AQMD FACT SHEET

STUDY OF AIR POLLUTION LEVELS INSIDE VEHICLES

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What was the study's basic finding?

Levels of some air pollutants are up to 10 times higher inside vehicles than in outside air. Specifically, the study found levels of volatile organic compounds, including benzene, toluene, formaldehyde and methyl tertiary butyl ether (MTBE), as well as carbon monoxide were up to 10 times higher inside vehicles than at fixed monitoring stations. The variations depended on the pollutant, the type of road, the level of traffic and the type of vehicle being followed.

What was its goal?

The study aimed to measure motorists' personal exposure to volatile organic compounds, toxic air pollutants, fine particulates, diesel soot and carbon monoxide – all products of vehicle exhaust -- during commutes in the Los Angeles and Sacramento areas.

In general, levels of toxics and other pollutants are higher inside vehicles than in outdoor ambient air because cars are surrounded by the emissions from other vehicles on the freeways and streets.

How was the study conducted?

In the study, conducted during fall 1997, a 1991 Chevrolet Caprice was converted to a monitoring station on wheels, with instruments crammed into the backseat measuring air pollution levels inside and just outside the car. Two other vehicles – a 1997 Ford Taurus and a 1997 Ford Explorer – also were tested to see if air pollution levels inside sedans differed from those in sport utility vehicles.

Two roadside air pollution monitors also were set up in different locations along the commute routes and ambient measurements were taken from an existing network of fixed monitoring stations.

Researchers drove the test cars during several two-hour commutes along Los Angeles and Sacramento area freeways and surface streets during rush and non-rush hours. Drivers made an effort where possible to follow high-emitting vehicles such as diesel trucks to record a "worst case" in-car pollution scenario.

What routes were driven in the test vehicles?

The Los Angeles freeway commute route started from El Monte during afternoon rush hours and followed Interstate 10 West, Interstate 110 South, Interstate 405 East, Interstate 710 North, State Route 91 East, Interstate 605 North and Interstate 10 West back to El Monte. Drivers drove the same route in the opposite direction during morning rush hours.

How do these results compare to past studies?

The research corroborates a 1989 study conducted by AQMD that found levels of toxics two to four times higher inside cars than outdoors.

How do in-car pollution levels in Los Angeles compare to other parts of the state?

The new report also found that in-car pollutant levels were two to four times higher in the Los Angeles area than in Sacramento, paralleling higher ambient levels of toxics in the Southland.

What other results did the study find?

- Particulate pollution such as diesel soot levels were 20% to 40% lower inside vehicles than immediately outside and along roadways, probably due to vehicles' ventilation systems keeping some of the particles out, the study said;
- A highly polluting vehicle such as a heavy-duty diesel truck directly in front of a motorist can account for up to 50% of the pollutants inside their car, according to the study;
- Opening or closing a vehicle's air vents has little effect on pollutant levels in the car;
- The air inside a car driving in a relatively non-congested carpool lane was 30% to 50% cleaner than that in a car driving in a slow right-hand lane;
- Pollution inside cars was worse during freeway rush hours than non-rush hours;
- Particulate levels were three to five times lower inside cars following ethanol- or compressed natural gas-powered transit buses compared to diesel buses; and
- Sedans and sport utility vehicles had similar inside pollution levels.

How can motorists reduce their exposure to in-car pollution?

- Report smoking vehicles and trucks to AQMD's smoking vehicle hotline at 1-800-CUT-SMOG;
- Carpool if possible since vehicles driven in the carpool lane have lower levels of inside air pollution; and
- When purchasing a new vehicle consider buying one equipped with an air filtration device to reduce particulate pollution inside the vehicle.

Who conducted and funded the study?

Research Triangle Institute of Research Triangle Park, N.C., and subcontractors conducted the study with a $399,716 grant from the California Air Resources Board and $40,000 from AQMD.

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