
Hazard Information Bulletin



U.S. Department of Labor
Occupational Safety and Health Administration

Potential Hazards Associated With The Refurbishing of Gas Meters

HIB 01-12-21

Purpose

The purpose of this Hazard Information Bulletin (HIB) is to inform employers/employees who repair or refurbish gas meters that:

1. the threaded male gas inlet and outlet fittings on gas meters, called “ferrules” or “spuds,” may have been plated with cadmium to reduce corrosion while in operation; and
2. cleaning gas meter ferrules/spuds with high-speed rotating wire brushes may release cadmium dust, creating a potential health hazard.

Background

The Madison Area Office brought to the attention of the Directorate of Technical Support that potential hazards may be associated with cleaning and refurbishing gas meters. The Gas Displacement Meters standard (ANSI B109.1) states that the meter case and the meter’s external components shall be made of, or protected by, materials resistant to attack by the atmosphere, weather or sunlight, and agents used in meter cleaning and repair over the meter’s expected life. During the 1980’s, many manufacturers plated threaded male gas inlet and outlet fittings (ferrules/spuds) with cadmium to meet this requirement. OSHA is concerned that many employers and employees at gas meter repair shops are unaware that gas meter ferrules/spuds may be plated with cadmium.

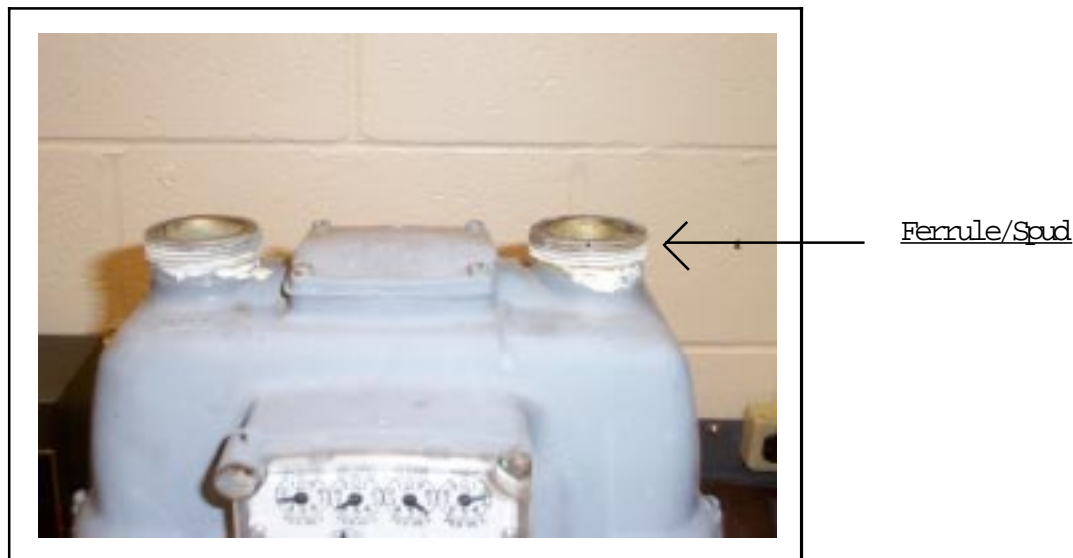
Description of Hazard

During a recent OSHA inspection of a gas meter repair shop at a utility company, the Agency discovered cadmium overexposures when employees used rotating wire brushes to clean the ferrules/spuds during refurbishing of gas meters (see Figure 1). Employees perform this cleaning operation to remove corrosion and residue from the ferrules/spuds. Gas meter repair shops refurbish these gas meters after 15+ years of use or when calibration is required. During the cleaning operation, in which a 4-inch diameter high-speed rotating wire brush was used, employee exposures to cadmium were measured at up to 3 times the cadmium permissible exposure limit (PEL) of $5 \mu\text{g}/\text{m}^3$ averaged over an 8-hour workday. Wipe samples taken in the gas meter repair shop were found to contain as much as $20,945 \mu\text{g}/\text{ft}^2$ cadmium.

The Occupational Safety and Health Administration’s (OSHA’s) Directorate of Technical Support issues Hazard Information Bulletins (HIBs) to provide information about unrecognized or misunderstood safety and health hazards, as well as potential hazards associated with particular materials, devices, techniques, and engineering controls. These bulletins are not standards or regulations and they create no independent legal obligations. They are advisory in nature, informational in content, and are intended to assist employers in providing a safe and healthful workplace.

Further information about this bulletin may be obtained by contacting OSHA’s Directorate of Technical Support at 202-693-2095.

Figure 1



Technical Information

Cadmium is a blue-white metal and is insoluble in water. Acute health effects associated with significant, short-term cadmium overexposures include a flu-like illness — with shortness of breath, chest pain, weakness, fever, headache, chills, sweating, muscular pain — and pulmonary edema. Chronic health effects, generally associated with overexposures over a longer period of time, include kidney dysfunction, and an increased risk of both lung and prostate cancer. Cadmium's primary routes of entry into the body are inhalation (i.e., breathing cadmium dust) and ingestion (e.g., smoking and eating in environments containing cadmium dust), particularly if people fail to wash their hands after being exposed to cadmium.

Recommendations

OSHA recommends that all employers at gas meter repair shops do the following:

1. Determine whether the ferrules/spuds on gas meters that are being refurbished have been plated with cadmium. This information may be obtained from the original equipment manufacturer or through analysis by a testing laboratory. In some cases when dealing with a mix of different manufacturers and build dates, it may be prudent to assume that all the ferrules/spuds are plated with cadmium.
2. If ferrules/spuds are found to be plated with cadmium and refurbishing operations are to be performed, evaluate the work environment to determine if employees could be exposed to an airborne cadmium concentration above the OSHA Standard's action level of $2.5 \mu\text{g}/\text{m}^3$ or PEL of $5.0 \mu\text{g}/\text{m}^3$.
3. Comply with all the appropriate requirements of the OSHA Cadmium Standard, 29 Code of Federal Regulations (CFR) 1910.1027 if a potential cadmium exposure is found to exist.
4. If cadmium plating of ferrules/spuds is known or suspected, and exposure monitoring results confirm that employee exposure to cadmium exceeds the PEL of $5.0 \mu\text{g}/\text{m}^3$, then implement engineering and work practice controls to reduce the exposure below the PEL:
 - a. feasible engineering controls may include local source capture ventilation. If high-speed rotating wire bushes are employed that create particles with high initial velocity, then a ventilated enclosure is recommended. For automated operations, consider a high toxicity materials machining hood, such as that shown in figure VS-45-02 of the *Industrial Ventilation Manual*, 23rd Edition from the American

Conference of Governmental Industrial Hygienists. For small production runs using hand operations, consider a ventilated glove box, such as the one shown in figure VS-35-20 of the *Industrial Ventilation Manual*, 23rd Edition from the American Conference of Governmental Industrial Hygienists. Every effort should be made to prevent cadmium particles from becoming airborne;

b. feasible work practice controls may include the implementation of work practices, such as wetting down or submerging the ferrules/spuds before cleaning and avoiding the use of high speed rotational wire brushes. Every effort should be made to prevent the cadmium particles from becoming airborne; and

c. feasible housekeeping methods may include vacuuming in lieu of dry sweeping dusty surfaces. Every effort should be made to prevent the cadmium particles from becoming airborne.

5. In situations where respiratory protection is appropriate, employers must comply with the provisions of 29 CFR 1910.1027 (q).