

# Updated Emission Factors of Air Pollutants from Vehicle Operations in GREET<sup>TM</sup> Using MOVES

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## 1 BACKGROUND

Air pollutant emission factors from conventional gasoline and diesel vehicles are needed to construct baseline emission scenarios for well-to-wheels (WTW) analysis of the air pollutant emissions of both conventional and advanced vehicle technologies. Air pollutant emission factors vary over time with advances in engine technologies, changes in fuel specification regulations, deterioration due to vehicle mileage accumulation, implementation of tighter on-road emission controls such as inspection and maintenance (I/M) programs, and adoption of advanced emission control technologies, such as second-generation onboard diagnostics (OBD II), selective catalytic reduction, diesel particulate filters, and diesel oxidation catalysts. Therefore, up-to-date air pollutant emission factors from vehicle operations that reflect the impacts of recent advances in vehicle technologies and emission control regulations are needed for an improved understanding of pump-to-wheels emissions and for the evaluation of the air pollutant emission reduction potentials of alternative vehicle technologies.

Efforts were made to estimate the vehicle criteria air pollutant emission factors using EPA's MOBILE6.2 and California Air Resource Board's EMFAC models in a previous Argonne National Laboratory study (Brinkman et al., 2005). The present document aims to update the vehicle model year (MY)-based emission factors of various air pollutants from vehicle operation activities involving various vehicle technologies, using the EPA's latest mobile-source emission factor model, the Motor Vehicle Emission Simulator (MOVES) (EPA, 2013a). The lifetime mileage-weighted average emission factors for vehicles of each MY between 1990 and 2020, over their lifetime of over 30 years, are to be estimated. The probability distribution functions (PDFs) of the emission factors will also be updated for uncertainty analysis purposes. The updated emission factors and their PDFs are to be used by the GREET<sup>TM</sup> (Greenhouse gases, Regulated Emissions, and Energy use in Transportation) model, which was originally developed to evaluate the fuel-cycle (or WTW) energy use and emissions of various transportation technologies (Wang, 1999).

## 2 METHODOLOGY AND DATA

### 2.1 The MOVES Model

We used MOVES2010b, the latest version of the EPA's modeling tool for estimating emissions from highway vehicles. Specifically, emission factors from gasoline and diesel passenger cars, light-duty and heavy-duty trucks, and motorcycles were estimated for six criteria air pollutants, carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), sulfur oxides (SO<sub>x</sub>), volatile organic compounds (VOCs), particulate matter with diameters of 10 micrometers or less (PM<sub>10</sub>), and particulate matter with diameters of 2.5 micrometers or less (PM<sub>2.5</sub>), as well as the major components of particulate matter, i.e., black carbon (BC), organic carbon (OC), and sulfate. In addition, emission factors for two non-carbon dioxide (CO<sub>2</sub>) greenhouse gases, methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O), were estimated. The development of MOVES has been based on the analysis of millions of emission test results and considerable advances in the EPA's understanding of vehicle emissions (EPA, 2013b).

Over the last ten years, EPA's in-use emission data, reflecting standards and technologies such as Tier 2, OBD II, and enhanced evaporative emission control systems, have dramatically improved. For MOVES2010b, EPA has been able to carefully study these newer technologies, examining millions of results for light-duty vehicles. Also in support of MOVES2010b development, the EPA conducted a landmark study of PM emissions, testing nearly 500 gasoline-fueled light-duty cars and trucks in Kansas City, Missouri, in what is currently the largest such study ever conducted. With the testing of more than 400 in-use trucks and the incorporation of additional emission measurement data from heavy-duty diesel crankcase ventilation and from extended idling—two emission processes that were relatively unstudied at the time MOBILE6.2 was developed—EPA's understanding of emissions from heavy-duty vehicles has continued to improve since MOBILE6.2 was issued. Therefore, MOVES2010b replaces MOBILE6.2, the previous model for estimating on-road mobile-source emissions, as EPA's best available tool for quantifying criteria pollutant and precursor emissions from light- and heavy-duty vehicles (EPA, 2013b).

In the development of MOVES, EPA has transitioned away from the standard MOBILE6 vehicle classes (based on gross vehicle weight rating, or GVWR) and instead characterizes vehicles by source type, based on their expected mode of operation. However, the emission factors contained within the model are still primarily aggregated on a vehicle class/weight basis (ERG, 2011). An internal module of MOVES called Source Bin Generator maps the source types in MOVES to GVWR-based vehicle classes. Table A1 in the Appendix summarizes the vehicle type mapping in MOVES. MOVES is also capable of generating emission factors by source classification code, which corresponds to GVWR-based vehicle classes.

### 2.2 MOVES Inputs

Vehicle engine technologies, driving cycles on various road types, fuel specifications and quality, I/M programs, emission control technologies, ambient meteorological conditions, and

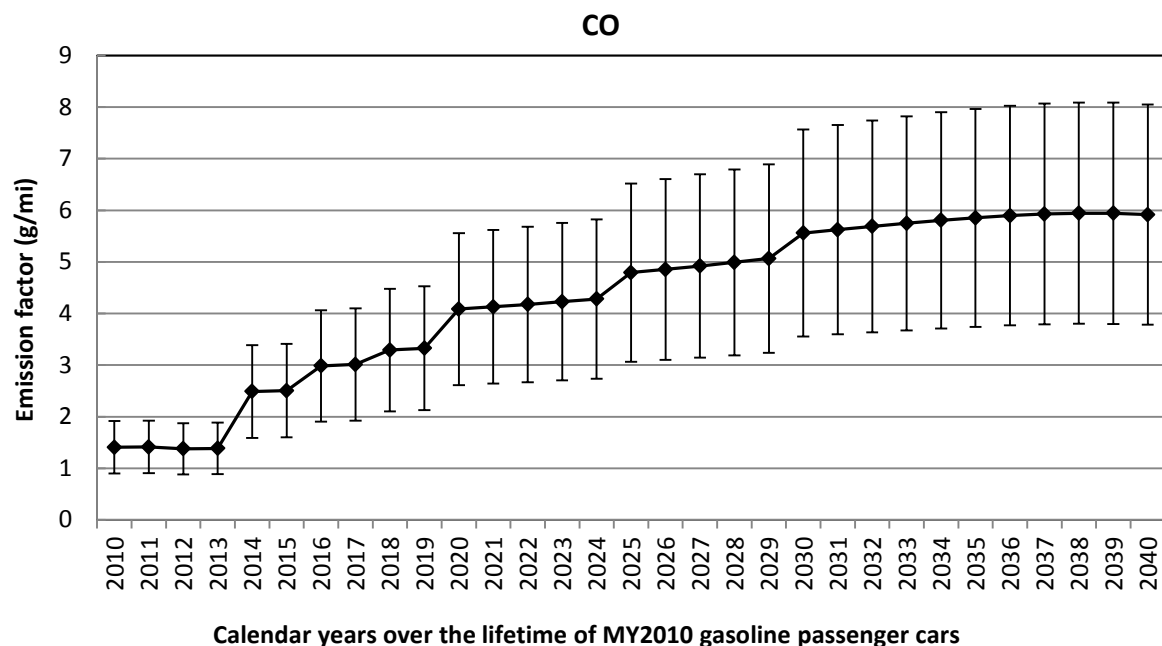


deterioration effects due to accumulated mileage are among the many factors that affect air pollutant emissions from vehicle operations. Therefore, the input parameters required by MOVES include population and vehicle miles traveled (VMT) by vehicle type; temporal and spatial distributions of VMT by vehicle type; age distribution and average speed distribution by vehicle type; road type distribution; ramp fractions and types; formulations and market shares of fuels; I/M programs by vehicle type by MY; and ambient meteorological conditions. To this end, we used the “default” input database in MOVES2010b that summarizes all required emission-relevant information for the entire U.S. to estimate the U.S. average emission factors of a specific MY vehicle over the calendar years (CYs) of the vehicle’s lifetime, except for information on evaporative VOC emissions, which requires hourly temperature and relative-humidity profiles and fuel specifications for hourly-based simulation. The data for the default database come from many sources, including EPA studies, Census Bureau vehicle surveys, Federal Highway Administration travel data, and other federal, state, local, industry and academic sources (EPA, 2012). The national-level MOVES2010b runs were performed for each CY from 1990 to 2050, to provide emissions and VMT results for each CY of each MY vehicle’s lifetime from 1990 to 2020. For evaporative VOC emissions, which are produced through fuel vapor venting, permeation, and leak processes, we performed the state-level MOVES2010b simulations in Illinois and Texas with state-specific hourly meteorological data and fuel types and fuel specifications, which are available in the default database in MOVES2010b. Such state-level simulations were performed for January and July representing winter and summer, respectively, to evaluate the seasonal and fuel impacts on evaporative VOC emissions, because both meteorological conditions and fuel specifications significantly differ between summer and winter. These state-level MOVES2010b simulations were performed for each CY from 1990 to 2050 to generate evaporative VOC emissions and the corresponding VMT for each CY of each MY vehicle’s lifetime from 1990 to 2020. Finally, the evaporative VOC emission factors in both states in both months were averaged to represent the U.S. national average evaporative VOC emission factors.

### **2.3 Development of Probability Distribution Functions of Vehicle Emission Factors**

Vehicle emission factors vary with location and time, because of spatial variation in vehicle driving cycles, road distributions, fuel specifications, and ambient temperature and humidity, as well as deterioration of engine operations over time. We conducted state-level simulations with MOVES2010b for MY 2010 vehicles to understand the spatial variation in emission factors due to state-specific driving cycles, road type distribution, ramp fractions, formulations and market shares of fuels, I/M programs, and ambient meteorological conditions. Noticeable variation in emission factors of tailpipe pollutants among states is revealed by the state-specific modeling results obtained with MOVES2010b. This agrees with our expectation of the impacts of the various location-specific influencing factors on emission factors. Meanwhile, deterioration due to engine aging with mileage accumulated over time contributes to temporal variation in emission factors. Taking CO emission factors as an example, Figure 1 shows the spatial and temporal variation in CO emission factors of MY 2010 passenger cars. To incorporate these spatial and temporal variations in emission factors into the lifetime weighted average emission factors for each MY vehicle, which are necessary for stochastic simulations for uncertainty diagnosis, we developed the VMT-weighted average PDFs of emission factors for

each MY vehicle on the basis of the state-specific emission factors and annual VMT in each CY over the lifetime of a particular MY vehicle. These PDFs capture the effects of changes in vehicle driving cycles, road distributions, fuel specifications, and ambient temperature and humidity, and the effects of deterioration of engine operations, on the pollutant emission factors nationwide over the lifetime of a particular MY vehicle. It is noted that we scaled the state-specific emission factors in CYs beyond 2010 on the basis of (a) the 2010 emission factors and (b) the ratios of the national average emission factors beyond 2010 to those in 2010. The state-specific VMTs of the vehicles in CYs beyond 2010 are scaled by assuming that the share of each state's VMT relative to the national total VMT would remain the same as in 2010. Using this approach, the simulated national average emission factors in each CY over the lifetime of each MY vehicle are further allocated to the state level, and the potential distribution type of all the state-specific emission-factor data points in each CY over the lifetime of each MY vehicle is tested, with the state-specific VMT in the corresponding CY as the weighting factor, against 55 possible distribution types ranked by their Kolmogorov-Smirnov, Anderson-Darling and Chi-Squared test statistics as obtained with the Easyfit toolbox (Mathwave, 2013). The statistically best PDF is determined on the basis of the goodness-of-fit rank of all the possible distribution types.



