

## ***Exposure to Mercury Vapor During the Use of Mercury Carburetor Synchronizers***

### **Description of HAZARD**

In motorcycle and marine outboard engines with multiple carburetors, the vacuum pressure of each carburetor should be balanced. Mechanics commonly use mercury carburetor synchronizers for this procedure. Exposure to mercury may occur in two ways. Mercury carburetor synchronizers (gauges) contain about 40 grams of mercury that can be spilled if these gauges are not handled or stored properly. Also, improper engine tuning can cause mercury to be sucked into the engine and released instantly in high concentrations from the exhaust system. Acute exposure to high concentrations of mercury vapor can affect lung function and possibly damage the lungs. Mercury can also enter the body through the skin. Prolonged exposure to mercury can damage the kidneys and the central nervous system.

The National Institute for Occupational Safety and Health (NIOSH) is also concerned that many motorcycle and marine mechanics work in garages without effective ventilation systems for controlling motor vehicle emissions. To reduce exposure to these emissions, the mechanics rely on natural ventilation from open doors and windows, or they try to limit the amount of time an engine runs inside the garage.

### **Recommendations for Prevention**

#### **O Ventilation**

Motorcycle service garages should be equipped with an engine exhaust ventilation system to control carbon monoxide and other contaminants. Also referred to as “exhaust collectors,” these fan-powered systems are placed either overhead or under the floor, and are connected to flexible ducts that the mechanic attaches to the vehicle tail pipes. Marine mechanics should tune outboard motors in water tanks equipped with a slot exhaust ventilation system placed at the rear of the tank. Drawings and design specifications for these ventilation systems are available from the American Conference of Governmental Industrial Hygienists, Cincinnati, Ohio.

#### **O Work Practices**

1. Read the manufacturer’s instructions carefully before loading or using the mercury carburetor synchronizer. The gauges are shipped empty and must be loaded with mercury by the user. Make sure the top of the gauge is elevated about 1 inch before filling the mercury reservoir. Otherwise, the mercury will spill out of the top of the tubes.

2. Adjust the carburetors only while the engine is idling at 1,000 rpm. After the carburetors are synchronized at 1,000 rpm, the tuning procedure requires that the engine speed be slowly raised to 3,000 rpm to see whether the carburetors remain synchronized. Engine speeds exceeding 3,500 rpm can cause mercury to be drawn into the engine. Rapid throttle movements—especially cutting the throttle during a high engine speed—can also cause mercury to be sucked into the engine.
3. Evacuate the area immediately if mercury is drawn into an engine that is not connected to a properly functioning exhaust collector. It is likely that high concentrations of mercury vapor would be released instantly from the exhaust. Dissipation of these vapors would depend on the amount of ventilation supplied to the garage.
4. To avoid leaks, store the synchronizer in an upright position with the reservoir vent-cap closed.
5. Spills provide a continuous source of exposure to mercury vapor until the spill is cleaned up. If mercury is spilled, restrict access to minimize tracking mercury to other areas; ventilate the area by opening windows. Immediately contact your State health department or the U.S. Environmental Protection Agency (EPA) for detailed advice about the proper procedures for cleaning up and disposing of spilled mercury.

## O Substitution

Two types of mercury-free instruments are available for synchronizing carburetors: analog gauges (also known as vacuum gauges) and electronic gauges. Both of these are more expensive than mercury gauges, which cost \$30 to \$50. Vacuum gauges cost about \$100, and electronic gauges cost \$330. However, the proper cleanup and disposal of spills from mercury gauges can be expensive. The EPA requires that mercury from nonresidential spills be treated as hazardous waste by a licensed waste disposal company.

## For More Information

To obtain more free information about controlling this hazard, or to obtain information about other occupational safety and health issues:

—call NIOSH at **1-800-35-NIOSH (1-800-356-4674)**, or  
—visit the NIOSH Homepage on the World Wide Web at  
**<http://www.cdc.gov/niosh>**

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