

Control of Hazardous Air Pollutants from Mobile Sources: Final Rule to Reduce Mobile Source Air Toxics

The U.S. Environmental Protection Agency (EPA) is issuing a final rule to reduce hazardous air pollutants from mobile sources. Hazardous air pollutants, also known as air toxics, include benzene and other hydrocarbons such as 1,3-butadiene, formaldehyde, acetaldehyde, acrolein, and naphthalene. Air toxics emitted by motor vehicles and other moving sources (called “mobile source air toxics,” or MSATs) contribute significantly to the nationwide risk from breathing outdoor air toxics. The final standards will significantly lower emissions of benzene and the other air toxics in three ways: (1) by lowering benzene content in gasoline; (2) by reducing exhaust emissions from passenger vehicles operated at cold temperatures (under 75 degrees); and (3) by reducing emissions that evaporate from, and permeate through, portable fuel containers.

Background

Section 202(1) of the Clean Air Act requires EPA to set standards to control hazardous air pollutants from motor vehicles, motor vehicle fuels, or both. EPA published a rule under this authority in March 2001 that established toxics emissions performance standards for gasoline refiners and committed to additional rulemaking to evaluate the need for and feasibility of additional controls. This final rule fulfills that commitment from the 2001 rule.

In addition, EPA is adopting emission standards for portable fuel containers (such as gas cans) under the consumer products authority of the Clean Air Act (section 183(e)).

Reason to Reduce Mobile Source Air Toxics

MSATs are known or suspected to cause cancer or other serious health or environmental effects. Benzene is of particular concern because it is a known carcinogen and most of the nation's benzene emissions come from mobile sources. People who live or work near major roads, or spend a large amount of time in vehicles, are likely to have higher exposures and higher risks. People living in homes with attached garages are also likely to be exposed to benzene levels that are higher than average.

Many MSATs are part of a larger category of mobile source emissions known as volatile organic compounds (VOC), which contribute to the formation of ozone and possibly particulate matter (PM). Ozone and PM can contribute to serious public health problems, including premature mortality, aggravation of respiratory and cardiovascular diseases, damage to lung tissues and structures, altered respiratory defense mechanisms, and chronic bronchitis.

Fuel Program

EPA is requiring that, beginning in 2011, refiners must meet an annual average gasoline benzene content standard of 0.62 percent by volume (vol%) on all their gasoline, both reformulated and conventional, nationwide. The national benzene content of gasoline today is about 1.0 vol%. (Gasoline sold in California will not be covered because California has already implemented more stringent standards similar to those EPA is establishing.)

The regulations include a nationwide averaging, banking, and trading program. In addition to the 0.62 vol% standard, refiners must also meet a maximum average benzene standard of 1.3 vol% beginning on July 1, 2012. A refinery's or importer's actual annual average gasoline benzene levels may not exceed this maximum average standard. The Agency expects that gasoline in all areas of the country will have lower benzene levels than they do now, and there will be less geographic variability in gasoline benzene levels. Areas where benzene levels are currently highest, such as Alaska and the Northwest, will experience the most significant reductions. EPA is providing special compliance flexibility for approved small refiners or any refiner facing extreme unforeseen circumstances.

Vehicle Program

EPA is adopting new standards to reduce non-methane hydrocarbon (NMHC) exhaust emissions from new gasoline-fueled passenger vehicles. NMHCs include many mobile source air toxics, such as benzene. Recent research indicates that the current test procedures often do not result in robust control of NMHCs at colder temperatures below 75 degrees. Therefore, we are requiring that passenger vehicles meet new NMHC exhaust emissions standards at colder

temperatures. As shown in Table 1, each manufacturer's vehicles will be subject to a sales-weighted fleet average NMHC level of 0.3 grams/mile for lighter vehicles weighing 6,000 pounds (lbs) or less. Vehicles above 6,000 lbs (which include trucks up to 8,500 lbs and passenger vehicles up to 10,000 lbs) must meet a sales-weighted fleet average NMHC level of 0.5 grams/mile. The standards phase in between 2010 and 2013 for the lighter vehicles, and between 2012 and 2015 for the heavier vehicles. A credit program and other provisions provide flexibility to manufacturers, especially during the phase-in periods.