**Figure 1 Spatial and temporal variation in CO emission factors of MY 2010 gasoline passenger cars over their lifetime CYs. Error bars depict the spatial variation among states.**

### 3 RESULTS

#### 3.1 Lifetime Mileage-weighted Average Emission Factors by Model Year

Using the emission factors in each CY during the lifetime of every MY vehicle from 1990 to 2020 generated by MOVES2010b for U.S. average conditions, we calculated the annual VMT weighted average emission factors by MY for gasoline and diesel passenger cars, light-duty and heavy-duty trucks, and motorcycles, as shown in Tables A2 to A23, using Equation (1):

$$EF_{i,j,MY} = \frac{\sum_{CY}^{CY+30} (VMT_{i,CY} \times EF_{i,j,CY})}{\sum_{CY}^{CY+30} VMT_{i,CY}},$$

where  $EF_{i,j,MY}$  is the VMT-weighted lifetime emission factor of pollutant  $j$  from vehicle type  $i$  for MY;  
 $VMT_{i,CY}$  is the VMT of vehicle type  $i$  for each CY during the lifetime of the MY vehicle; and  
 $EF_{i,j,CY}$  is the emission factor of pollutant  $j$  from vehicle type  $i$  for each CY during the lifetime of the MY vehicle.

VMT shares and emission shares by vehicle type are important for understanding the contributions of various types of vehicles to emissions of each specific pollutant that is of concern for air quality and human health, and are critical evidence to support policy-making for emission control. Therefore, we analyzed the lifetime VMT and pollutant emission shares of various vehicle types by MY, as shown in Tables A24 and A25, respectively.

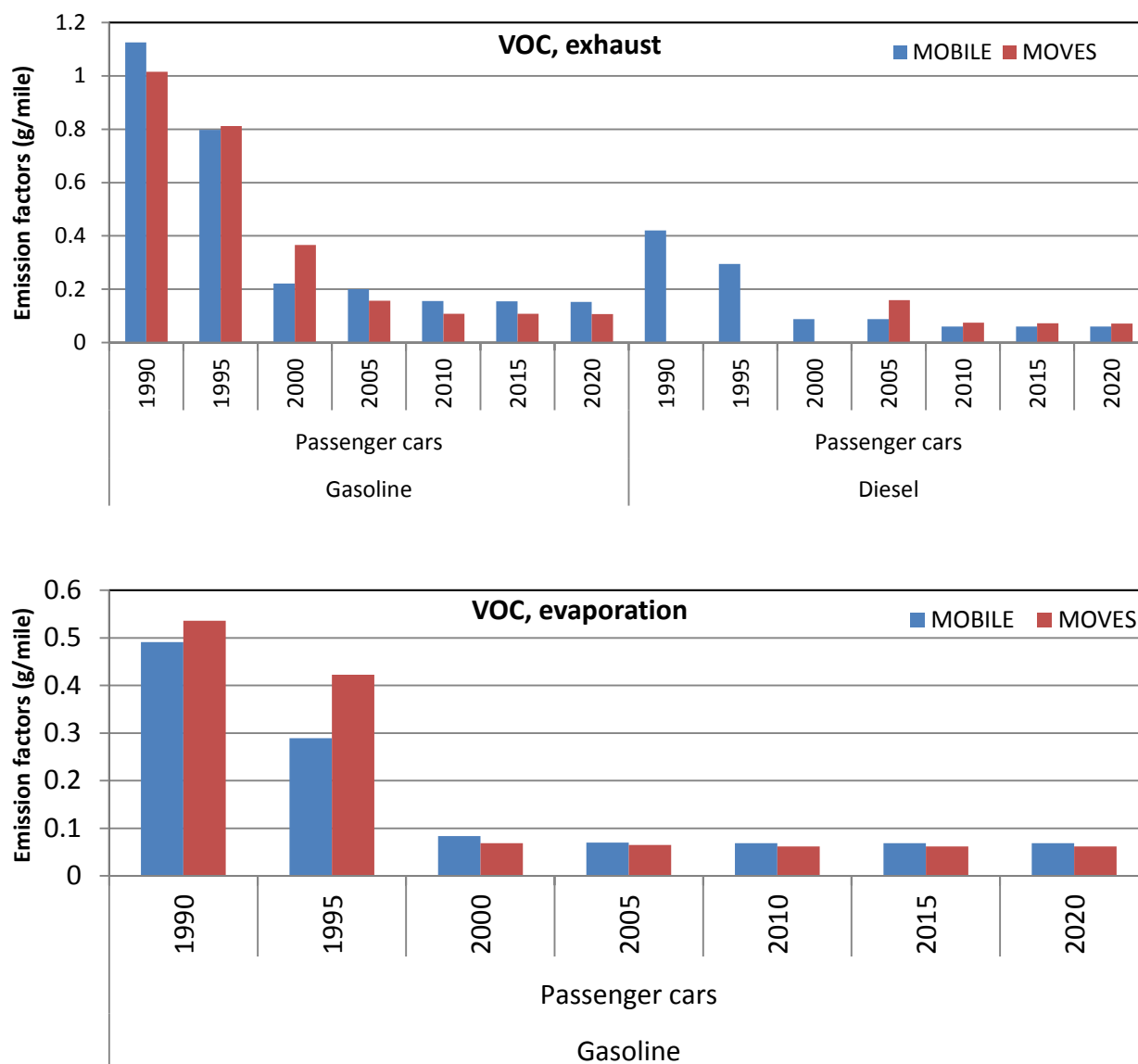
#### 3.2 Probability Distribution Functions of Vehicle Air Pollutant Emission Factors

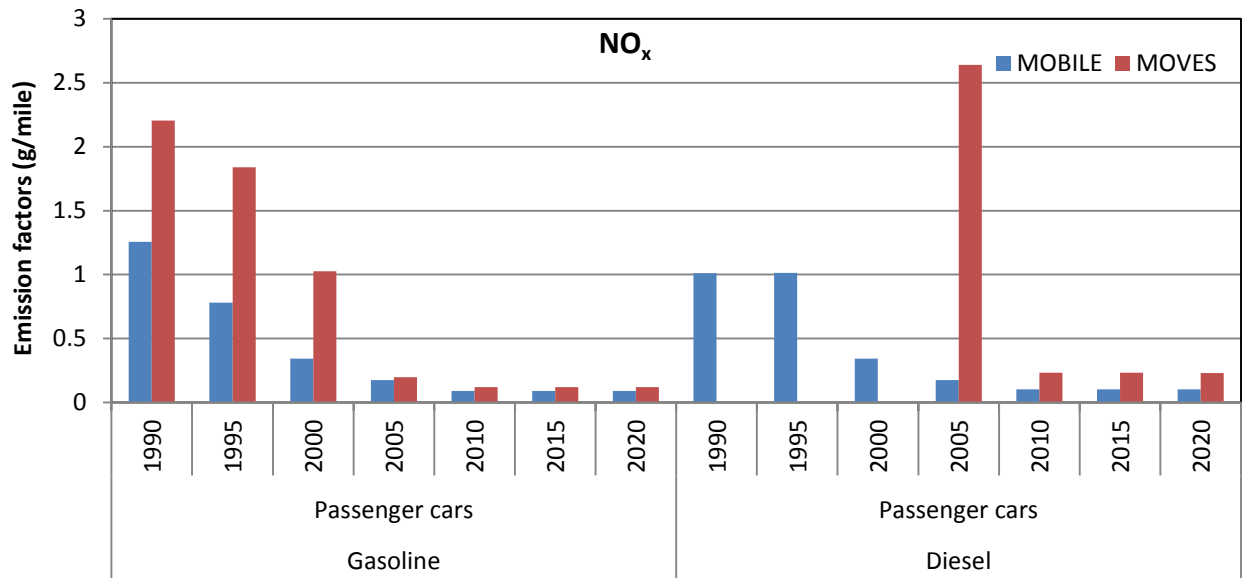
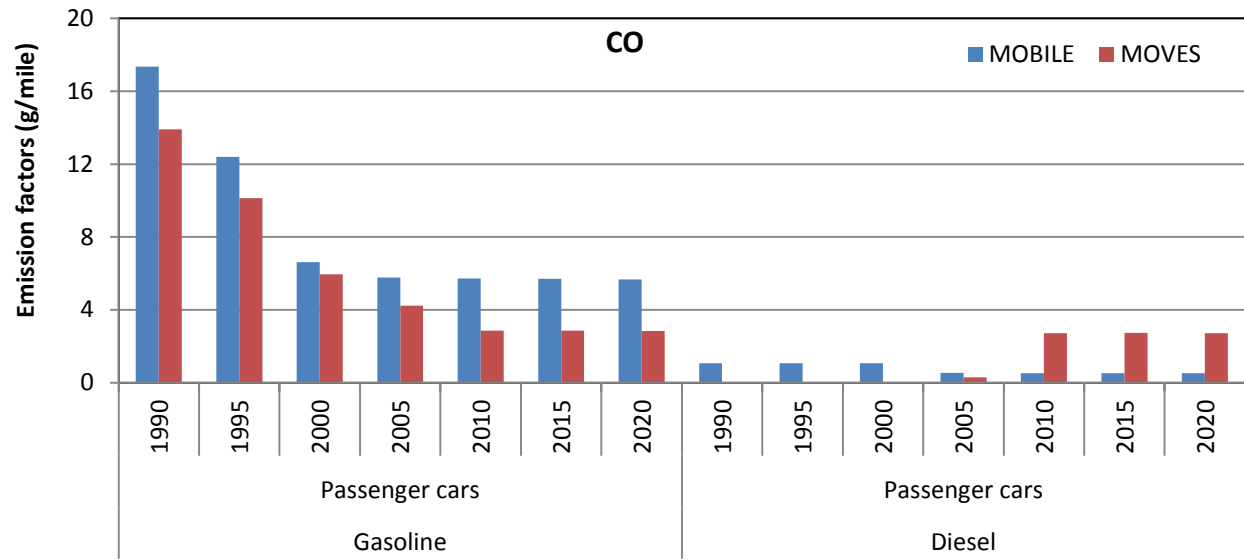
The PDFs of lifetime VMT-weighted average emission factors for each MY gasoline passenger cars are summarized in Table A26.

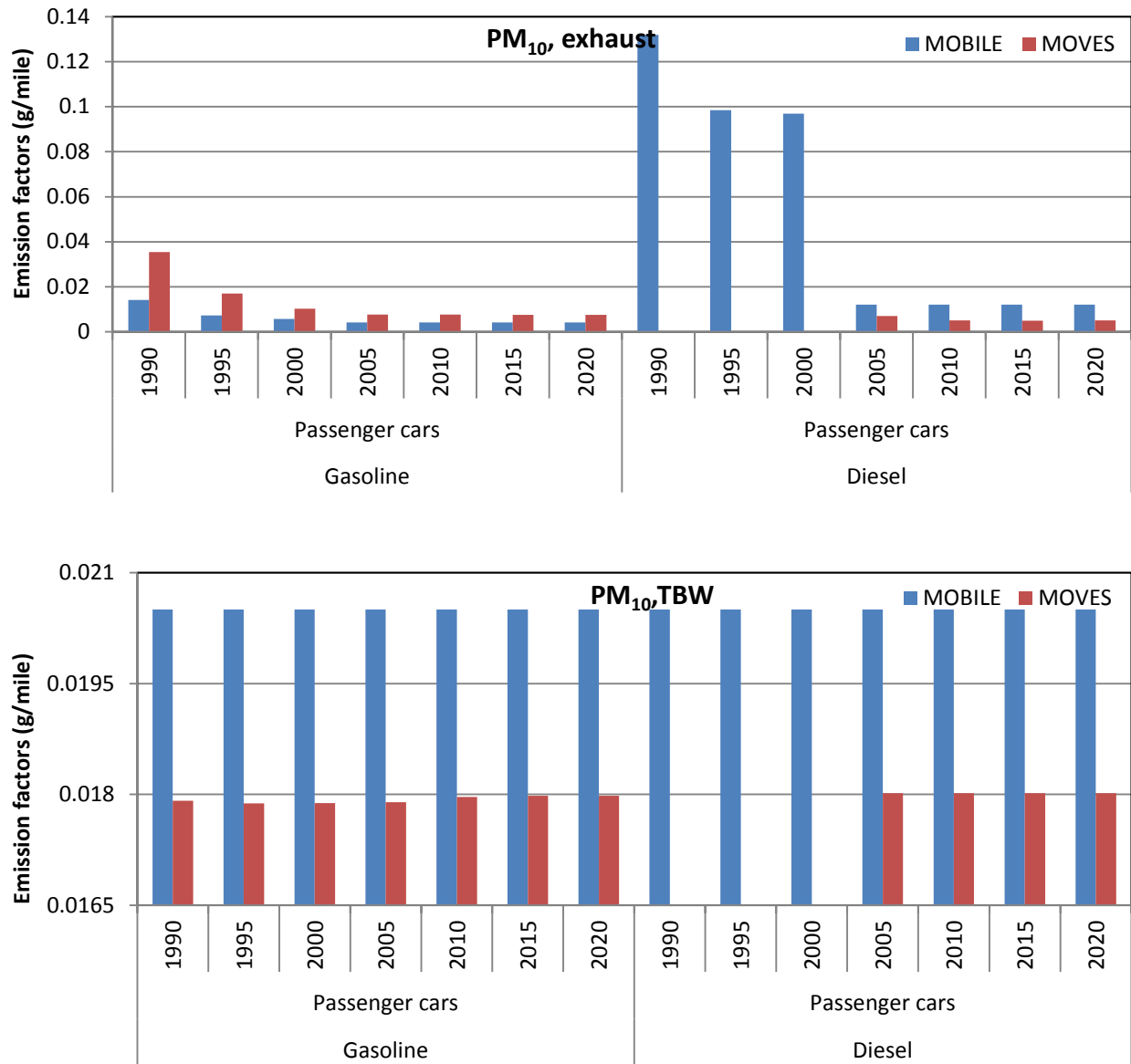
#### 3.3 Comparison with Previous Emission Factors in GREET

