United States Environmental Protection Agency

Office of Transportation and Air Quality
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Questions and Answers
MOBILE6.2

What is EPA releasing?

EPA is releasing a final version of MOBILE6.2, a computer model for estimating emissions from highway vehicles, including cars, trucks and motorcycles. This model replaces a draft version that was made available in October 2002. MOBILE6.2 is now our official model for estimating emissions of particulate matter (PM) and air toxics. It may also be used to estimate carbon monoxide (CO), hydrocarbons (HC) and oxides of nitrogen (NOx) for official EPA purposes.

How can I access the final version of MOBILE6.2?

EPA has posted the final version of the materials needed for running MOBILE6.2 on the EPAís MOBILE6 Web site at: www.epa.gov/otaq/m6.htm.

How does the final version of MOBILE6.2 differ from the draft version?

The final version of MOBILE6.2 includes a further reduction in future CO emissions to better account for the effect of new emission standards on car and light truck emissions. This is explained in more detail below.

The model also includes some minor technical changes to make it easier to run the model on different computers. Finally, the model includes a change to the carbon dioxide (CO_2) emissions methodology to better estimate atmospheric CO_2. As explained below, the CO_2 portion of the MOBILE6.2 model will continue to be considered ì draftî . EPA is not approving this part of the model in the final version of MOBILE6.2.

Why were new CO rates developed?

In the 2002 versions of MOBILE6 and MOBILE6.2, we assumed that upcoming improvements in the HC and NOx emission standard for light duty vehicles would have no effect on the vehiclesí basic CO emission rates. Now that vehicles certified to the National Low Emitting Vehicle (NLEV) and Tier2 standards are available, new data suggest that the changes in the HC and NOx emission standards for NLEV and Tier 2 vehicles will affect CO emission rates. This difference is important enough that EPA has decided to change the basic emission and deterioration rates for CO emissions in MOBILE6 for vehicles certified to the NLEV and Tier 2 emission standards.

How does the new model compare to previous models for estimating CO emissions?

The new model shows reduced CO emissions for vehicles certified to the NLEV and Tier 2 standards. In most states, NLEV vehicles begin to enter the fleet in 2001. There is no change in CO emissions for years prior to the phase-in of these vehicles. The effect of this change on fleet-wide CO emissions is fairly small.

How does the new model compare to previous models for estimating PM and air toxics?

EPAís PART5 model was created in 1995 to estimate PM emissions from highway vehicles. EPAís MOBTOX model was created in 1993 and updated in 1999 to estimate highway vehicle air toxics emissions. The final version of MOBILE6.2 officially replaces these models.

The final MOBILE6.2 algorithm is not a major update to the PART5 and MOBTOX emission factors. However, MOBILE6.2 is easier to use than the previous models, and like the draft version, the finalMOBILE6.2 reflects new particulate regulations that came into effect since PART5 was released. Also, the vehicle fleet and activity data have been updated.

Why were new particulate and air toxics models developed?

Combining the particulate matter and air toxics models with MOBILE6.0 gives users a single, consistent way to model all the major highway vehicle pollutants. It eliminates significant duplication of technical material between the models, which reduces errors and speeds model updates.

The new tools also address major problems with the previous models, particularly by updating the particulate emission factors to account for new regulations and significantly reducing the number of steps required to model air toxics.

Combining updated PART5 and MOBTOX models with MOBILE was a prominent recommendation of the National Academy of Science Research Councilís review of MOBILE.

What kinds of particulate emissions can be calculated with the new model?

MOBILE6.2 estimates highway vehicle emissions of direct particulate matter from vehicle exhaust, brake and tire wear, and particulate precursor emissions of gaseous sulfur dioxide (SO_2) and ammonia (NH_3). For diesel fueled vehicles, exhaust particulate matter is broken down into four constituents: lead particulate, organic carbon particulate, elemental carbon particulate, and sulfate particulate. For gasoline fueled vehicles the two carbon particulate components are combined.

MOBILE6.2 does not include estimates of fugitive road dust emissions. These can be estimated using emission factors developed separately by EPAís Office of Air Quality Planning and Standards (OAQPS). Note, these fugitive dust factors have also been updated and the new factors are being approved for SIP and conformity use. More information is available on OAQPS's Web site at: www.epa.gov/ttn/chief/ap42/ch13/.

What kinds of air toxics emissions can be calculated with the new updated model?

MOBILE6.2 estimates highway vehicle emission factors in milligrams per mile for mobile source air toxics. MOBILE6.2 estimates emission factors for benzene, 1,3-butadiene, formaldehyde, acetaldehyde, acrolein, and MTBE. All of these compounds except MTBE were identified as risk drivers in the recent National-Scale Air Toxics Assessment. The model also can estimate emissions of other toxics based on user provided information. Emission factors are reported according to whether they are exhaust, diurnal, hot soak, running loss, resting loss or refueling loss emissions.