Table 1 - Cold Temperature NMHC Standard and Phase-In Schedule

| Vehicle Weight Class (GVWR) ^A | NMHC Emission Level (grams/mile) | Phase-In Schedule ^B (percent) | | | | | |
|---|----------------------------------|--|------|------|------|------|------|
| | | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
| ≤ 6000 lbs | 0.3 | 25 | 50 | 75 | 100 | | |
| > 6000 lbs to 8500 lbs plus passenger vehicles up to 10,000 lbs | 0.5 | | | 25 | 50 | 75 | 100 |

^AGross Vehicle Weight Rating

^B Percent of each manufacturer's fleet, by model year, that must comply with the standard.

Along with the vehicle exhaust standards, we are also adopting more stringent evaporative emission standards for new passenger vehicles. The new standards are equivalent to California's standards and codify the approach that manufacturers are already taking for 50-state evaporative systems. We are implementing the evaporative emission standards in 2009 for lighter vehicles and in 2010 for the heavier vehicles.

Portable Fuel Container Program

EPA is establishing standards that will limit hydrocarbon emissions that evaporate from or permeate through portable fuel containers such as gas cans. Gas cans are consumer products used to refuel a wide variety of gasoline-powered equipment, including lawn and garden equipment, recreational equipment, and passenger vehicles that have run out of gas. The new requirements also apply to diesel and kerosene containers. Starting with containers manufactured in 2009, the standard limits evaporation and permeation emissions from these containers to 0.3 grams of hydrocarbons per gallon per day. We are also adopting test procedures and a certification and compliance program in order to ensure that containers meet the emission standard over a range of in-use conditions.

EPA has worked closely with major container manufacturers and it is expected that the new cans will be built with a simple and inexpensive permeation barrier and new spouts that close automatically.

Program Benefits

The new fuel benzene standard and hydrocarbon standards for vehicles and gas cans will together reduce total emissions of mobile source air toxics by 330,000 tons in 2030, including 61,000 tons of benzene. As a result of this rule, new passenger vehicles will emit 45 percent less benzene, gas cans will emit 78 percent less benzene, and gasoline will have 38 percent less benzene overall. Our analyses show that this rule provides the biggest benefit to individuals from areas experiencing the highest levels of risk. That includes areas such as the Pacific Northwest, where fuel benzene levels are currently among the highest in the country, and cold temperature vehicle emissions are high as well.

In addition, the hydrocarbon reductions from the vehicle and gas can standards will reduce volatile organic compound (VOC) emissions (which are precursors to ozone and can be precursors to $PM_{2.5}$) by over 1 million tons in 2030. The vehicle standards will reduce direct $PM_{2.5}$ emissions by 19,000 tons in 2030 and may also reduce secondary formation of $PM_{2.5}$. Once the regulation is fully implemented, the Agency estimates these PM reductions will result in the avoidance of nearly 900 premature deaths annually.

We estimate that most of the benefits of this final rule will come from the reduced direct $PM_{2.5}$ emissions of the vehicle standards, estimated to be about \$6 billion in 2030. Some additional benefits will come from reductions in mobile source air toxics and VOCs, although we have not been able to monetize these benefits.

Estimated Costs per Program

The additional cost of producing gasoline to comply with the new benzene standard is expected to average \$0.0027 per gallon. This per-gallon cost would result from an average of \$14 million in capital investment in each refinery that adds equipment to reduce gasoline benzene levels.

We estimate that the annual net social costs of this rule will be approximately \$400 million in 2030 (expressed in 2003 dollars). These net social costs include the value of gasoline savings from the new fuel container standards, which is estimated to be worth \$92 million in 2030.

We estimate that the additional cost to manufacturers will be less than \$1 per vehicle. The costs will be associated with vehicle research and development and recalibration, as well as facilities upgrades to handle additional development testing under cold conditions. We are not anticipating additional costs for the new vehicle evaporative emissions standard since manufacturers will likely continue to produce 50-state evaporative systems that meet California's standards.

The average additional cost of producing portable fuel containers that comply with the new standards will be less than \$2 per can. The reduced evaporation from containers will result in gasoline savings over the life of the container that will more than offset the increased cost for the container.

For More Information

You can access documents on this rulemaking on EPA's Office of Transportation and Air Quality Web site at:

www.epa.gov/otaq/toxics.htm

For further information, please contact the Assessment and Standards Division at:

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