The previous vehicle air pollutant emission factors in GREET were determined by the average of simulations from both the MOBILE6.2 and EMFAC2002 models (Brinkman et al., 2005). Owing to significant differences between the two models' simulations, the average emission factors in GREET are not representative of the MOBILE6.2 simulations and therefore are not directly comparable to the MOVES2010b results in this work. Instead, we compared the MOVES2010b-based emission factors to the previous simulations from MOBILE6.2. The MOVES2010b simulations generally produce lower CO and VOC emission factors and higher

NO<sub>x</sub> emission factors for gasoline passenger cars than the MOBILE6.2 simulations, as shown in Figure 2; this result is consistent with EPA's findings (EPA, 2013b). On the other hand, the CO and VOC emission factors for gasoline light-duty vehicles, diesel passenger cars, and diesel light-duty vehicles are higher for MOVES2010b than for MOBILE6.2. Evaporative VOC emission factors simulated by MOVES2010b are higher than previous estimations by MOBILE6.2 for MY 1995 and earlier passenger cars, and are slightly lower than those for MY 2000 and newer passenger cars. The PM<sub>10</sub>, PM<sub>2.5</sub> and NO<sub>x</sub> emission factors simulated by MOVES2010b are significantly higher compared to MOBILE6.2 for both passenger cars and light-duty vehicles. These differences agree with EPA's findings as well. On the basis of newly available measurement data, the new results generated by MOVES2010b, which models the impacts of low ambient temperatures, vehicle speed, vehicle load, deterioration effects, and extended idle activity as a fraction of total activity on in-use emissions (EPA, 2013b), capture the real-world emission characteristics much better, particularly for more-recent-MY vehicles.







**Figure 2 Comparison of air pollutant emissions factors generated by MOBILE6.2 and MOVES2010b for gasoline and diesel passenger cars. TBW refers to tire and brake wear.**

### 3.4 Urban Shares of Vehicle Operations

We evaluated the urban shares of vehicle operations on the basis of urban vehicle miles traveled by vehicles (FHWA, 2011). Table 1 summarizes the urban shares of vehicle operations by state and on the U.S. average.

<b>State</b>	<b>Vehicle operations</b>	<b>State</b>	<b>Vehicle operations</b>	<b>State</b>	<b>Vehicle operations</b>	<b>State</b>	<b>Vehicle operations</b>	<b>State</b>	<b>Vehicle operation</b>
CT	88%	NY	75%	KS	51%	TN	60%	MT	25%
DE	69%	PA	64%	KY	42%	WI	47%	UT	70%
FL	82%	RI	89%	MI	67%	AL	52%	WY	28%
GA	67%	SC	52%	MN	57%	AR	44%	AK	54%
MA	92%	VA	64%	MO	57%	LA	58%	AZ	71%
MD	75%	VT	26%	NE	43%	MS	41%	CA	82%
ME	0.30%	WV	42%	ND	28%	NM	43%	HI	76%
NC	75%	IL	75%	OH	68%	TX	71%	NV	77%
NH	56%	IN	63%	OK	54%	CO	69%	OR	56%
NJ	91%	IA	39%	SD	28%	ID	42%	WA	70%

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## 5 APPENDIX

**Table A1 Mapping of vehicle types in MOVES**

		<b>Motor- cycle</b>	<b>Pas- senger Cars</b>	<b>Pas- senger Trucks</b>	<b>Light Commer- -cial Trucks</b>	<b>Inter- city Buses</b>	<b>Tran- sit Buses</b>	<b>School Buses</b>
Light-Duty Gasoline Vehicles (Passenger Cars)	LDGV	0%	100%	0%	0%	0%	0%	0%
Light-Duty Gasoline Trucks 1 (0–6,000 lb GVWR, 0–3,750 lb LVW <sup>a</sup> )	LDGT1	0%	0%	78%	22%	0%	0%	0%
Light-Duty Gasoline Trucks 2 (0–6,000 lb GVWR, 3,751–5,750 lb LVW)	LDGT2	0%	0%	78%	22%	0%	0%	0%
Light-Duty Gasoline Trucks 3 (6,001–8,500 lb GVWR, 0–5,750 lb ALVW <sup>b</sup> )	LDGT3	0%	0%	78%	22%	0%	0%	0%
Light-Duty Gasoline Trucks 4 (6,001–8,500 lb GVWR, >5,750 lb ALVW)	LDGT4	0%	0%	78%	22%	0%	0%	0%
Class 2b Heavy-Duty Gasoline Vehicles (8,501–10,000 lb GVWR)	HDGV2b	0%	0%	63%	37%	0%	0%	0%
Class 3 Heavy-Duty Gasoline Vehicles (10,001–14,000 lb GVWR)	HDGV3	0%	0%	63%	37%	0%	0%	0%
Class 4 Heavy-Duty Gasoline Vehicles (14,001–16,000 lb GVWR)	HDGV4	0%	0%	6%	94%	0%	0%	0%
Class 5 Heavy-Duty Gasoline Vehicles (16,001–19,500 lb GVWR)	HDGV5	0%	0%	6%	94%	0%	0%	0%
Class 6 Heavy-Duty Gasoline Vehicles (19,501–26,000 lb GVWR)	HDGV6	0%	0%	0%	0%	0%	0%	4%
Class 7 Heavy-Duty Gasoline Vehicles (26,001–33,000 lb GVWR)	HDGV7	0%	0%	0%	0%	0%	0%	4%
Class 8a Heavy-Duty Gasoline Vehicles (33,001–60,000 lb GVWR)	HDGV8a	0%	0%	0%	0%	0%	0%	0%
Class 8b Heavy-Duty Gasoline Vehicles (>60,000 lb GVWR)	HDGV8b	0%	0%	0%	0%	0%	0%	0%
Light-Duty Diesel Vehicles (Passenger Cars)	LDDV	0%	100%	0%	0%	0%	0%	0%
Light-Duty Diesel Trucks 1 and 2 (0–6,000 lb GVWR)	LDDT12	0%	0%	42%	58%	0%	0%	0%
Class 2b Heavy-Duty Diesel Vehicles (8,501–10,000 lb GVWR)	HDDV2b	0%	0%	43%	57%	0%	0%	0%

		<b>Motor-cycle</b>	<b>Pas-senger Cars</b>	<b>Pas-senger Trucks</b>	<b>Light Commer-cial Trucks</b>	<b>Inter-city Buses</b>	<b>Tran-sit Buses</b>	<b>School Buses</b>
Class 3 Heavy-Duty Diesel Vehicles (10,001–14,000 lb GVWR)	HDDV3	0%	0%	43%	57%	0%	0%	0%
Class 4 Heavy-Duty Diesel Vehicles (14,001–16,000 lb GVWR)	HDDV4	0%	0%	10%	90%	0%	0%	0%
Class 5 Heavy-Duty Diesel Vehicles (16,001–19,500 lb GVWR)	HDDV5	0%	0%	10%	90%	0%	0%	0%
Class 6 Heavy-Duty Diesel Vehicles (19,501–26,000 lb GVWR)	HDDV6	0%	0%	0%	0%	0%	0%	0%
Class 7 Heavy-Duty Diesel Vehicles (26,001–33,000 lb GVWR)	HDDV7	0%	0%	0%	0%	0%	0%	0%
Class 8a Heavy-Duty Diesel Vehicles (33,001–60,000 lb GVWR)	HDDV8a	0%	0%	0%	0%	0%	0%	0%
Class 8b Heavy-Duty Diesel Vehicles (>60,000 lb GVWR)	HDDV8b	0%	0%	0%	0%	0%	0%	0%
Motorcycles (All)	MC	100%	0%	0%	0%	0%	0%	0%
Gasoline Buses (School, Transit, and Urban)	HDGB	0%	0%	0%	0%	0%	0%	100%
Diesel Transit and Urban Buses	HDDBT	0%	0%	0%	0%	25%	75%	0%
Diesel School Buses	HDDBS	0%	0%	0%	0%	0%	0%	100%
Light-Duty Diesel Trucks 3 and 4 (6,001–8,500 lb GVWR)	LDDT34	0%	0%	42%	58%	0%	0%	0%

		<b>Refuse Trucks</b>	<b>Single-unit Short-haul Trucks</b>	<b>Single-unit Long-haul Trucks</b>	<b>Motor Homes</b>	<b>Combination Short-haul Trucks</b>	<b>Combination Long-haul Trucks</b>
Light-Duty Gasoline Vehicles (Passenger Cars)	LDGV	0%	0%	0%	0%	0%	0%
Light-Duty Gasoline Trucks 1 (0–6,000 lb GVWR, 0–3,750 lb LVW)	LDGT1	0%	0%	0%	0%	0%	0%
Light-Duty Gasoline Trucks 2 (0–6,000 lb GVWR, 3,751–5,750 lb LVW)	LDGT2	0%	0%	0%	0%	0%	0%
Light-Duty Gasoline Trucks 3 (6,001–8,500 lb GVWR, 0–5,750 lb ALVW)	LDGT3	0%	0%	0%	0%	0%	0%

