CAR-MON Safety Report

Carbon Monoxide and Diesel Exhaust in the Workplace

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CARBON MONOXIDE is a colorless, odorless, poisonous gas found in emissions from motor vehicles that can cause illness, permanent neurological damage, and death. It enters through the lungs and inhibits the blood's capacity to carry oxygen to organs and tissues. In small amounts it may impair exercise capacity, manual dexterity, learning functions, visual perception, and the ability to perform complex tasks. In larger amounts it can be deadly. Carbon monoxide (CO) is the leading cause of accidental poisoning deaths in America, according to the Journal of the American Medical Association (JAMA). The Occupational Safety and Health Administration (OSHA) has established a maximum safe working level for carbon monoxide at 35 parts per million (ppm) over an 8 hour period in the general workplace. Exposure to greater concentrations than this can and will have adverse effects on those exposed.

Due to the expanding use of diesel equipment, more workers than ever are exposed to diesel exhaust. Motor vehicles emit several pollutants that the EPA classifies as known or probable human carcinogens. Laboratory tests have shown that diesel exhaust is toxic, mutagenic, and carcinogenic. Formaldehyde, acetaldehyde, diesel particulate matter, and l,3-butadiene are hazardous products of incomplete combustion found in diesel exhaust.

Carbon monoxide and diesel smoke are considered by OSHA to be hazardous materials. If higher than allowable levels of contaminants are detected in the work environment, fines and penalties of up to thousands of dollars per day can be imposed by federal or state authorities. It is critical that maintenance facilities have adequate vehicle exhaust evacuation systems for both worker safety and OSHA compliance.

THE FIRST STEP in protecting your work environment is to gather information on the engines and operating conditions in the facility. Make a list of the engine displacements in cubic inches or liters. Pick the maximum RPM at which the engines are tested in the facility. Determine if the vehicles are tested under load either on a dynamometer or by hydraulic testing. It is important to note if the vehicles in the fleet have single exhaust, dual exhaust, or a mix of both.

The foregoing information is necessary to define the exhaust requirements for the vehicles and provide the basis for creating an adequate system design. The *Vehicle Exhaust System Design Worksheet* (Car-Mon Publication 96-ESD2) is in the Car-Mon catalog.

THE OTHER ELEMENTS of design include:

❖ Fan Selection ❖ System Layout ❖ Duct Sizing
❖ Points of Vehicle Exhaust Connection ❖ Type of Collection Devices

It is crucial that the fan is sized to evacuate more air than the vehicle exhausts to ensure that all of the contaminant is removed. If the vehicle exhausts more than the system can handle, the exhaust gasses will expand into the room and create a health hazard. Please refer to *Exhaust Requirements,* (Publication 96-ESD1) in the Car-Mon catalog. If you have any questions about system requirements, have an engineer or vehicle exhaust system expert verify the correct exhaust requirements as well as determine duct and fan sizing.

IT IS ALSO IMPORTANT for a system to be user friendly so that the operators will use it on a regular basis. There are many types of system arrangements and adapter styles designed for different building and vehicle configurations. For existing systems, some simple modifications may make the equipment easier to use. There are many different tailpipe adapters available for a variety of vehicles. Make sure that there are adapters on site that fit every tailpipe configuration so the exhaust system can be used on all vehicles.

For facilities with existing systems, managers should perform routine checks of the exhaust system to ensure that it works properly and is in good condition. They should check the tubing for any holes or burns and verify that it is not collapsed. They should also verify that the tailpipe adapters stay on the tailpipes during all test procedures. The fans should be checked for any excessive noise or vibration that may be due to worn bearings or improper balance. It is a good practice to physically feel the air suction at the adapter in all bays to make sure that the system ductwork is not blocked at any point.

EMPLOYERS SHOULD EDUCATE their employees of the effects of exposure to carbon monoxide and diesel exhaust. Employees should learn the symptoms of carbon monoxide poisoning; headache, nausea, weakness, dizziness, visual disturbances, changes in personality, and loss of consciousness.

Safety issues are always of primary importance. Whenever engines are run inside buildings, the health and safety of technicians, office personnel, and unsuspecting individuals are the primary concern of trade unions, insurance companies, local fire departments, and OSHA representatives. Compliance with regulations is necessary in every case.

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