

MERCURY HYGIENE PROGRAM DECONTAMINATION PROCEDURE

PURPOSE

The purpose of this procedure is to establish a comprehensive program to protect employees and contract workers by eliminating mercury exposure that could occur from exposure to contaminated clothing, personal protection equipment and contaminated surfaces. To ensure that everything is done to prevent or reduce the pain and suffering caused by mercury exposure. The procedure outlines specific instructions for cleaning hands, clothing and other surfaces.

SCOPE

This procedure applies to all employees, contract personnel and visitors entering the cell room, RCRA pad, and areas of the plant with potential mercury exposure.

DEFINITIONS

- Clean Room - An area where mercury vapors is maintained below .025 mg/m³ and where workers may use as a lunchroom or room to store street clothes. Also referred to as clean side.
- Contaminate - The process by which any surface is stained soiled, or comes into contact with elemental mercury in any form. Also referred to as contamination.
- Decontaminate - The process of removing or neutralizing mercury from surfaces stained, soiled, or which has contact with elemental mercury. Also referred to as decontamination or decon.
- Mercury - Mercury is a silver gray metallic poisonous element that is a liquid at ordinary ambient temperatures. Mercury can also exist in a vapor form.
- Restricted Area - An area where mercury vapor levels exceed .025 mg/m³ but less than .05 mg/m³.
- Regulated Area - An area where mercury vapor levels exceed .050 mg/m³. Special precautions are required for entry into these areas.

RESPONSIBILITIES

A. Management/Supervision

1. Ensure all elements of this procedure are implemented in their areas of responsibility.
2. Ensure workers decontaminate all personal protective equipment daily.
3. Ensure workers enter clean room areas such as the lunchroom and other plant areas only after they have removed contaminated clothing and other PPE.
4. Provide a means for employees and contractors to decontaminate clothing and PPE daily.

B. Safety/Industrial Hygiene

1. Ensure all employees affected by this procedure are trained and understand the requirements.
2. Evaluate clean room areas through monitoring mercury vapor levels in the air and on surfaces to ensure proper decontamination has taken place.

C. Employees

1. Ensure personal protective equipment is decontaminated daily and as needed.
2. Ensure you do not enter clean room areas with PPE or clothing that is contaminated.
3. Use decontaminating agents whenever mercury contamination is suspected.

PROCEDURE

A. Decontaminating Hands

Workers performing tasks where mercury exposure has occurred must decontaminate their hands prior to entering any clean room area. Hands should also be cleaned prior to eating, and using tobacco products (smoking and chewing). Bar soaps are not recommended because they can transfer contamination. The following recommendations should be followed prior to entering:

1. Hands may be cleaned by using the Mercon wipes or Mercon X spray found in the change houses or rest rooms. Workers should remove contaminated clothing prior to

C. Decontaminating Laundry

The following procedure will be used when clothing has been contaminated with mercury. These recommendations will also help reduce contamination in the laundry room and other areas where mercury vapor exposure could occur.

1. Apply Mercon X spray to clothing as soon as the clothing is removed from worker. The worker should direct the spray to areas where he/she suspects mercury contamination (i.e., waist area where contaminated tools or equipment have touched clothing or where clothing has contacted other contaminated surfaces).

Laundry Room Attendant

Note: Follow these requirements for uniforms worn by workers that exceed the .05 mg/m³ level as indicated by the mercury survey meter. Apply Mercon X spray to the chest and waist area of the uniform until saturated.

1. Allow uniforms to sit for 2 – 3 hours. Place in washer and rewash.

Note: Use Nitrile gloves whenever handling clothing contaminated with mercury. Contact the safety department whenever the daily mercury survey readings exceed .05 in the laundry room.

D. Decontaminating Personal Protective Equipment

Respirators

Respirators may be washed by hand or in the respirator washer. When it is suspected that respirators have been contaminated by mercury contaminated materials, workers should use the Mercon wipes to clean the respirator surface before placing it in the washer. Respirators can be washed in the respirator washer after the Mercon wipe is applied. Escape respirators can be decontaminated by using the Mercon wipes on the outside shell. Do not use anything other than bleach and water on the mouthpiece.

Boots

Boots can be decontaminated by going through the boot wash. Workers should scrub the bottom of the boot by moving the foot across the brush pad in the bottom of the footbath. The top of the boot can be cleaned by using the brushes mounted next to the footbaths. The janitor will replace the Mercon X solution in the footbath weekly or as needed.

Gloves

Gloves can be decontaminated by spraying Mercon X solution on the gloves, rubbing the gloves together, and then rinsing the gloves with water. This will reduce the amount of contamination transferred to other equipment. Glove decontamination should be completed after each task where the worker suspects the gloves have been contaminated.

Hard-hats, Goggles, and Glasses

Hard-hats can be decontaminated by spraying Mercon X on the surface and rinsing with water. The inside of the hard-hat can be decontaminated by using the Mercon wipes. Goggles and glasses can be decontaminated by spraying them with the Mercon spray, waiting 2 minutes, then rinsing with water. Use the table below as a guide to decontaminating Personal Protective Equipment.