		<b>Refuse Trucks</b>	<b>Single-unit Short-haul Trucks</b>	<b>Single-unit Long-haul Trucks</b>	<b>Motor Homes</b>	<b>Combination Short-haul Trucks</b>	<b>Combination Long-haul Trucks</b>
Light-Duty Gasoline Trucks 4 (6,001–8,500 lb GVWR, >5,750 lb ALVW)	LDGT4	0%	0%	0%	0%	0%	0%
Class 2b Heavy-Duty Gasoline Vehicles (8,501–10,000 lb GVWR)	HDGV2b	0%	0%	0%	0%	0%	0%
Class 3 Heavy-Duty Gasoline Vehicles (10,001–14,000 lb GVWR)	HDGV3	0%	0%	0%	0%	0%	0%
Class 4 Heavy-Duty Gasoline Vehicles (14,001–16,000 lb GVWR)	HDGV4	0%	0%	0%	0%	0%	0%
Class 5 Heavy-Duty Gasoline Vehicles (16,001–19,500 lb GVWR)	HDGV5	0%	0%	0%	0%	0%	0%
Class 6 Heavy-Duty Gasoline Vehicles (19,501–26,000 lb GVWR)	HDGV6	0%	69%	3%	23%	1%	0%
Class 7 Heavy-Duty Gasoline Vehicles (26,001–33,000 lb GVWR)	HDGV7	0%	69%	3%	23%	1%	0%
Class 8a Heavy-Duty Gasoline Vehicles (33,001–60,000 lb GVWR)	HDGV8a	0%	90%	8%	0%	2%	0%
Class 8b Heavy-Duty Gasoline Vehicles (>60,000 lb GVWR)	HDGV8b	0%	90%	8%	0%	2%	0%
Light-Duty Diesel Vehicles (Passenger Cars)	LDDV	0%	0%	0%	0%	0%	0%
Light-Duty Diesel Trucks 1 and 2 (0–6,000 lb GVWR)	LDDT12	0%	0%	0%	0%	0%	0%
Class 2b Heavy-Duty Diesel Vehicles (8,501–10,000 lb GVWR)	HDDV2b	0%	0%	0%	0%	0%	0%
Class 3 Heavy-Duty Diesel Vehicles (10,001–14,000 lb GVWR)	HDDV3	0%	0%	0%	0%	0%	0%
Class 4 Heavy-Duty Diesel Vehicles (14,001–16,000 lb GVWR)	HDDV4	0%	0%	0%	0%	0%	0%
Class 5 Heavy-Duty Diesel Vehicles (16,001–19,500 lb GVWR)	HDDV5	0%	0%	0%	0%	0%	0%
Class 6 Heavy-Duty Diesel Vehicles (19,501–26,000 lb GVWR)	HDDV6	1%	72%	6%	7%	11%	3%
Class 7 Heavy-Duty Diesel Vehicles (26,001–33,000 lb GVWR)	HDDV7	1%	72%	6%	7%	11%	3%

		<b>Refuse Trucks</b>	<b>Single-unit Short-haul Trucks</b>	<b>Single-unit Long-haul Trucks</b>	<b>Motor Homes</b>	<b>Combination Short-haul Trucks</b>	<b>Combination Long-haul Trucks</b>
Class 8a Heavy-Duty Diesel Vehicles (33,001–60,000 lb GVWR)	HDDV8a	2%	30%	2%	0%	35%	31%
Class 8b Heavy-Duty Diesel Vehicles (>60,000 lb GVWR)	HDDV8b	2%	30%	2%	0%	35%	31%
Motorcycles (All)	MC	0%	0%	0%	0%	0%	0%
Gasoline Buses (School, Transit, and Urban)	HDGB	0%	0%	0%	0%	0%	0%
Diesel Transit and Urban Buses	HDDBT	0%	0%	0%	0%	0%	0%
Diesel School Buses	HDDBS	0%	0%	0%	0%	0%	0%
Light-Duty Diesel Trucks 3 and 4 (6,001–8,500 lb GVWR)	LDDT34	0%	0%	0%	0%	0%	0%

a: Loaded vehicle weight, which is the weight of vehicle sitting empty (curb weight) plus 300 lbs;

b: Adjusted loaded vehicle weight, which is the average of the gross vehicle weight and the curb weight.

**Table A2 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for gasoline passenger cars for model years 1990–2020**

Model Year	VOC, exhaust	VOC, evaporation	CO	NO <sub>x</sub>	SO <sub>2</sub>	PM <sub>10</sub> , exhaust	PM <sub>10</sub> , OC	PM <sub>10</sub> , BC	PM <sub>10</sub> , Sulfate
1990	1.0151	0.5358	14.8991	2.2045	0.0503	0.0355	0.0277	0.0075	0.00030
1991	1.0441	0.5087	14.2734	2.3290	0.0401	0.0279	0.0217	0.0060	0.00024
1992	1.0034	0.4935	13.6901	2.2612	0.0395	0.0263	0.0204	0.0056	0.00023
1993	0.9623	0.4812	13.1883	2.2047	0.0371	0.0250	0.0195	0.0053	0.00022
1994	0.8464	0.4656	10.6804	1.9368	0.0359	0.0206	0.0160	0.0043	0.00021
1995	0.8116	0.4225	10.1368	1.8394	0.0340	0.0170	0.0132	0.0036	0.00020
1996	0.5950	0.1435	6.9986	1.2153	0.0329	0.0146	0.0113	0.0031	0.00020
1997	0.5601	0.1408	6.6299	1.1468	0.0309	0.0137	0.0106	0.0029	0.00018
1998	0.4765	0.0817	6.3217	1.0902	0.0297	0.0121	0.0094	0.0025	0.00018
1999	0.4005	0.0666	6.0580	1.0430	0.0287	0.0101	0.0078	0.0021	0.00017
2000	0.3664	0.0683	5.9614	1.0271	0.0253	0.0103	0.0080	0.0021	0.00015
2001	0.2096	0.0710	5.2897	0.6300	0.0224	0.0088	0.0068	0.0018	0.00013
2002	0.1932	0.0728	4.9832	0.5610	0.0189	0.0077	0.0060	0.0016	0.00011
2003	0.1796	0.0746	4.8139	0.4914	0.0153	0.0075	0.0058	0.0016	0.00009
2004	0.1634	0.0629	4.4445	0.2524	0.0115	0.0077	0.0060	0.0016	0.00007
2005	0.1570	0.0646	4.2325	0.1984	0.0090	0.0077	0.0060	0.0016	0.00005
2006	0.1213	0.0663	3.1571	0.1877	0.0078	0.0077	0.0060	0.0016	0.00005
2007	0.1155	0.0669	2.9546	0.1515	0.0068	0.0077	0.0060	0.0016	0.00004
2008	0.1129	0.0721	2.9184	0.1405	0.0060	0.0077	0.0060	0.0016	0.00004
2009	0.1095	0.0601	2.8868	0.1300	0.0056	0.0077	0.0060	0.0016	0.00003
2010	0.1084	0.0617	2.8656	0.1205	0.0055	0.0077	0.0060	0.0016	0.00003
2011	0.1082	0.0633	2.8638	0.1203	0.0055	0.0076	0.0060	0.0016	0.00003
2012	0.1094	0.0652	2.8625	0.1201	0.0049	0.0076	0.0060	0.0016	0.00003
2013	0.1100	0.0638	2.8639	0.1202	0.0048	0.0076	0.0060	0.0016	0.00003
2014	0.1096	0.0628	2.8648	0.1202	0.0047	0.0076	0.0060	0.0016	0.00003
2015	0.1086	0.0611	2.8652	0.1202	0.0044	0.0076	0.0060	0.0016	0.00003
2016	0.1069	0.0610	2.8647	0.1202	0.0042	0.0076	0.0060	0.0016	0.00002
2017	0.1086	0.0610	2.8633	0.1201	0.0042	0.0076	0.0060	0.0016	0.00002

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
2018	0.1078	0.0604	2.8611	0.1200	0.0042	0.0076	0.0060	0.0016	0.00002
2019	0.1074	0.0598	2.8582	0.1199	0.0042	0.0076	0.0060	0.0016	0.00002
2020	0.1065	0.0593	2.8547	0.1198	0.0042	0.0076	0.0060	0.0016	0.00002

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
1990	0.0179	0.0327	0.0255	0.0069	0.00028	0.0046	0.0666	0.0475
1991	0.0179	0.0257	0.0200	0.0055	0.00022	0.0046	0.0658	0.0473
1992	0.0179	0.0242	0.0188	0.0052	0.00022	0.0046	0.0642	0.0465
1993	0.0179	0.0230	0.0179	0.0049	0.00020	0.0046	0.0628	0.0458
1994	0.0179	0.0190	0.0148	0.0040	0.00020	0.0046	0.0495	0.0382
1995	0.0179	0.0157	0.0122	0.0033	0.00019	0.0046	0.0332	0.0308
1996	0.0179	0.0134	0.0104	0.0028	0.00018	0.0046	0.0251	0.0267
1997	0.0179	0.0126	0.0098	0.0026	0.00017	0.0046	0.0241	0.0261
1998	0.0179	0.0112	0.0087	0.0023	0.00016	0.0046	0.0227	0.0241
1999	0.0179	0.0093	0.0072	0.0020	0.00016	0.0046	0.0177	0.0209
2000	0.0179	0.0095	0.0074	0.0020	0.00014	0.0046	0.0155	0.0173
2001	0.0179	0.0081	0.0063	0.0017	0.00012	0.0046	0.0137	0.0069
2002	0.0179	0.0071	0.0055	0.0015	0.00010	0.0046	0.0130	0.0068
2003	0.0179	0.0069	0.0054	0.0015	0.00008	0.0046	0.0131	0.0068
2004	0.0179	0.0071	0.0055	0.0015	0.00006	0.0046	0.0138	0.0068
2005	0.0179	0.0071	0.0055	0.0015	0.00005	0.0046	0.0139	0.0068
2006	0.0179	0.0071	0.0055	0.0015	0.00004	0.0046	0.0105	0.0068
2007	0.0179	0.0071	0.0055	0.0015	0.00004	0.0046	0.0104	0.0068
2008	0.0179	0.0071	0.0055	0.0015	0.00003	0.0046	0.0102	0.0068
2009	0.0180	0.0071	0.0055	0.0015	0.00003	0.0046	0.0107	0.0067
2010	0.0180	0.0071	0.0055	0.0015	0.00003	0.0046	0.0106	0.0067
2011	0.0180	0.0070	0.0055	0.0015	0.00003	0.0046	0.0121	0.0044
2012	0.0180	0.0070	0.0055	0.0015	0.00003	0.0046	0.0110	0.0044
2013	0.0180	0.0070	0.0055	0.0015	0.00003	0.0046	0.0112	0.0044

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
2014	0.0180	0.0070	0.0055	0.0015	0.00003	0.0046	0.0112	0.0044
2015	0.0180	0.0070	0.0055	0.0015	0.00002	0.0046	0.0117	0.0044
2016	0.0180	0.0070	0.0055	0.0015	0.00002	0.0046	0.0127	0.0044
2017	0.0180	0.0070	0.0055	0.0015	0.00002	0.0046	0.0107	0.0044
2018	0.0180	0.0070	0.0055	0.0015	0.00002	0.0046	0.0111	0.0044
2019	0.0180	0.0070	0.0055	0.0015	0.00002	0.0046	0.0111	0.0044
2020	0.0180	0.0070	0.0055	0.0015	0.00002	0.0046	0.0116	0.0043

**Table A3 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for diesel passenger cars for model years 2001–2020**

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
2001	0.1610		0.3016	0.9182	0.0446	0.1261	0.0447	0.0783	0.00320
2002	0.1604		0.3009	0.9162	0.0381	0.1254	0.0445	0.0782	0.00274
2003	0.1600		0.3004	2.6403	0.0314	0.1247	0.0443	0.0781	0.00225
2004	0.1598		0.3001	2.6393	0.0243	0.0075	0.0046	0.0012	0.00174
2005	0.1597		0.3000	2.6390	0.0169	0.0070	0.0046	0.0012	0.00121
2006	0.0627		0.3954	0.4509	0.0092	0.0064	0.0046	0.0012	0.00066
2007	0.0312		0.3953	0.4508	0.0058	0.0062	0.0046	0.0012	0.00042
2008	0.0308		0.3940	0.4504	0.0043	0.0051	0.0038	0.0010	0.00031
2009	0.0307		0.3939	0.4502	0.0037	0.0051	0.0038	0.0010	0.00027
2010	0.0750		2.7274	0.2339	0.0031	0.0051	0.0038	0.0010	0.00023
2011	0.0751		2.7289	0.2339	0.0029	0.0051	0.0038	0.0010	0.00021
2012	0.0737		2.7309	0.2339	0.0024	0.0050	0.0038	0.0010	0.00017
2013	0.0735		2.7329	0.2339	0.0023	0.0050	0.0038	0.0010	0.00017
2014	0.0733		2.7345	0.2338	0.0022	0.0050	0.0038	0.0010	0.00016
2015	0.0730		2.7357	0.2336	0.0021	0.0050	0.0039	0.0010	0.00015
2016	0.0726		2.7362	0.2333	0.0020	0.0050	0.0039	0.0010	0.00014
2017	0.0724		2.7360	0.2329	0.0020	0.0050	0.0039	0.0010	0.00014

