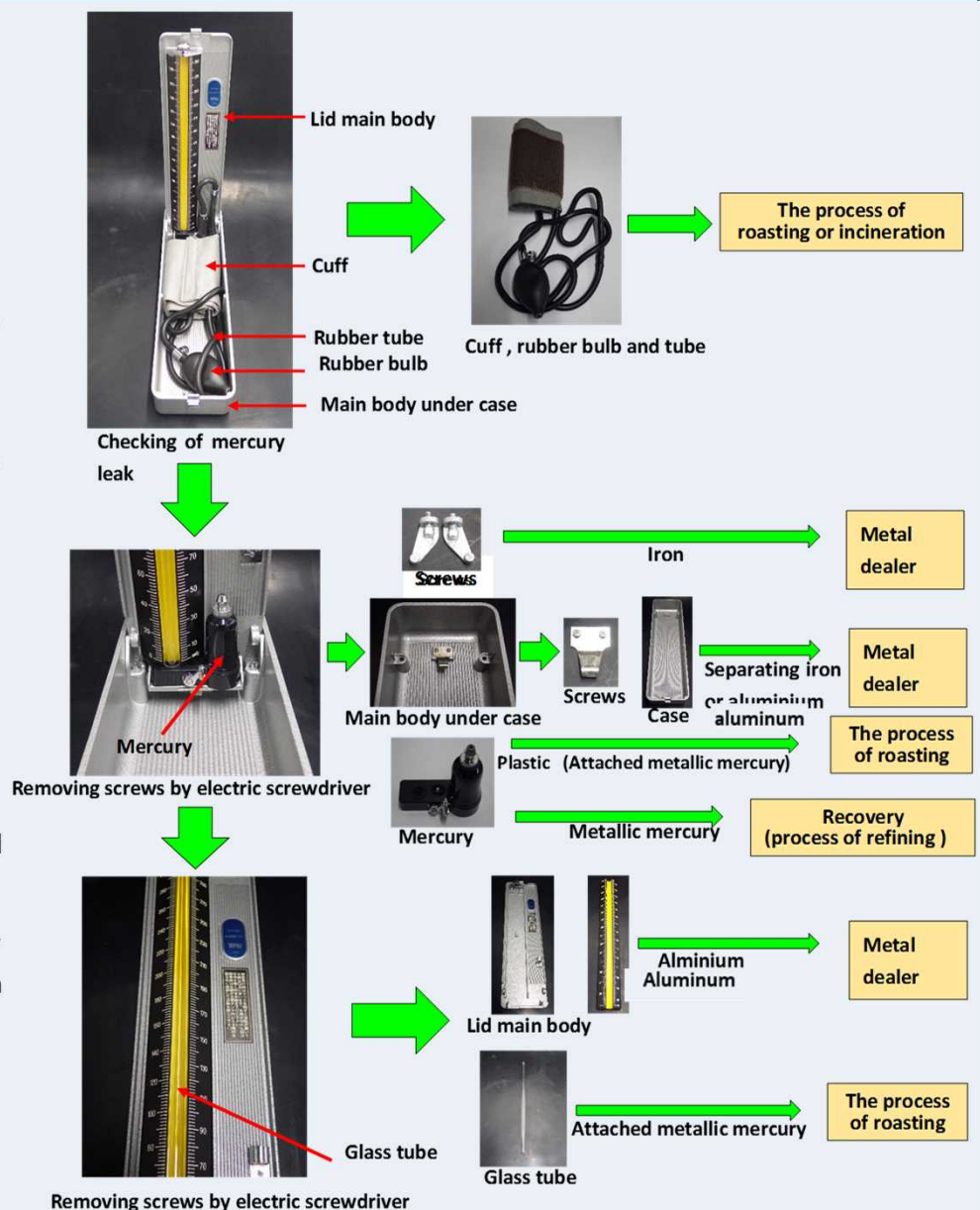
Sphygmomanometers with mercury



Overview of the Technology

Sphygmomanometers are manually dismantled under fumed hoods which are setup inside an enclosed dismantling facility. The dismantling facility is closed off from other areas to prevent accidental leaking of mercury vapor to other areas.

Mercury vapor generated in the fume hood or the facility is processed through the exhaust air treatment process using activated carbon. Mercury is collected in an iron bottle attached to the bottom of the fume hood. Workers are required to wear hard hats, masks, goggles and work clothing and gloves. Parts that come in contact with mercury are dismantled separately from those that do not. All the parts are collected separately according to the composition of the material. Dismantling of the mercury tank itself is carried out inside a fume hood. Iron and aluminum are recycled whereas glass and other materials are treated further by roasting (600°C to 800°C) where mercury is vaporized and collected.



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Advantages/Strengths

High recovery rate of mercury

A combination of manual dismantling and roasting ensures that the recovery rate of mercury is very high. On average, about 50g of mercury is recovered from one sphygmomanometer.

Safe and environmentally friendly method

Combination of fumed hood and sound care during dismantling ensures that no leakage of mercury occurs. Any material that comes in contact with mercury is sent for roasting whereby the mercury is vaporized and collected. Workers use safety gears while dismantling ensuring that the process is safe and environmentally friendly.

Recycling of components

One advantage of manual segregation is that in addition to recovery of mercury, other components of the devices like iron, aluminum, etc. can be separated and recycled.

Dismantling process



Photo provided by Nomura Kohsan Co., Ltd.

Applicability

In many countries, phase out of mercury containing medical measuring devices is being promoted through their health ministries. However, there is a lack of institutional framework to treat these devices once they become waste.

Hence, these devices end up being stored in containers inside interim storage facilities located within the hospital premises until an adequate treatment/disposal method becomes available. Japan has a lot of experience and know how on safe methods of handling of mercury containing medical measuring devices without breakage. Further, Japan also has established a scheme to collect thermometers and sphygmomanometers from households and hospitals which can be of reference to other countries.

Further Reading

UNIDO, Nomura Kohsan's mercury waste management technology

(http://www.unido.or.jp/en/technology_db/1716/)

MOEJ, Guidelines for Separation and Collection of Mercury Containing Waste discharged from Households (Japanese only)

(http://www.env.go.jp/recycle/waste/mercury-disposal/h2712_guide1.pdf)

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