PPE	FREQUENCY	PRODUCT USED TO DECONTAMINATE	NOTES
Respirators	Daily	Wipes	Respirators must be washed after wipes are used, wipes cannot be used on escape respirators.
Hard-hat	Daily	Mercon X	Wipes for inside hard-hat
Boots	After probable contamination, prior to entering any clean room area	Mercon X in foot bath	Wash both top and sole
Goggles, Glasses	Daily (after probable contamination when exposure to metallic mercury has occurred)	Mercon X/Wipes	Rinse goggles and glasses prior to use

Tools/Instruments

Tools needing decontamination should be sprayed or covered with Mercon solution. Saturate the tool on both sides and in hard to reach areas. Allow the solution to remain on the tool for 30-45 minutes. Use a water hose to rinse off the solution.

Delicate instruments such as the mercury survey meter should be decontaminated using the Mercon wipes. The suspected contaminated surface should be wiped with a moist wipe each time it comes in contact with mercury contaminated substances. Rinse well with water once decontaminated

Mercury metal is a silver-gray liquid

Because of its unique properties as a liquid metal, metallic mercury is especially challenging to control. When exposed to the air or if spilled, mercury metal vaporizes into the air where it can be breathed into the lungs. The warmer the temperature, the more quickly the mercury gets into the air. A temperature increase from 64.4oF to 78.8o F doubles mercury's vapor pressure. Mercury can also be absorbed or injected through the skin but is not usually harmful if swallowed unless it becomes lodged in the digestive system. If spilled mercury is not cleaned up completely, it easily gets spread around. Mercury forms droplets that can accumulate in the smallest spaces like cracks between floorboards and under fingernails. These droplets are very slippery and hard to remove from work surfaces or skin. If there is contamination of a worker with mercury, a micro environment of mercury vapor is created around that worker that can give exposure greater than that attributable to the general work environment. Mercury can be spread around work, car, and home from shoes, clothing, hair, and other objects with tiny drops of mercury metal on them.

Some of the places mercury metal is found

- Thermometers, thermostats, barometers, electric switches
- Dental fillings and medical equipment
- Some light bulbs, including fluorescent, high intensity, mercury vapor high-pressure sodium, and metal halide
- Some clock pendulums,
- Some athletic shoes, toys, and cards that light up or make noise.
- Electrical applications in several manufacturing processes

Health Effects

Breathing mercury metal vapor over time affects the human brain , spinal cord, eyes, and kidneys. Inhaled mercury vapor may cause mood changes; inability to concentrate; memory loss; a fine shaking, tingling, or loss of feeling of the hand, tongue, or eyelid; discoloration of the cornea and lens of the eye; disturbances of vision; and kidney disease.

E. Small scale spill clean-up using merconkits™

- 1) Block off from foot traffic a large radius around center of spill site (approximately 6 foot radius). Check clothing and footwear for mercury and mercury debris. Remove contaminated footwear at edge of spill site.
- 2) Remove the merconspray from the spill kit, and wearing gloves and goggles proceed to spray the ambient Zone above the spill radius. Spray generously (18-20 pumps) into the air starting at breathing level and working down towards the floor, concentrating on the actual spill itself.
CAUTION: The floor surface may be SLIPPERY!
- 3) Using the Merconvap cover all visible mercury with merconvap leaving a wide margin for any unseen droplets. Ensure that any cracks in flooring are saturated with Meconvap to suppress any droplets that may be out of sight. The spill is now safe to clean up. **Mention allowing time for product to work**
- 4) OPEN MERCONTAINER , using hand held mercury aspirator suction up mercury droplets. Tipping aspirator upwards place over mercontainer and drop mercury into container. The aspirator can be re-used but should be decontaminated by suctioning up some m-vap once or twice and disposing of into the mercontainer. The mercontainer can be re-used but should not be filled to more than ½ in order for the suppressant sponge to remain effective.
- 5) Decontaminate spill site. Re- apply merconvap liquid to former spill site if you are dealing with a stubborn or old spill to or with merconwipes to wipe up any residual mercury.
- 6) DISPOSE of used mercontainers and any contaminated items as per your local environmental authority regulations. DO NOT INCINERATE. Wipe shoes, gloves, and any other contaminated items with MERCONWIPES or disposable towels soaked with MERCONVAP.

F. LARGE scale spill clean-up using mercondrum™

ALL LARGE SCALE SPILL AREAS MUST BE REPORTED TO PROPER AUTHORITY AS REQUIRED BY LAW.

EPS Chemicals, Inc. disapproves of any mercury clean-up procedures without proper protective clothing and self-contained breathing apparatus. Initial and periodic monitoring of ambient air is essential to properly evaluate the extent of the problem and to assess the quality of the clean-up process. Monitoring should be carried out with a calibrated Jerome mercury monitor or equal every two hours or more during the course of the clean-up.

