

The vehicle has been estimated to contribute 2 to 40% of the compounds of this class found in urban atmospheres, depending on the city. (The main source of PNA in city air is the burning of coal, particularly in antiquated residential heating units; the strongest doses to individuals come from smoking -- cigarette smoke is full of PNA's.) The reason for concern about PNA's is that many of them, and their methyl derivatives, are carcinogens.

Factors affecting PNA emissions are the following: High aromaticity in the fuel gives high PNA emissions. High consumption of lubricating oil gives high PNA emissions. The presence or absence of lead anti-knock fluid seems to have little or no effect on PNA emissions if the rest of the gasoline composition is held constant. Avoiding a rich fuel mixture strongly reduces PNA emissions but little is gained by continuing to increase the air-fuel ratio beyond the stoichiometric value and into the lean region. Emissions of PNA's are at their highest during acceleration and deceleration. As a rule, emission controls for PNA's are the same as those for hydrocarbons in general and for CO: air injection thermal reactors on the manifold, catalytic converters, etc. Particulate traps reduce PNA emissions but not to an impressive extent. Much of the PNA produced in the automobile ends up in the crankcase; presumably, then, the control of blowby suppresses PNA emissions.

Fuel factors affecting the mass of emitted gross particulate matter are the following: The presence of Pb gives higher emissions (though Habibi and Jacobs of DuPont claim the opposite), mostly due to an increase in the amount of inorganic material (primarily Pb salts). However, there is some evidence that leaded fuel reduces the emission of carbon and/or carbon compounds during cold start and warmup. An increase in the amount of scavenger (ethylene dichloride, ethylene dibromide) in the anti-knock fluid causes emission of more particulate matter. Fuel additives such as upper cylinder lubricant seem to increase