

General Procedure
for
Removing Mercury Switches
from Appliances

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2008

Mercury Switches in Appliances

Responsibilities of Appliance Recyclers

- **Inspect all appliances and remove any mercury switches from all appliances prior to delivery to our facility**
- **Bring mercury switches and deposit them gently in the containers provided at our facility.**

Introduction

Mercury switches have been used in the appliance industry in various switching applications. They were commonly used in the *switch-on* mechanisms of convenient light fixtures on the underside of deep freezer lids and in the *switch-off* mechanisms (activated by lid levers) of some washing machines.

Mercury is a highly toxic substance – only one gram (the amount in one mercury switch) can contaminate a 20-acre lake for one year to the point where fish cannot be eaten. “Hg” is the scientific symbol for mercury and is the abbreviation for the Latin “Hydrargyrum”

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- 1) Basically, all deep freezers will have and must be checked for mercury switches on the underside of the lids. Similarly, all washing machines will have and must be checked for mercury-containing switches.
- 2) Removal of a lighting fixture from a freezer lid takes only a few seconds, and can be done at the same time as the removal of FREON/CFC/refrigerant.
- 3) Removal of a mercury switch from a washing machine takes only a few second also.
- 4) A freezer switch-on lid convenience light fixture is made up of the following components: two wires, a housing containing a capsule, a capsule/switch containing a drop of liquid mercury, one or two light bulbs and may have a fastener to secure the housing to the lid. Commonly the soft rubber housing is pressed in a receiving slot in the lid.
- 5) A washer switch-off mechanism is made up of the following components: two wires, a housing containing a capsule, a capsule/switch containing a drop of liquid mercury, and a lever to which the housing is anchored.
- 6) The capsules are the switches and the capsule shells are usually made of steel. (Some capsules in washing machines are made of glass.) Within a capsule, are two contact points and a drop (1 gram) of liquid mercury. When a freezer lid is opened, the

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housing/capsule is tilted and the mercury within the capsule completes the electrical circuit by submerging the two contact points in a continuous pool of mercury, allowing the electricity to travel to and illuminate the bulb(s).

- 7) When a washer lid is opened, the housing/capsule is tilted and the continuous pool of mercury straddling the two contact points within the capsule is broken, cutting electricity to the motor.
- 8) Mercury containing components should be removed from scrapped appliances prior to **crushing or shredding** in order to recover the mercury and eliminate potential mercury release to the environment.

Locating and Removing Mercury-Containing Switches

- 1) In freezers, mercury-containing switch lighting fixtures are always located on the underside of the lids. The light plastic lid can be easily smashed with a screw driver to loosen the light fixture, which can be easily pulled off.
- 2) In washing machines, the types of levers used determine whether mercury-containing switch-off mechanisms are present or not.
- 3) If the lever is made of a wire-rod located at the hinge of the lid, then a mercury-containing switch is used. A long screw driver or a crowbar is needed to gently pry open the top of the washing machine to get to the mercury switch. The switch can be easily pulled off.
- 4) (If the lid of a washer contains a 1.5 cm protruding probe that inserts into a hole, then the switch-off mechanism may not contain a mercury switch.)
- 5) The drop of mercury is usually hermetically contained in a sealed steel capsule, so there is no risk of breakage during removal of the light fixtures from freezers or removal of the capsules/switches from the housing assemblies. The mercury is contained in a sealed, metal capsule. EXCEPTION (1): Some freezer convenient lights do contain glass capsule switches; therefore proper care must be taken not to break the glass and thereby releasing the mercury. EXCEPTION (2): Washing machines have glass capsule switches encased by thick rigid plastic jackets; therefore proper care must be taken not to break the plastic jackets and thereby releasing the mercury.

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Disassembly of Mercury Switches

- 1) Removing the capsules/switches from the rubber/plastic housings can be very difficult. The capsules are often molded inside the rubber/plastic housings. It is safer just to leave the switches in rubber/plastic housings; just trim wires short to reduce volume and the amount of space required for storage prior to shipping them to a recycling/disposal facility.

Storage of Recovered Mercury Switches

- 1) Mercury is a hazardous material – proper procedures for storage must be adhered to.
- 2) For mercury light fixtures, they may be stored in a 205L steel drum lined with a layer of vermiculite and away from the general work area in a dry cool well-ventilated place.
- 3) For mercury capsules/switches, the container may be made of a high density plastic and should be stored away from the general work area in a cool dry and well-ventilated area.
- 4) The container holding the mercury light fixtures or capsules/switches must be clearly labeled according to the Transportation of Dangerous Goods Regulations.

Disposal of Recovered Mercury Switches

- 1) Mercury is a hazardous material – proper procedures for transportation must be adhered to. Licensed waste haulers are required.
- 2) The mercury light fixtures and/or capsules must be securely packaged in such a way that they will not be damaged or ruptured during transport.

Responsibilities of Appliance Crushers/Recyclers

1. Inspect all appliances and remove any mercury switches from appliances prior to delivery to our facility
2. Bring mercury switches and deposit them gently in the containers provided at our facility.