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
2018	0.0722		2.7352	0.2324	0.0020	0.0050	0.0039	0.0010	0.00014
2019	0.0719		2.7337	0.2318	0.0020	0.0050	0.0039	0.0010	0.00014
2020	0.0716		2.7317	0.2311	0.0020	0.0050	0.0039	0.0010	0.00014

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
2001	0.0180	0.1224	0.0433	0.0759	0.00312	0.0046	0.0006	0.0007
2002	0.0180	0.1217	0.0431	0.0759	0.00267	0.0046	0.0006	0.0007
2003	0.0180	0.1210	0.0430	0.0758	0.00219	0.0046	0.0006	0.0007
2004	0.0180	0.0073	0.0044	0.0012	0.00170	0.0046	0.0006	0.0007
2005	0.0180	0.0068	0.0044	0.0012	0.00118	0.0046	0.0006	0.0007
2006	0.0180	0.0062	0.0044	0.0012	0.00065	0.0046	0.0033	0.0007
2007	0.0180	0.0060	0.0044	0.0012	0.00041	0.0046	0.0340	0.0007
2008	0.0180	0.0050	0.0037	0.0010	0.00030	0.0046	0.0333	0.0007
2009	0.0180	0.0049	0.0037	0.0010	0.00026	0.0046	0.0333	0.0007
2010	0.0180	0.0049	0.0037	0.0010	0.00022	0.0046	0.0938	0.0007
2011	0.0180	0.0049	0.0037	0.0010	0.00021	0.0046	0.0938	0.0007
2012	0.0180	0.0049	0.0037	0.0010	0.00017	0.0046	0.0938	0.0007
2013	0.0180	0.0049	0.0037	0.0010	0.00016	0.0046	0.0937	0.0007
2014	0.0180	0.0049	0.0037	0.0010	0.00016	0.0046	0.0936	0.0007
2015	0.0180	0.0049	0.0037	0.0010	0.00015	0.0046	0.0935	0.0007
2016	0.0180	0.0049	0.0037	0.0010	0.00014	0.0046	0.0933	0.0007
2017	0.0180	0.0049	0.0037	0.0010	0.00014	0.0046	0.0930	0.0007
2018	0.0180	0.0049	0.0037	0.0010	0.00014	0.0046	0.0927	0.0007
2019	0.0180	0.0049	0.0037	0.0010	0.00014	0.0046	0.0924	0.0007
2020	0.0180	0.0049	0.0037	0.0010	0.00014	0.0046	0.0920	0.0007



**Table A4 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for gasoline passenger trucks for model years 2001–2020.**

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
1990	1.9502	0.8302	31.4166	4.4513	0.0604	0.0589	0.0509	0.0076	0.00036
1991	2.0190	0.7884	32.2508	4.6846	0.0453	0.0424	0.0359	0.0062	0.00027
1992	1.9433	0.7638	30.8482	4.5023	0.0443	0.0403	0.0343	0.0058	0.00026
1993	1.8760	0.7429	29.5552	4.3494	0.0437	0.0386	0.0329	0.0055	0.00026
1994	2.7801	0.7203	28.8053	4.4498	0.0430	0.0376	0.0325	0.0049	0.00026
1995	2.5857	0.6507	27.2477	4.2078	0.0432	0.0309	0.0265	0.0041	0.00026
1996	1.3005	0.2708	13.1972	2.3190	0.0410	0.0253	0.0216	0.0034	0.00024
1997	1.2681	0.2659	13.0354	2.0425	0.0431	0.0240	0.0207	0.0031	0.00026
1998	1.1659	0.1558	11.9160	1.9443	0.0419	0.0202	0.0173	0.0027	0.00025
1999	1.1211	0.1275	11.6261	1.8914	0.0404	0.0186	0.0160	0.0024	0.00024
2000	1.1210	0.1305	11.5455	1.8726	0.0355	0.0180	0.0155	0.0023	0.00021
2001	0.5943	0.1357	10.5410	1.3507	0.0319	0.0161	0.0138	0.0021	0.00019
2002	0.5028	0.1388	10.0501	1.2777	0.0267	0.0138	0.0118	0.0018	0.00016
2003	0.4767	0.1423	10.1391	1.3073	0.0214	0.0145	0.0125	0.0019	0.00013
2004	0.3468	0.1275	7.8141	0.6787	0.0160	0.0138	0.0119	0.0018	0.00010
2005	0.2665	0.1299	7.1584	0.5282	0.0126	0.0138	0.0119	0.0018	0.00007
2006	0.1921	0.1317	5.5140	0.4258	0.0110	0.0138	0.0119	0.0018	0.00007
2007	0.1841	0.1323	5.2937	0.3863	0.0097	0.0137	0.0118	0.0018	0.00006
2008	0.1665	0.1384	5.1907	0.3416	0.0080	0.0137	0.0118	0.0018	0.00005
2009	0.1628	0.1180	5.0982	0.3262	0.0074	0.0136	0.0118	0.0018	0.00004
2010	0.1620	0.1213	5.0191	0.3129	0.0073	0.0135	0.0117	0.0018	0.00004
2011	0.1576	0.1234	5.0010	0.3120	0.0066	0.0135	0.0117	0.0017	0.00004
2012	0.1603	0.1260	4.9848	0.3111	0.0062	0.0134	0.0116	0.0017	0.00004
2013	0.1607	0.1236	4.9717	0.3107	0.0060	0.0133	0.0116	0.0017	0.00004
2014	0.1599	0.1216	4.9594	0.3103	0.0059	0.0133	0.0115	0.0017	0.00003
2015	0.1576	0.1179	4.9475	0.3099	0.0057	0.0132	0.0115	0.0017	0.00003
2016	0.1551	0.1175	4.9361	0.3095	0.0054	0.0132	0.0115	0.0017	0.00003
2017	0.1579	0.1172	4.9250	0.3091	0.0054	0.0132	0.0115	0.0017	0.00003

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
2018	0.1567	0.1158	4.9144	0.3088	0.0054	0.0132	0.0115	0.0017	0.00003
2019	0.1562	0.1146	4.9043	0.3084	0.0054	0.0132	0.0115	0.0017	0.00003
2020	0.1545	0.1133	4.8947	0.3082	0.0054	0.0132	0.0115	0.0017	0.00003

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
1990	0.0257	0.0543	0.0469	0.0070	0.00033	0.0066	0.1207	0.1244
1991	0.0256	0.0390	0.0331	0.0057	0.00025	0.0066	0.1215	0.1278
1992	0.0256	0.0371	0.0316	0.0053	0.00024	0.0066	0.1176	0.1248
1993	0.0256	0.0356	0.0303	0.0051	0.00024	0.0066	0.1139	0.1222
1994	0.0256	0.0347	0.0300	0.0045	0.00024	0.0066	0.0950	0.1036
1995	0.0256	0.0284	0.0244	0.0038	0.00024	0.0066	0.0844	0.0852
1996	0.0256	0.0233	0.0199	0.0032	0.00022	0.0066	0.0538	0.0797
1997	0.0256	0.0221	0.0190	0.0029	0.00024	0.0066	0.0510	0.0789
1998	0.0256	0.0186	0.0159	0.0025	0.00023	0.0066	0.0462	0.0678
1999	0.0256	0.0172	0.0147	0.0022	0.00022	0.0066	0.0347	0.0553
2000	0.0256	0.0166	0.0143	0.0021	0.00019	0.0066	0.0376	0.0568
2001	0.0256	0.0148	0.0127	0.0019	0.00017	0.0066	0.0286	0.0148
2002	0.0256	0.0127	0.0108	0.0017	0.00015	0.0066	0.0273	0.0144
2003	0.0256	0.0133	0.0115	0.0017	0.00012	0.0066	0.0273	0.0144
2004	0.0256	0.0127	0.0109	0.0017	0.00009	0.0066	0.0298	0.0144
2005	0.0256	0.0127	0.0109	0.0017	0.00007	0.0066	0.0319	0.0143
2006	0.0256	0.0127	0.0109	0.0017	0.00006	0.0066	0.0239	0.0142
2007	0.0257	0.0126	0.0109	0.0017	0.00005	0.0066	0.0236	0.0141
2008	0.0257	0.0126	0.0109	0.0017	0.00004	0.0066	0.0234	0.0141
2009	0.0257	0.0126	0.0109	0.0017	0.00004	0.0066	0.0240	0.0140
2010	0.0257	0.0125	0.0108	0.0016	0.00004	0.0066	0.0238	0.0139
2011	0.0257	0.0124	0.0107	0.0016	0.00004	0.0066	0.0280	0.0080
2012	0.0257	0.0123	0.0107	0.0016	0.00003	0.0066	0.0255	0.0080
2013	0.0257	0.0122	0.0106	0.0016	0.00003	0.0066	0.0256	0.0080

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
2014	0.0257	0.0122	0.0106	0.0015	0.00003	0.0066	0.0255	0.0079
2015	0.0257	0.0122	0.0106	0.0015	0.00003	0.0066	0.0266	0.0079
2016	0.0257	0.0122	0.0106	0.0015	0.00003	0.0066	0.0279	0.0079
2017	0.0257	0.0122	0.0106	0.0015	0.00003	0.0066	0.0245	0.0078
2018	0.0257	0.0122	0.0106	0.0015	0.00003	0.0066	0.0250	0.0078
2019	0.0257	0.0122	0.0106	0.0015	0.00003	0.0066	0.0249	0.0078
2020	0.0257	0.0121	0.0106	0.0015	0.00003	0.0066	0.0260	0.0077

**Table A5 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for diesel passenger trucks for model years 1990–2020**

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
1990	0.9117		3.5976	6.2729	0.0944	0.7476	0.2371	0.5038	0.00677
1991	1.0212		4.1599	5.7078	0.0947	0.4390	0.1219	0.3103	0.00679
1992	1.0173		4.1472	5.6859	0.0966	0.4381	0.1213	0.3098	0.00693
1993	1.0127		4.1374	5.6688	0.0898	0.4367	0.1207	0.3095	0.00644
1994	0.9589		3.9854	5.4998	0.0992	0.6878	0.2192	0.4615	0.00712
1995	0.9287		3.9485	5.4731	0.0910	0.6395	0.2071	0.4258	0.00653
1996	0.8710		3.7308	5.5577	0.0830	0.6218	0.2013	0.4146	0.00595
1997	0.8393		3.5751	5.6882	0.0865	0.6142	0.1983	0.4097	0.00621
1998	0.7917		3.3729	4.6926	0.0866	0.2952	0.0852	0.2038	0.00622
1999	0.7540		3.1997	4.6942	0.0810	0.2878	0.0831	0.1989	0.00581
2000	0.6869		2.9799	4.3105	0.0732	0.2707	0.0801	0.1853	0.00525
2001	0.7872		3.3106	4.8040	0.0785	0.2945	0.0847	0.2042	0.00563
2002	0.7545		3.2060	4.6111	0.0665	0.2856	0.0832	0.1976	0.00477
2003	0.5430		2.2964	5.1000	0.0543	0.2570	0.0757	0.1774	0.00389
2004	0.5434		2.2999	5.0983	0.0414	0.2170	0.0617	0.1523	0.00297
2005	0.5435		2.3017	5.0962	0.0289	0.2162	0.0617	0.1524	0.00207

