



Just the Facts...

Vehicle Exhaust Gases-Individual

GENERAL INFORMATION	<p>There are three major types of internal combustion vehicle engines: gasoline, diesel, and turbine. The fuels used in these engines are generally mixtures of many chemicals. There are several methods of providing and burning the fuel. The composition of the exhaust is based primarily on the fuel and the temperature at which it is burned. Fuels use additive chemicals for many different reasons—to aid in flow, prevent freezing, and clean internal parts. These additives are present in low concentrations but they may be important exhaust components. One additive, tetraethyl lead, was previously used extensively in gasoline and other motor fuels. It is no longer used for automobiles in the US, but it is still used in some aircraft fuels and may be used in vehicle fuels overseas.</p> <p>Diesel and turbine engines use similar fuels and produce similar exhaust gases; except that diesel engines generally release more unburned carbon as particulate matter. JP-8, a NATO and joint service fuel, is currently replacing fuels used in diesel engines and turbines (JP-4 and JP-5). Chemical additives are blended in the JP-8 when it is used for different purposes (diesel engine fuel, cooking stoves, heating). Gasoline is a more refined fuel, but additive chemicals are still used.</p> <p>Vehicle exhaust gases are mostly made of carbon (as very small particles), unburned hydrocarbons, carbon dioxide, carbon monoxide, nitrogen oxides, sulfur oxides, water vapor, and thousands more “low-level” chemicals. The peculiar odor of diesel exhaust is due to aldehydes, acrolein, and sulfur compounds. Gasoline engines typically produce more carbon monoxide than diesel or turbine engines.</p> <p>The use of emission control measures from fuel regulation, to air injection and catalytic conversion of the exhaust gases, greatly affects the types and amounts of chemicals found in the exhaust gases.</p>
ROUTINE USES IN THE DEPLOYED SETTING	<p>Abrams M1A1/M1A2 Main Battle Tanks use gas turbine engine; Bradley Fighting Vehicles, HumVees, and most Army trucks use diesel engines; passenger and “light” motor vehicles, and small engine applications (water and transfer pumps; pesticide sprayers) use gasoline-fueled engines; Army boats are primarily diesel powered.</p>
PERSONAL PROTECTIVE EQUIPMENT (PPE) and COUNTERMEASURES AVAILABLE FOR DEPLOYED PERSONNEL	<p>Routine use of personal protective equipment is not necessary. The location of the exhaust discharge is considered in the vehicle’s design to prevent or minimize exposure to personnel in the vehicle. However, under some operating conditions, exhaust gases may enter the driver or passenger area. In these instances, reasonable actions, consistent with operational requirements, should be made to minimize production and inhalation of the exhaust gases. These actions include changing the direction or speed of movement, varying engine speed if idling, shutting down the engine, and moving unnecessary personnel out of the nearby area.</p>
EXPOSURE LEVELS HISTORICALLY ENCOUNTERED	<p>The make-up of exhaust gases varies under different engine and environmental operating conditions. You can smell many exhaust components at levels below which they are known to cause harm. If you smell the “exhaust gas: odor, it does not mean that you have been exposed to a harmful level. All engines produce exhaust gases that can contain many chemicals, but when they are released and diluted in the air, these levels decrease rapidly. Internal combustion engines should not be operated in confined (closed) spaces.</p> <p>Gasoline engine exhaust, even with a catalytic converter, can produce potentially lethal levels of carbon monoxide.</p>

<p>SIGNS AND SYMPTOMS OF ACUTE AND CHRONIC EXPOSURE</p>	<p>Short-Term (Acute) Effects at moderate concentrations above permissible exposure levels (if you were in a closed space) include: irritation of the eyes, nose, and throat; lightheadedness; headache; fatigue; dizziness; visual disturbances; difficulty concentrating; feeling of being “drunk”; heartburn; weakness, numbness and tingling in extremities; chest tightness; wheezing; nausea, and vomiting.</p> <p>Long-Term (Chronic) Effects can be seen in some individuals. Chronic lung conditions can develop due to the inhalation of vehicle exhaust. Persistent cough and the production of mucous, inflammation of the airway passages (bronchitis), and reduced lung capacity can occur. This condition is called chronic respiratory disease. It is very similar to the condition that is caused by smoking tobacco.</p> <p>Several substances in vehicle engine exhaust are known to cause cancer. They may be present in very low concentrations, and the levels vary greatly. It may take many years following exposure for diesel-related cancer to develop.</p>
<p>REVERSIBILITY OF ACUTE AND CHRONIC EFFECTS</p>	<p>Mild exposures do not usually result in any significant short- or long-term effects. The effects go away when the exposure is stopped and individuals breathe fresh air. Moderate levels of exposure exceeding the permissible exposure limit for the various exhaust components, can result in significant effects that may, or may not, be reversible. The effects and their severity are dependent upon the specific exhaust component and its concentration. High levels of exposure can result in rapid death.</p>
<p>TREATMENT REQUIRED/AVAILABLE FOR EXPOSURE</p>	<p>The general treatment for vehicle exhaust gas inhalation is to stop the exposure and to start breathing fresh air. Oxygen may be used depending upon the severity and duration of the exposure. Chronic lung diseases usually require periodic medical care in addition to health maintenance for the specific condition.</p>
<p>LONG TERM MEDICAL SURVEILLANCE REQUIREMENTS OF HEALTH EFFECTS MONITORING</p>	<p>There is no general health monitoring needed for routine exposure. Based upon the composition of the specific fuel or exhaust, specific monitoring for a component chemical (benzene), or associated exposure (noise) may be required.</p> <p>Individuals who have been identified with a chronic lung disease require periodic medical evaluation and follow-up</p>
<p>SPECIAL RISK COMMUNICATION INFORMATION</p>	<p>Carbon monoxide is a minor component of diesel and turbine exhaust, but it is a more significant component of gasoline engine exhaust. Although a catalytic converter reduces the level, a potentially lethal exposure can occur. Some of the chemicals in vehicle exhaust are very toxic, and vehicles should not be operated in confined spaces.</p> <p>Most of the harmful chemicals in vehicle exhaust are found in low quantities and are mixed rapidly with fresh air. Under these conditions, there is no anticipated effect on your health.</p>