- 1) EVACUATE AREA immediately, placing placards or border tape to warn other personnel of spill hazard. Ensure all contaminated objects remain at immediate spill site to restrict the areas affected. Shoes should be left, changed or “booted” to prevent the spread of contaminants.

SHUT OFF ANY VENTILATION SYSTEMS within the affected area to avoid the risk of spreading air-borne contaminants to other areas.

OPEN WINDOWS to reduce the concentration of ambient mercury.

SHUT OFF HEATING SYSTEMS within the affected area to reduce the rate of vaporization.

- 2) Using either Merconspray or merconvap with sprayer spray the air in a large radius from the spill center or cover contaminated walls floors ceilings. Spray from breathing level down towards the floor concentrating on the spill itself. CAUTION: The floor may be slippery
- 3) Placing the squirt cap provided on the MERCONVAP 475 ml COVER all visible mercury with MERCONVAP liquid . (As a rule of thumb use 1 litre of MERCONvap for every 5 kilograms of mercury.) Leave a wide margin of MERCONvap around spill center for any unseen droplets. Ensure that any cracks in flooring are saturated with MERCONvap to suppress any droplets that may be out of sight and reach.
- 4) Remove all contents of MERCONdrum , leaving only the pre-soaked mercury vapor suppressing sponge in place. Using dustpan and squeegee provided in MERCONdrum attach a broom handle to each. Gather mercury and debris, including the MERCONvap liquid, into center of spill area being very careful to avoid cracks and joints in the flooring or other surface. Scoop mercury and debris into dustpan and deposit into MERCONdrum .
- 5) DECONTAMINATE spill area using MERCONvap and the mopping sponge provided. Mop entire area around spill center using as a rule of thumb 1 litre of MERCONvap for every 200 square feet of floor. (NOTE: the amount of MERCONvap needed increases with permeability of flooring.) Leave to dry naturally or at least 24 hours minimum is highly recommended for better results. CAUTION: Floor will remain slippery until dry.
- 6) Place all articles used in clean-up procedures into MERCONdrum . Dispose according to local environmental regulations. Call EPS Chemicals for more detailed clean-up procedures.
- 7) Repeat mopping procedure using MERCON-x and regular mop if mercury levels persist. This will depend on age of mercury spill or residual contamination.

Industrial Decontamination and maintenance using MERCON™-X

EPS Chemicals, Inc. disapproves of any mercury clean-up procedures without proper protective clothing and self-contained breathing apparatus. Initial and periodic monitoring of ambient air is essential to properly evaluate the extent of the problem and to assess the quality of the clean-up process. Monitoring should be carried out with a calibrated Jerome 5000 Mercury Monitor of equal every 2 hours during the course of the clean-up.

- 1) Shut off all re-circulating air systems if possible and heat sources kept on low or shut off to prevent vapors from moving into other areas of the building. If the area is above “normal room” temperature, allow some time for the ambient temperature to drop.
- 2) EVACUATE STAFF from areas of potential contamination and Mercury vapor generation. MARK OFF THE AREA OF SUSPECTED CONTAMINATION. COMMENCE MONITORING to determine the scale of contamination. Keep accurate records as to time, place and levels of all mercury monitor results. If levels are significantly above the TLV contact EPS Chemicals, Inc. for further consultation.
- 3) Wearing appropriate safety clothing and breathing apparatus, begin decontamination.

CAUTION: Floor surfaces may be very slippery.

If positive mercury levels are detected in the air, first spray the air in the contaminated zone with MERCONvap or MERCON-X .

APPLY MERCON-X to contaminated floor area either by mopping or by use of sprayer. MERCON-X will change color as it comes into contact with elemental Mercury. Allow MERCON –X to dry naturally or leave on as long as possible before washing away residual mercury with soap and water.

- 4) REPEAT DECONTAMINATION procedure giving particular attention to areas of noticeable color change. Saturate these areas with MERCONvap . Allow to dry. If contamination levels persist, contact EPS Chemicals, Inc.

NOTE: Mercury vapor build up will vary with temperature, atmospheric pressure (altitude) , air circulation, type of surface involved, and the effects of other contaminants. Highly porous surfaces and heavily contaminated soils may require more decontaminant

- 5) MONITOR THE SITE TO ENSURE THAT ALL SOURCES OF MERCURY CONTAMINATION HAVE BEEN IDENTIFIED, CLEANED OR REMOVED,

and FILE A FORMAL INCIDENT REPORT WITH MANAGEMENT AND THE APPROPRIATE HEALTH AND SAFETY OFFICIALS.

REPEAT MONITORING ON A REGULAR BASIS.

DISCLAIMER:

The information supplied in this clean-up procedure is based on data believed to be reliable, but is given without any guarantee or warranty of any kind, either expressed or implied and EPS Chemicals, Inc., its subsidiaries, employees, officers, directors and agents disclaim any liability incurred from the use thereof.

The products and waste mercury materials should be stored, handled and used in accordance with municipal, provincial, state and federal laws and regulations.