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
2006	0.5098		1.9740	3.8388	0.0164	0.2153	0.0617	0.1524	0.00118
2007	0.0741		0.4683	1.9454	0.0105	0.0140	0.0120	0.0012	0.00075
2008	0.0717		0.4657	1.9414	0.0072	0.0116	0.0100	0.0010	0.00052
2009	0.0714		0.4645	1.9384	0.0062	0.0115	0.0100	0.0010	0.00045
2010	0.0798		1.3397	0.9573	0.0053	0.0110	0.0096	0.0010	0.00038
2011	0.0793		1.3366	0.9550	0.0048	0.0110	0.0096	0.0010	0.00035
2012	0.0787		1.3337	0.9529	0.0047	0.0110	0.0096	0.0010	0.00034
2013	0.0784		1.3311	0.9510	0.0046	0.0102	0.0089	0.0009	0.00033
2014	0.0781		1.3287	0.9491	0.0046	0.0102	0.0089	0.0009	0.00033
2015	0.0778		1.3263	0.9472	0.0046	0.0102	0.0089	0.0009	0.00033
2016	0.0775		1.3241	0.9455	0.0045	0.0102	0.0089	0.0009	0.00033
2017	0.0772		1.3220	0.9437	0.0045	0.0102	0.0089	0.0009	0.00033
2018	0.0770		1.3200	0.9420	0.0045	0.0102	0.0089	0.0009	0.00033
2019	0.0768		1.3181	0.9403	0.0045	0.0102	0.0089	0.0009	0.00033
2020	0.0766		1.3164	0.9386	0.0045	0.0102	0.0089	0.0009	0.00033

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
1990	0.0262	0.7253	0.2300	0.4887	0.00660	0.0067	0.0022	0.0030
1991	0.0262	0.4259	0.1183	0.3010	0.00662	0.0067	0.0021	0.0031
1992	0.0262	0.4250	0.1177	0.3006	0.00676	0.0067	0.0021	0.0030
1993	0.0262	0.4236	0.1171	0.3002	0.00628	0.0067	0.0021	0.0030
1994	0.0262	0.6672	0.2126	0.4477	0.00694	0.0067	0.0020	0.0029
1995	0.0263	0.6203	0.2009	0.4131	0.00636	0.0067	0.0020	0.0028
1996	0.0263	0.6032	0.1953	0.4022	0.00581	0.0067	0.0021	0.0029
1997	0.0262	0.5958	0.1924	0.3974	0.00605	0.0067	0.0023	0.0029
1998	0.0262	0.2863	0.0826	0.1977	0.00606	0.0067	0.0023	0.0029
1999	0.0264	0.2792	0.0806	0.1930	0.00567	0.0067	0.0023	0.0029
2000	0.0263	0.2626	0.0777	0.1797	0.00512	0.0067	0.0021	0.0027
2001	0.0263	0.2857	0.0821	0.1981	0.00549	0.0067	0.0023	0.0030

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
2002	0.0262	0.2770	0.0807	0.1916	0.00465	0.0067	0.0023	0.0029
2003	0.0262	0.2493	0.0734	0.1721	0.00380	0.0067	0.0023	0.0029
2004	0.0262	0.2105	0.0599	0.1477	0.00290	0.0067	0.0023	0.0029
2005	0.0262	0.2098	0.0599	0.1478	0.00202	0.0067	0.0022	0.0029
2006	0.0262	0.2088	0.0599	0.1478	0.00115	0.0067	0.0022	0.0028
2007	0.0262	0.0135	0.0116	0.0012	0.00074	0.0067	0.0851	0.0028
2008	0.0262	0.0112	0.0097	0.0010	0.00050	0.0067	0.0831	0.0028
2009	0.0262	0.0112	0.0097	0.0010	0.00044	0.0067	0.0828	0.0028
2010	0.0262	0.0107	0.0094	0.0010	0.00037	0.0067	0.0943	0.0028
2011	0.0262	0.0107	0.0094	0.0010	0.00034	0.0067	0.0939	0.0028
2012	0.0262	0.0107	0.0094	0.0010	0.00033	0.0067	0.0935	0.0028
2013	0.0262	0.0099	0.0087	0.0009	0.00032	0.0067	0.0932	0.0028
2014	0.0262	0.0099	0.0086	0.0009	0.00032	0.0067	0.0929	0.0028
2015	0.0262	0.0099	0.0086	0.0009	0.00032	0.0067	0.0925	0.0028
2016	0.0262	0.0099	0.0086	0.0009	0.00032	0.0067	0.0922	0.0028
2017	0.0262	0.0099	0.0086	0.0009	0.00032	0.0067	0.0919	0.0028
2018	0.0262	0.0099	0.0086	0.0009	0.00032	0.0067	0.0916	0.0028
2019	0.0262	0.0099	0.0086	0.0009	0.00032	0.0067	0.0913	0.0028
2020	0.0262	0.0099	0.0086	0.0009	0.00032	0.0067	0.0910	0.0028

**Table A6 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for gasoline light-duty commercial trucks for model years 1990–2020**

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
1990	1.9287	0.8290	31.1684	4.2917	0.0643	0.0545	0.0468	0.0073	0.00038
1991	2.1114	0.7868	33.9104	4.6812	0.0450	0.0417	0.0352	0.0063	0.00027
1992	2.0103	0.7621	31.8201	4.5046	0.0438	0.0397	0.0335	0.0059	0.00026
1993	1.9408	0.7412	30.4850	4.3545	0.0432	0.0380	0.0322	0.0056	0.00026

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
1994	2.8369	0.7186	30.7363	4.4336	0.0426	0.0380	0.0327	0.0050	0.00025
1995	2.6426	0.6490	28.9723	4.1970	0.0428	0.0297	0.0253	0.0041	0.00025
1996	1.4412	0.2694	16.0867	2.4858	0.0406	0.0243	0.0206	0.0035	0.00024
1997	1.3838	0.2647	15.3462	2.1945	0.0427	0.0237	0.0202	0.0032	0.00025
1998	1.2248	0.1552	13.1874	2.0660	0.0414	0.0196	0.0167	0.0027	0.00025
1999	1.1783	0.1271	12.8887	2.0209	0.0400	0.0173	0.0147	0.0024	0.00024
2000	1.1755	0.1301	12.7028	1.9943	0.0351	0.0170	0.0145	0.0023	0.00021
2001	0.6814	0.1352	12.0853	1.5395	0.0315	0.0151	0.0129	0.0021	0.00019
2002	0.5941	0.1384	11.4211	1.4406	0.0264	0.0133	0.0113	0.0019	0.00016
2003	0.5723	0.1419	11.4683	1.4615	0.0212	0.0139	0.0118	0.0019	0.00013
2004	0.4396	0.1271	9.1983	0.8384	0.0159	0.0136	0.0116	0.0019	0.00009
2005	0.3153	0.1295	8.5504	0.6701	0.0124	0.0136	0.0116	0.0019	0.00007
2006	0.2319	0.1313	6.8295	0.5710	0.0109	0.0135	0.0116	0.0019	0.00006
2007	0.2234	0.1319	6.5861	0.5302	0.0096	0.0135	0.0116	0.0018	0.00006
2008	0.1904	0.1380	6.4735	0.4577	0.0080	0.0135	0.0116	0.0018	0.00005
2009	0.1866	0.1176	6.3722	0.4424	0.0074	0.0134	0.0115	0.0018	0.00004
2010	0.1858	0.1209	6.2868	0.4293	0.0073	0.0133	0.0115	0.0018	0.00004
2011	0.1816	0.1230	6.2619	0.4281	0.0066	0.0132	0.0114	0.0018	0.00004
2012	0.1845	0.1256	6.2395	0.4271	0.0062	0.0131	0.0113	0.0017	0.00004
2013	0.1851	0.1233	6.2213	0.4266	0.0061	0.0130	0.0113	0.0017	0.00004
2014	0.1842	0.1212	6.2039	0.4261	0.0059	0.0130	0.0113	0.0017	0.00004
2015	0.1817	0.1175	6.1871	0.4257	0.0057	0.0130	0.0113	0.0017	0.00003
2016	0.1791	0.1171	6.1709	0.4253	0.0054	0.0130	0.0112	0.0017	0.00003
2017	0.1822	0.1168	6.1550	0.4249	0.0054	0.0130	0.0112	0.0017	0.00003
2018	0.1811	0.1155	6.1397	0.4245	0.0054	0.0130	0.0112	0.0017	0.00003
2019	0.1805	0.1142	6.1249	0.4242	0.0054	0.0129	0.0112	0.0017	0.00003
2020	0.1785	0.1129	6.1108	0.4239	0.0054	0.0129	0.0112	0.0017	0.00003

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
1990	0.0260	0.0502	0.0431	0.0067	0.00035	0.0067	0.1314	0.1252
1991	0.0260	0.0384	0.0324	0.0058	0.00025	0.0067	0.1412	0.1307
1992	0.0259	0.0366	0.0309	0.0055	0.00024	0.0067	0.1347	0.1283
1993	0.0259	0.0350	0.0296	0.0052	0.00024	0.0066	0.1302	0.1256
1994	0.0259	0.0350	0.0301	0.0046	0.00023	0.0067	0.1218	0.1067
1995	0.0259	0.0274	0.0233	0.0038	0.00023	0.0067	0.1094	0.0889
1996	0.0259	0.0224	0.0190	0.0032	0.00022	0.0066	0.0622	0.0913
1997	0.0259	0.0218	0.0186	0.0029	0.00023	0.0067	0.0559	0.0897
1998	0.0259	0.0181	0.0154	0.0025	0.00023	0.0067	0.0486	0.0771
1999	0.0259	0.0159	0.0135	0.0022	0.00022	0.0066	0.0371	0.0637
2000	0.0259	0.0156	0.0134	0.0021	0.00019	0.0066	0.0397	0.0626
2001	0.0258	0.0140	0.0119	0.0019	0.00017	0.0066	0.0306	0.0178
2002	0.0258	0.0123	0.0104	0.0017	0.00014	0.0066	0.0289	0.0171
2003	0.0258	0.0128	0.0109	0.0017	0.00012	0.0066	0.0291	0.0171
2004	0.0258	0.0125	0.0107	0.0017	0.00009	0.0066	0.0310	0.0171
2005	0.0258	0.0125	0.0107	0.0017	0.00007	0.0066	0.0339	0.0170
2006	0.0259	0.0125	0.0107	0.0017	0.00006	0.0066	0.0259	0.0169
2007	0.0259	0.0124	0.0107	0.0017	0.00005	0.0066	0.0256	0.0168
2008	0.0259	0.0124	0.0106	0.0017	0.00004	0.0067	0.0257	0.0167
2009	0.0259	0.0123	0.0106	0.0017	0.00004	0.0067	0.0264	0.0166
2010	0.0259	0.0123	0.0106	0.0017	0.00004	0.0067	0.0262	0.0165
2011	0.0260	0.0122	0.0105	0.0016	0.00004	0.0067	0.0302	0.0087
2012	0.0260	0.0121	0.0104	0.0016	0.00003	0.0067	0.0276	0.0086
2013	0.0260	0.0120	0.0104	0.0016	0.00003	0.0067	0.0276	0.0086
2014	0.0260	0.0120	0.0104	0.0016	0.00003	0.0067	0.0274	0.0086
2015	0.0260	0.0120	0.0104	0.0016	0.00003	0.0067	0.0288	0.0085
2016	0.0260	0.0119	0.0104	0.0016	0.00003	0.0067	0.0302	0.0085
2017	0.0260	0.0119	0.0104	0.0016	0.00003	0.0067	0.0265	0.0085
2018	0.0260	0.0119	0.0103	0.0016	0.00003	0.0067	0.0270	0.0084
2019	0.0260	0.0119	0.0103	0.0015	0.00003	0.0067	0.0268	0.0084

Model Year	PM <sub>10</sub> , TBW	PM <sub>2.5</sub> , exhaust	PM <sub>2.5</sub> , OC	PM <sub>2.5</sub> , BC	PM <sub>2.5</sub> , Sulfate	PM <sub>2.5</sub> , TBW	CH <sub>4</sub>	N <sub>2</sub> O
2020	0.0260	0.0119	0.0103	0.0015	0.00003	0.0067	0.0282	0.0084