How does the release of a final MOBILE6.2 affect EPAís policies on the use of MOBILE6 in SIPs and conformity determinations?

The effect of MOBILE6.2 on SIP and conformity policy varies depending on what pollutant is being analyzed. Please see the separate SIP and conformity policy memo for details.

Does the final release of MOBILE6.2 mean that SIPs and conformity determinations will be required for air toxics?

No, SIPs and air quality designations are only required for criteria air pollutants. The criteria pollutants are ozone, carbon monoxide, particulate matter, lead, sulfur dioxide and nitrogen dioxide. Transportation conformity determinations are required only in nonattainment and maintenance areas for ozone, carbon monoxide, particulate matter and nitrogen dioxide.

What does the update of the air toxics model mean for analyses under the National Environmental Policy Act?

While MOBILE6.2 is EPA's best available tool for quantifying toxics emissions from highway vehicles, its availability has no direct bearing on the administration of the National Environmental Policy Act (NEPA). The Department of Transportation has responsibility for implementing NEPA for its projects, and it has not yet developed a policy on how mobile source air toxics should be addressed in NEPA analyses.

How does MOBILE6.2 estimate particulate emissions?

MOBILE6.2 estimates emission factors using vehicle fleet and activity information from MOBILE6 and emission rate information from PART5, supplemented with information about future vehicle emission standards. MOBILE6.2 calculates SO_2 and sulfate particulate emissions via the method used in PART5, but instead of using hard-coded fuel sulfur values, MOBILE6.2 bases the calculation on user-supplied fuel sulfur levels of gasoline and diesel fuel.

It is important to realize that the PM emission rate estimates of MOBILE6.2 are not as sophisticated as those for HC, CO, and NOx. For example vehicle speed has little effect on the gram per mile estimates of PM emissions, and there are no effects of temperature or I/M programs.

Additional detail regarding the particulate emission rate calculations in MOBILE6.2 is provided in the technical paper ìMOBILE6.1 Particulate Emission Factor Model - Technical Descriptionî (EPA420-R-03-001, January 2003). (Note, we have changed our model numbering since this paper was written. Despite the title, the report correctly describes the particulate matter data and algorithms in the final version of MOBILE6.2.)

How does MOBILE6.2 estimate toxics emissions?

For the air toxics directly estimated in the model (benzene, 1,3-butadiene, formaldehyde, acetaldehyde, acrolein, and MTBE), MOBILE6.2 applies toxic fractions to the total organic gas (TOG) gram per mile emission factors to calculate air toxic emission factors. The model adjusts the fractions to account for the difference between laboratory data and in-use driving. The model also accounts for differences in exhaust toxic fractions between different vehicle technologies and normal and high emitting vehicles in calculating emission rates. Moreover, the model accounts for the impacts of specific fuel parameters as in EPAís Complex Model for Reformulated Gasoline.

For other toxics, the user can enter emission factors or air toxic ratios as fractions of VOC, fractions of TOG, or fractions of PM, and the model will calculate average vehicle class and fleet in-use emission factors.

MOBILE6.2 uses the same algorithms as MOBTOX5b to estimate toxic to TOG ratios for benzene, 1,3-butadiene, formaldehyde, acetaldehyde, and MTBE. However, while the base TOG emission rates in MOBTOX5b incorporated elements of MOBILE6, significant revisions to emission rates were made subsequent to the development of MOBTOX5b and prior to release of MOBILE6. As a result, MOBILE6.2 estimates somewhat higher emission factors in base years, with a convergence in emission factors by 2020. These differences are discussed in more detail in the report, ìTechnical Description of the Toxics Module for MOBILE6.2 and Guidance on the Its Use for Emission Inventory Preparationî (EPA420-R-02-029, November 2002).

How does the new model compare to previous models for estimating fuel economy and CO_2 emissions?

While the new model is a final model for HC, CO, NOx, PM and air toxics, the fuel economy and CO_2 estimates produced by the model are still considered draft. The fuel economy estimates in todayís version of the model are the same as those in the October 2002 draft. However, the CO_2 estimates are now calculated with a different algorithm that assumes all carbon in the fuel is eventually converted to atmospheric CO_2. The details of this algorithm are explained in the EPAís fall 2003 draft technical report ìUpdating Fuel Economy Estimates in MOBILE 6.2.î

Where can I get more information on MOBILE6.2?

Technical reports describing the details of the MOBILE6.2 calculations are posted on the MOBILE6 Web site at: www.epa.gov/otaq/m6.htm. A user guide is also posted on this site. If, after reviewing these materials, you still have questions about MOBILE6.2, please contact us by email at mobile@epa.gov.