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Responsibilities of Our Company

1. Supply appliance crushers/recyclers with the following:
 - Containers at its facility for appliance crushers/recyclers to deposit the mercury switches.
 - Written materials on locations (*may not be possible due to the fact that appliance manufacturers do not want to disclose their practices*) and procedures for removal of mercury-containing switches/lighting fixtures.
2. Issue receipts to auto crushers/recyclers who bring in and deposit mercury switches in the container provided.
3. Work with the responsible regulatory agencies to ensure that all procedures and collection infrastructures follow pertinent waste and transportation regulations.
4. Dispose of mercury switches/lighting fixtures through proper channels according to pertinent waste and transportation regulations.
5. Be available to answer questions.

Mercury Switches in Appliances



Washing machine with mercury switch



Prying open a washing machine



Mercury switch in a washing machine



Mercury switch in a washing machine



Mercury switch in a washing machine



Mercury switches from washing machines

Mercury Switches in Appliances



Mercury switch in a freezer



Mercury switch in a freezer



Mercury switch in a freezer



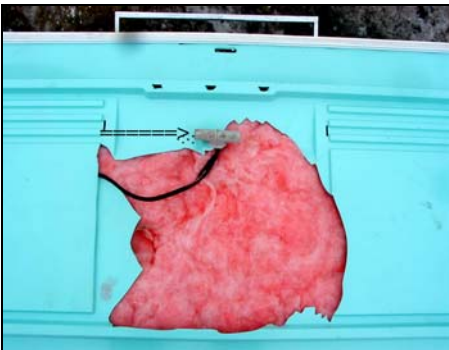
Mercury switch in a freezer



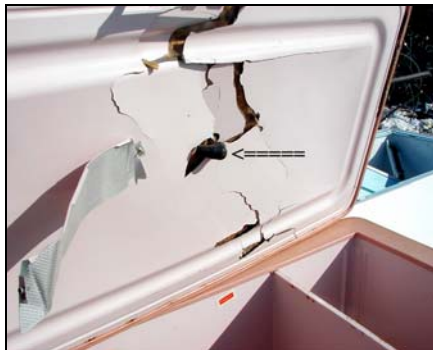
Mercury switch in a freezer



Mercury switch in a freezer



Mercury switch in a freezer



Mercury switch in a freezer



Removing mercury switch in a freezer



Removing mercury switch in a freezer



Container for holding mercury switches recovered by scrap recyclers

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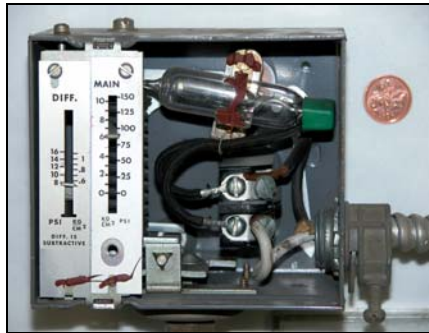
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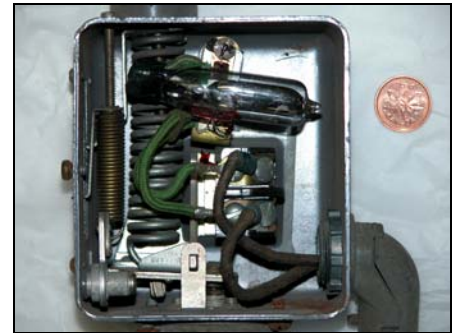
Mercury-containing Materials



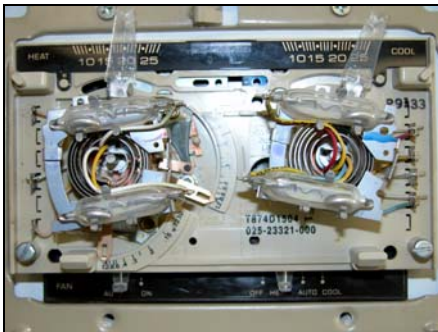
Prohibited: Mercury in pressure and temperature gauges



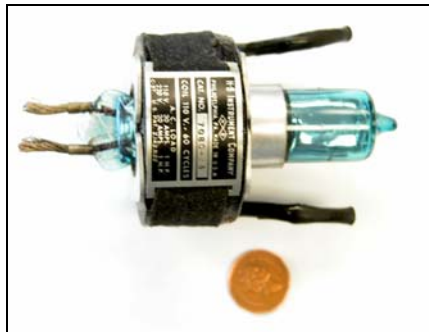
Prohibited: Mercury in pressure and temperature gauges



Prohibited: Mercury in pressure and temperature gauges



Prohibited: Mercury switches in a thermostat



Prohibited: Mercury switch from a centrifuge instrument



Prohibited: Mercury in level switches



Prohibited: Fluorescent light bulbs



Prohibited: Mercury switches from pressure and temperature gauges



Prohibited: Mercury switches from vehicles

Mercury Switches from Vehicles



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Radioactive Materials



Prohibited: Liquid level detector



Prohibited: Smoke detectors



Prohibited: Phosphorescence compass



Prohibited: Radioactive level detectors



Prohibited: Heat exchanger with deposit / scale



Prohibited: Filter with radioactive residue



Prohibited: Kiln with radioactive refractory bricks



Prohibited: Pipe with radioactive deposit / scale



Prohibited: Storage tank with radioactive deposit / sludge

Radiation Detectors



Truck scale detectors



Rail scale detectors



Handheld detector

Signs