**Table A7 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for diesel light-duty commercial trucks for model years 1990–2020**

Model Year	VOC, exhaust	VOC, evaporation	CO	NO <sub>x</sub>	SO <sub>2</sub>	PM <sub>10</sub> , exhaust	PM <sub>10</sub> , OC	PM <sub>10</sub> , BC	PM <sub>10</sub> , Sulfate
1990	1.0255		4.0965	7.3858	0.1014	0.7847	0.2398	0.5377	0.00727
1991	1.1008		4.4597	6.1238	0.0946	0.4928	0.1365	0.3495	0.00679
1992	1.0579		4.2930	5.8576	0.0963	0.4624	0.1293	0.3262	0.00691
1993	1.1172		4.5378	6.2396	0.0884	0.5056	0.1387	0.3606	0.00634
1994	1.0965		4.4863	6.1942	0.0999	0.7600	0.2463	0.5066	0.00717
1995	1.0408		4.3328	5.9810	0.0903	0.7092	0.2319	0.4708	0.00648
1996	0.9479		3.9834	5.9140	0.0823	0.6688	0.2190	0.4439	0.00591
1997	0.7640		3.3106	5.1456	0.0846	0.5529	0.1829	0.3638	0.00607
1998	0.8918		3.6954	5.1290	0.0826	0.3153	0.0906	0.2188	0.00593
1999	0.7927		3.3190	4.8365	0.0792	0.2937	0.0858	0.2022	0.00568
2000	0.7975		3.3399	4.8322	0.0710	0.2939	0.0861	0.2027	0.00510
2001	0.7104		3.0454	4.3426	0.0772	0.2726	0.0823	0.1848	0.00554
2002	0.7754		3.2664	4.6579	0.0655	0.2871	0.0852	0.1973	0.00470
2003	0.5578		2.3320	5.0716	0.0534	0.2580	0.0773	0.1769	0.00383
2004	0.5579		2.3356	5.0699	0.0408	0.2211	0.0638	0.1544	0.00293
2005	0.5578		2.3374	5.0677	0.0284	0.2203	0.0638	0.1545	0.00204
2006	0.5259		2.0289	3.9138	0.0161	0.2194	0.0638	0.1544	0.00115
2007	0.0765		0.4820	1.9872	0.0103	0.0139	0.0119	0.0012	0.00074
2008	0.0741		0.4793	1.9830	0.0071	0.0115	0.0100	0.0010	0.00051
2009	0.0738		0.4780	1.9799	0.0062	0.0115	0.0100	0.0010	0.00044
2010	0.0812		1.2682	0.9861	0.0052	0.0110	0.0096	0.0010	0.00038
2011	0.0807		1.2651	0.9837	0.0048	0.0109	0.0096	0.0010	0.00034
2012	0.0801		1.2623	0.9815	0.0046	0.0109	0.0096	0.0010	0.00033
2013	0.0798		1.2597	0.9794	0.0046	0.0101	0.0089	0.0009	0.00033



<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
2014	0.0795		1.2573	0.9774	0.0046	0.0101	0.0089	0.0009	0.00033
2015	0.0792		1.2549	0.9754	0.0045	0.0101	0.0089	0.0009	0.00033
2016	0.0789		1.2527	0.9735	0.0045	0.0101	0.0089	0.0009	0.00032
2017	0.0786		1.2506	0.9717	0.0045	0.0101	0.0088	0.0009	0.00032
2018	0.0784		1.2486	0.9698	0.0045	0.0101	0.0088	0.0009	0.00032
2019	0.0782		1.2467	0.9680	0.0045	0.0101	0.0088	0.0009	0.00032
2020	0.0779		1.2449	0.9663	0.0045	0.0101	0.0088	0.0009	0.00032

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
1990	0.0351	0.7613	0.2326	0.5216	0.00709	0.0090	0.0031	0.0035
1991	0.0303	0.4780	0.1324	0.3390	0.00662	0.0078	0.0025	0.0033
1992	0.0283	0.4486	0.1254	0.3164	0.00674	0.0072	0.0024	0.0032
1993	0.0313	0.4905	0.1346	0.3498	0.00618	0.0080	0.0026	0.0033
1994	0.0308	0.7373	0.2389	0.4914	0.00699	0.0079	0.0026	0.0033
1995	0.0295	0.6880	0.2250	0.4567	0.00632	0.0076	0.0024	0.0031
1996	0.0304	0.6488	0.2125	0.4306	0.00576	0.0078	0.0022	0.0031
1997	0.0279	0.5363	0.1774	0.3529	0.00592	0.0071	0.0021	0.0027
1998	0.0319	0.3058	0.0879	0.2122	0.00578	0.0082	0.0025	0.0033
1999	0.0291	0.2849	0.0832	0.1962	0.00554	0.0074	0.0024	0.0031
2000	0.0301	0.2851	0.0835	0.1967	0.00497	0.0077	0.0024	0.0031
2001	0.0278	0.2644	0.0798	0.1793	0.00540	0.0071	0.0021	0.0028
2002	0.0279	0.2785	0.0826	0.1914	0.00458	0.0071	0.0023	0.0030
2003	0.0279	0.2503	0.0750	0.1716	0.00374	0.0071	0.0023	0.0030
2004	0.0279	0.2144	0.0619	0.1497	0.00285	0.0071	0.0023	0.0030
2005	0.0279	0.2137	0.0619	0.1499	0.00199	0.0071	0.0023	0.0029
2006	0.0279	0.2128	0.0618	0.1498	0.00113	0.0071	0.0023	0.0029
2007	0.0279	0.0135	0.0115	0.0012	0.00072	0.0071	0.0886	0.0029
2008	0.0279	0.0112	0.0097	0.0010	0.00050	0.0071	0.0866	0.0029
2009	0.0279	0.0111	0.0097	0.0010	0.00043	0.0071	0.0862	0.0029

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
2010	0.0279	0.0107	0.0093	0.0010	0.00037	0.0071	0.0963	0.0029
2011	0.0279	0.0106	0.0093	0.0010	0.00033	0.0071	0.0959	0.0029
2012	0.0279	0.0106	0.0093	0.0010	0.00032	0.0071	0.0955	0.0029
2013	0.0279	0.0098	0.0086	0.0009	0.00032	0.0071	0.0952	0.0029
2014	0.0279	0.0098	0.0086	0.0009	0.00032	0.0071	0.0949	0.0029
2015	0.0279	0.0098	0.0086	0.0009	0.00032	0.0071	0.0945	0.0029
2016	0.0279	0.0098	0.0086	0.0009	0.00031	0.0071	0.0942	0.0029
2017	0.0279	0.0098	0.0086	0.0009	0.00031	0.0071	0.0939	0.0029
2018	0.0279	0.0098	0.0086	0.0009	0.00031	0.0071	0.0936	0.0029
2019	0.0279	0.0098	0.0086	0.0009	0.00031	0.0071	0.0933	0.0029
2020	0.0279	0.0098	0.0086	0.0009	0.00031	0.0071	0.0930	0.0029

**Table A8 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for diesel intercity buses for model years 1990–2020**

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
1990	0.9426		6.3411	28.3322	0.2580	1.1677	0.2390	0.9102	0.01851
1991	0.9690		6.5261	26.4411	0.2425	1.2797	0.2408	1.0215	0.01740
1992	0.9691		6.5274	26.4761	0.2358	1.2792	0.2408	1.0215	0.01692
1993	0.9691		6.5285	26.5066	0.2298	1.2788	0.2408	1.0215	0.01649
1994	0.9692		6.5297	26.4579	0.2234	1.2463	0.2174	1.0129	0.01603
1995	0.9692		6.5309	26.4880	0.2171	1.2459	0.2174	1.0129	0.01557
1996	0.9275		6.2384	26.4970	0.2103	1.2099	0.2112	0.9837	0.01509
1997	0.8913		5.9897	26.5205	0.2039	1.1793	0.2058	0.9588	0.01463
1998	0.8626		5.7928	24.3218	0.1974	0.8260	0.1743	0.6375	0.01416
1999	0.8381		5.6247	18.1502	0.1909	0.8124	0.1715	0.6272	0.01369
2000	0.8432		5.6648	18.1510	0.1678	0.8134	0.1721	0.6292	0.01204
2001	0.8488		5.7072	18.1517	0.1440	0.8145	0.1727	0.6315	0.01033
2002	0.8519		5.7322	18.1522	0.1210	0.8145	0.1731	0.6327	0.00868
2003	0.7227		2.9153	9.3867	0.0980	0.7497	0.1595	0.5831	0.00703

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
2004	0.7250		2.9267	9.3870	0.0749	0.7493	0.1598	0.5841	0.00538
2005	0.7266		2.9351	9.3872	0.0525	0.7486	0.1600	0.5848	0.00376
2006	0.7300		2.9500	9.3874	0.0301	0.7489	0.1604	0.5863	0.00216
2007	0.1143		0.8323	4.7078	0.0205	0.0412	0.0363	0.0034	0.00147
2008	0.1133		0.8312	4.7056	0.0155	0.0345	0.0305	0.0029	0.00112
2009	0.1133		0.8317	4.7057	0.0139	0.0344	0.0305	0.0029	0.00100
2010	0.0967		0.6693	1.5796	0.0125	0.0326	0.0289	0.0027	0.00090
2011	0.0967		0.6679	1.5770	0.0119	0.0325	0.0289	0.0027	0.00086
2012	0.0966		0.6673	1.5754	0.0119	0.0324	0.0289	0.0027	0.00086
2013	0.0949		0.6506	1.4250	0.0119	0.0291	0.0258	0.0024	0.00086
2014	0.0949		0.6508	1.4227	0.0119	0.0291	0.0258	0.0024	0.00086
2015	0.0949		0.6514	1.4223	0.0119	0.0291	0.0258	0.0024	0.00086
2016	0.0949		0.6520	1.4221	0.0119	0.0290	0.0258	0.0024	0.00086
2017	0.0949		0.6527	1.4221	0.0119	0.0290	0.0258	0.0024	0.00086
2018	0.0949		0.6535	1.4222	0.0119	0.0290	0.0258	0.0024	0.00086
2019	0.0949		0.6543	1.4226	0.0119	0.0290	0.0258	0.0024	0.00086
2020	0.0950		0.6551	1.4230	0.0119	0.0291	0.0258	0.0024	0.00086

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
1990	0.1076	1.1328	0.2318	0.8829	0.01805	0.0277	0.0032	0.0024
1991	0.1076	1.2414	0.2336	0.9909	0.01697	0.0277	0.0032	0.0024
1992	0.1076	1.2410	0.2336	0.9909	0.01650	0.0277	0.0032	0.0024
1993	0.1076	1.2406	0.2336	0.9909	0.01608	0.0277	0.0032	0.0024
1994	0.1076	1.2090	0.2109	0.9825	0.01563	0.0277	0.0032	0.0024
1995	0.1076	1.2086	0.2109	0.9825	0.01518	0.0277	0.0032	0.0024
1996	0.1076	1.1737	0.2048	0.9542	0.01471	0.0277	0.0025	0.0024
1997	0.1076	1.1440	0.1997	0.9301	0.01426	0.0277	0.0025	0.0024
1998	0.1076	0.8013	0.1691	0.6184	0.01381	0.0277	0.0025	0.0024
1999	0.1076	0.7881	0.1664	0.6084	0.01335	0.0277	0.0025	0.0024

