

Mercury Switch Removal Process

1. Scope—Mercury capsules have been used in the automotive industry in various switching applications. The basic design and performance characteristics of mercury switches (or capsules) make these components particularly suited to underhood light and trunk light applications. The processes described in this SAE Standard deal with the location, removal, storage, and recycling of mercury switches and capsules associated with these underhood and trunk light applications.

1.1 Purpose—Mercury containing components should be removed from scrapped vehicles prior to crushing or shredding in order to recover the mercury and eliminate potential mercury release to the environment. Mercury containing components removed during repair or service must also be properly handled and ultimately recycled as well. Of the 10 million vehicles scrapped and recycled each year; approximately one third may contain mercury switches. Each of these underhood light or trunk light applications typically contain 0.8 to 1.0 g of mercury in a sealed capsule.

1.2 Caution—Mercury is a naturally occurring metal found in many different forms. It readily evaporates into the air, through a process called volatilization at normal temperatures and pressures, and may be eventually deposited back into soil and water through precipitation. Mercury is capable of bioaccumulating; which means it eventually may concentrate in the food chain where it can become toxic to plants, animals, and humans (Reference 2.1.2). It is therefore important that when following this document, one should always err to the safe side. When in doubt, assume the underhood light or trunk light contains a mercury capsule. If an attempt to reduce the size of the assembly is made for storage then do so only with common hand tools and avoid the use of power tools if possible.

2. References

2.1 Applicable Publications—The following publications form a part of this specification to the extent specified herein.

2.1.1 USDOT PUBLICATIONS—U. S. Government, DOD SSP, Subscription Service Division, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094

Hazardous Materials Transport Regulations (Title 49, CFR, Parts 260-268)

2.1.2 OTHER PUBLICATION

The Micromedex Times System—Toxicology, Occupational Medicine, and Environmental Series Plus, @ 1987-1998, Micromedex, Inc.

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2.2 Related Publications—The following publications are provided for information purposes only and are not a required part of this document.

Mark Rust, Mike Rafferty, and John Ikeda, "Automobile Shredder Residue Report" (1995), Minnesota Pollution Control Agency
 Minnesota Pollution Control Agency, "Mercury Switch Recycling - A Fact Sheet for Motor Vehicle Salvage Facilities" (1995)
 Minnesota Pollution Control Agency, "Motor Vehicle Salvage Facilities - A Report on the MPCA's Evaluation, Assessment, and Outreach Effort" (1995)
 Minnesota Pollution Control Agency, "Motor Vehicle Salvage Facility Environmental Compliance Manual" (1994)

3. How Mercury Switches Work—Mercury switches are practical for applications such as underhood light and trunk light switches. The basic function of these devices is to light the underhood or trunk area when the lid is opened. In order to minimize power consumption and maximize customer convenience, the lights should be automatically off when the lid is closed and automatically on when the lid is open.

Mercury switches contain two contact points within a capsule. When the capsule is held in a certain range of angles, the mercury completes the circuit by submerging these contact points in a continuous pool of mercury. Since mercury is a metal it conducts electricity, thus completing the electrical circuit and allowing the electricity to travel to and illuminate the bulb. When the capsule is in the "off" position (hood or trunk closed), the mercury does not touch both contact points at the same time. This condition does not close the circuit so no electricity flows to the bulb and the bulb is off. The mercury capsule can be tailored to operate over specific tilts in elevation, thus it is highly adaptable to the various angles of hood and trunk lid designs on many different vehicles.

4. Location/Identification—The mercury switches of concern are in convenience lighting fixtures usually located on the inner panel of a vehicle trunk and/or hood lid. The capsules themselves may be in the base of this small lighting fixture or along the wiring harness leading to the fixture at a point where the harness flexes. See Figure 1.

5. Removal/Disassembly

5.1 Vehicle Removal—Locate the small mercury lighting fixture or switch and cut the one or two wire harness leading into the device. Remove any fasteners required to separate the component from the vehicle. Remove any lenses or bulbs as necessary. Repeat process for each mercury containing lighting fixture or switch in the vehicle.

5.2 Disassembly—Mercury capsules may be removed from the lighting fixture or switch as follows:

- 5.2.1 Remove capsules only at a properly designed work station. Proper work station design requires a secondary containment bowl or container made of heavy plastic in a well-lighted well-vented area.
- 5.2.2 Inspect the lighting fixture or switch to determine the manner in which it was constructed. Locate a snap latch, clip, mechanical stake, etc., which when removed will allow disassembly. If the manner of construction is not straight forward, then recycle the entire assembly.
- 5.2.3 Remove or open the snap latch, clip, mechanical stake, etc., using hand tools and open the lighting fixture or switch to expose the mercury capsule. Mercury capsules are generally glass or metal and are cylindrical or bullet shaped. Mercury itself is a silver-gray liquid metal.
- 5.2.4 Exercise caution when cutting any electrical leads emanating from the capsule in order to avoid rupturing the capsule itself. Immediately proceed with the capsule to the storage area before returning to recycle any of the remaining loose metal/plastic parts.