

the car, some 75% of the Pb consumed is emitted as particulate. Emissions tend to increase with age.

Emissions of gross particulate matter are highest when the engine is cold. Particles can be expected to be larger at low exhaust gas velocity owing to enhanced opportunity for coagulation and wall loss, and indeed it appears (Ref. 36) that nitrate and sulfate particles are larger at lower road speed. It is presumably true that oil burners are smoke producers. Diesel particulate emissions rise very steeply when the engine load approaches its maximum rating.

Various means of control for gross particulates have been tried. A system of fluted exhaust pipes (for cooling) followed by a mesh-filled box and a cyclone collector (DuPont, Ref. 28) reduced Pb emissions 10-fold. Other systems (Ref. 42) include thermal precipitation in a packed bed or acoustic coagulation in a fluidized bed, or (Ref. 32) a simple trap muffler. The control of blowby gets rid of much of the problem, since the particulate emissions in blowby are in quantities approaching the tailpipe emissions.

Catalysts for the control of gaseous pollutants seem to be very effective in destroying organic particulates. With lead-free fuel, nearly all of the exhaust particulate matter is organic. It is therefore anticipated that the use of catalysts, especially since such use apparently must be accompanied by the use of lead-free fuel, will eliminate the problem of exhaust particulates. Particulate emissions from attrition of the catalyst itself, by chemical attack, exfoliation, pellets wearing against each other, etc., should perhaps be considered, especially in view of the fact that such material is, after all, a catalyst.