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
2000	0.1076	0.7890	0.1669	0.6104	0.01174	0.0277	0.0025	0.0024
2001	0.1076	0.7901	0.1675	0.6125	0.01007	0.0277	0.0025	0.0024
2002	0.1076	0.7901	0.1679	0.6138	0.00846	0.0277	0.0025	0.0024
2003	0.1076	0.7273	0.1548	0.5657	0.00686	0.0277	0.0022	0.0024
2004	0.1076	0.7269	0.1550	0.5666	0.00524	0.0277	0.0022	0.0024
2005	0.1076	0.7262	0.1552	0.5673	0.00367	0.0277	0.0022	0.0024
2006	0.1076	0.7265	0.1556	0.5687	0.00211	0.0277	0.0022	0.0024
2007	0.1076	0.0400	0.0352	0.0033	0.00143	0.0277	0.0832	0.0024
2008	0.1076	0.0335	0.0296	0.0028	0.00109	0.0277	0.0818	0.0024
2009	0.1076	0.0334	0.0296	0.0028	0.00097	0.0277	0.0818	0.0024
2010	0.1076	0.0316	0.0281	0.0026	0.00087	0.0277	0.0591	0.0024
2011	0.1076	0.0315	0.0280	0.0026	0.00083	0.0277	0.0591	0.0024
2012	0.1076	0.0315	0.0280	0.0026	0.00083	0.0277	0.0590	0.0024
2013	0.1076	0.0282	0.0250	0.0024	0.00083	0.0277	0.0566	0.0024
2014	0.1076	0.0282	0.0250	0.0024	0.00083	0.0277	0.0566	0.0024
2015	0.1076	0.0282	0.0250	0.0024	0.00083	0.0277	0.0566	0.0024
2016	0.1076	0.0282	0.0250	0.0024	0.00083	0.0277	0.0566	0.0024
2017	0.1076	0.0282	0.0250	0.0024	0.00083	0.0277	0.0567	0.0024
2018	0.1076	0.0282	0.0250	0.0024	0.00083	0.0277	0.0567	0.0024
2019	0.1076	0.0282	0.0250	0.0024	0.00083	0.0277	0.0567	0.0024
2020	0.1076	0.0282	0.0250	0.0024	0.00083	0.0277	0.0567	0.0024

**Table A9 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for gasoline transit buses for model years 1990–2020**

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
1990									
1991									
1992	3.8998	0.6920	37.7462	131.3477	0.0467	0.0241	0.0306	0.0194	0.00254
1993	3.8757	0.6752	39.3812	128.5886	0.0455	0.0242	0.0294	0.0182	0.00234

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
1994	3.8348	0.6549	43.3407	120.2962	0.0443	0.0270	0.0356	0.0216	0.00232
1995	3.5795	0.5914	44.9780	108.4651	0.0432	0.0213	0.0204	0.0118	0.00149
1996	3.5523	0.2454	46.6679	98.3601	0.0757	0.0202	0.0173	0.0097	0.00122
1997	3.4000	0.2422	48.4597	89.4128	0.0784	0.0205	0.0175	0.0095	0.00111
1998	2.0937	0.1418	17.3725	22.2528	0.0774	0.0187	0.0135	0.0070	0.00085
1999	2.0339	0.1151	17.8259	20.4516	0.0646	0.0181	0.0122	0.0061	0.00072
2000	2.0462	0.1178	19.9783	18.8837	0.0488	0.0168	0.0102	0.0047	0.00057
2001	2.1742	0.1224	23.4897	21.2488	0.0253	0.0171	0.0110	0.0047	0.00053
2002	2.1671	0.1253	25.9500	18.6193	0.0248	0.0153	0.0089	0.0035	0.00041
2003	2.1545	0.1284	28.2659	16.0404	0.0241	0.0152	0.0092	0.0033	0.00037
2004	2.2979	0.1154	31.2670	12.6979	0.0234	0.0152	0.0098	0.0032	0.00033
2005	1.8162	0.1176	32.9603	10.8851	0.0226	0.0147	0.0098	0.0029	0.00029
2006	1.8033	0.1191	34.3240	9.1544	0.0218	0.0142	0.0098	0.0025	0.00024
2007	1.8004	0.1196	35.5179	7.6796	0.0210	0.0135	0.0097	0.0023	0.00020
2008	1.5652	0.1247	36.9151	6.1024	0.0201	0.0127	0.0097	0.0020	0.00017
2009	1.5678	0.1061	38.3282	4.7769	0.0192	0.0119	0.0096	0.0017	0.00014
2010	1.5674	0.1097	39.4300	3.5553	0.0183	0.0111	0.0095	0.0015	0.00011
2011	1.5664	0.1116	39.2079	3.5466	0.0180	0.0110	0.0094	0.0015	0.00011
2012	1.5669	0.1139	39.0961	3.5388	0.0176	0.0109	0.0094	0.0014	0.00010
2013	1.5678	0.1117	39.0789	3.5377	0.0176	0.0108	0.0093	0.0014	0.00010
2014	1.5669	0.1097	39.0944	3.5370	0.0176	0.0108	0.0093	0.0014	0.00010
2015	1.5632	0.1064	39.1206	3.5364	0.0176	0.0108	0.0093	0.0014	0.00010
2016	1.5619	0.1060	39.1628	3.5362	0.0176	0.0108	0.0093	0.0014	0.00010
2017	1.5666	0.1057	39.2232	3.5364	0.0176	0.0109	0.0093	0.0014	0.00010
2018	1.5674	0.1045	39.2963	3.5370	0.0176	0.0109	0.0093	0.0014	0.00010
2019	1.5685	0.1033	39.3755	3.5376	0.0176	0.0109	0.0094	0.0014	0.00010
2020	1.5665	0.1022	39.4565	3.5383	0.0176	0.0109	0.0094	0.0014	0.00010

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
1990	0.0000					0.0000		
1991	0.0000					0.0000		
1992	0.0401	0.0180	0.0282	0.0179	0.00234	0.0109	6.1206	0.2169
1993	0.0402	0.0181	0.0270	0.0168	0.00216	0.0109	6.0047	0.2117
1994	0.0403	0.0207	0.0328	0.0199	0.00214	0.0109	5.9989	0.2205
1995	0.0404	0.0156	0.0188	0.0109	0.00137	0.0109	5.7636	0.2246
1996	0.0405	0.0147	0.0160	0.0089	0.00113	0.0109	5.4971	0.1090
1997	0.0407	0.0150	0.0161	0.0087	0.00102	0.0110	5.2821	0.0947
1998	0.0408	0.0134	0.0125	0.0065	0.00079	0.0110	3.1177	0.0765
1999	0.0409	0.0129	0.0113	0.0056	0.00066	0.0110	2.9911	0.0644
2000	0.0413	0.0121	0.0094	0.0043	0.00053	0.0110	2.7297	0.0575
2001	0.0417	0.0125	0.0102	0.0043	0.00049	0.0111	3.1162	0.0379
2002	0.0422	0.0112	0.0082	0.0032	0.00038	0.0111	2.7145	0.0363
2003	0.0426	0.0114	0.0085	0.0031	0.00034	0.0112	2.2985	0.0374
2004	0.0431	0.0118	0.0091	0.0029	0.00031	0.0113	1.5833	0.0370
2005	0.0437	0.0117	0.0090	0.0026	0.00026	0.0114	1.2676	0.0375
2006	0.0444	0.0116	0.0090	0.0023	0.00022	0.0115	1.0190	0.0368
2007	0.0450	0.0113	0.0090	0.0021	0.00019	0.0117	0.7502	0.0367
2008	0.0457	0.0110	0.0089	0.0018	0.00016	0.0118	0.4830	0.0368
2009	0.0464	0.0106	0.0089	0.0016	0.00013	0.0120	0.2462	0.0367
2010	0.0470	0.0102	0.0088	0.0014	0.00010	0.0121	0.0382	0.0365
2011	0.0470	0.0101	0.0087	0.0013	0.00010	0.0121	0.0367	0.0099
2012	0.0471	0.0100	0.0086	0.0013	0.00010	0.0121	0.0350	0.0099
2013	0.0471	0.0100	0.0086	0.0013	0.00010	0.0121	0.0336	0.0099
2014	0.0471	0.0100	0.0086	0.0013	0.00010	0.0121	0.0336	0.0099
2015	0.0471	0.0100	0.0086	0.0013	0.00010	0.0121	0.0367	0.0099
2016	0.0471	0.0100	0.0086	0.0013	0.00010	0.0121	0.0380	0.0099
2017	0.0471	0.0100	0.0086	0.0013	0.00010	0.0121	0.0338	0.0100
2018	0.0471	0.0100	0.0086	0.0013	0.00010	0.0121	0.0338	0.0100
2019	0.0471	0.0100	0.0086	0.0013	0.00010	0.0121	0.0339	0.0100

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
2020	0.0471	0.0100	0.0086	0.0013	0.00010	0.0121	0.0371	0.0100

**Table A10 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for diesel transit buses for model years 1990–2020**

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
1990	1.1667		7.6427	24.0701	0.2192	0.8562	0.1895	0.6510	0.01573
1991	1.2478		8.1753	22.6403	0.2031	1.0156	0.2106	0.7904	0.01457
1992	1.2043		7.8910	22.6386	0.1992	0.9934	0.2060	0.7731	0.01429
1993	1.1676		7.6497	22.6368	0.1954	0.9747	0.2021	0.7585	0.01402
1994	1.1115		7.2876	22.6352	0.1915	1.0530	0.2158	0.8234	0.01374
1995	1.0644		6.9822	22.6336	0.1875	1.0262	0.2104	0.8024	0.01345
1996	0.9988		6.5550	22.6321	0.1834	0.9881	0.2025	0.7724	0.01316
1997	0.9433		6.1977	22.6307	0.1792	0.9563	0.1960	0.7475	0.01286
1998	0.8973		5.9005	19.0713	0.1749	0.6722	0.1698	0.4898	0.01255
1999	0.8586		5.6486	14.9044	0.1706	0.6573	0.1661	0.4790	0.01224
2000	0.8701		5.7361	14.9071	0.1523	0.6600	0.1672	0.4819	0.01093
2001	0.8820		5.8249	14.9096	0.1326	0.6628	0.1683	0.4850	0.00951
2002	0.8912		5.8920	14.9112	0.1127	0.6646	0.1691	0.4874	0.00809
2003	0.6630		3.0059	8.4438	0.0921	0.6101	0.1556	0.4479	0.00661
2004	0.6676		3.0318	8.4450	0.0706	0.6105	0.1561	0.4494	0.00507
2005	0.6709		3.0505	8.4459	0.0489	0.6104	0.1565	0.4504	0.00351
2006	0.6744		3.0695	8.4466	0.0265	0.6103	0.1569	0.4515	0.00190
2007	0.1071		1.2704	4.2692	0.0168	0.0284	0.0248	0.0023	0.00121
2008	0.1060		1.2691	4.2674	0.0125	0.0238	0.0209	0.0020	0.00090
2009	0.1060		1.2703	4.2676	0.0109	0.0236	0.0209	0.0020	0.00079
2010	0.0883		1.1011	1.3099	0.0095	0.0225	0.0200	0.0019	0.00068
2011	0.0881		1.0957	1.3061	0.0089	0.0224	0.0199	0.0019	0.00064
2012	0.0881		1.0935	1.3039	0.0089	0.0224	0.0199	0.0019	0.00064
2013	0.0867		1.0807	1.2102	0.0089	0.0205	0.0182	0.0017	0.00064

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
2014	0.0867		1.0817	1.2089	0.0089	0.0205	0.0181	0.0017	0.00064
2015	0.0867		1.0831	1.2088	0.0089	0.0205	0.0181	0.0017	0.00064
2016	0.0867		1.0849	1.2088	0.0089	0.0205	0.0181	0.0017	0.00064
2017	0.0868		1.0871	1.2091	0.0089	0.0205	0.0181	0.0017	0.00064
2018	0.0868		1.0895	1.2096	0.0089	0.0205	0.0181	0.0017	0.00064
2019	0.0869		1.0921	1.2103	0.0089	0.0205	0.0182	0.0017	0.00064
2020	0.0870		1.0948	1.2111	0.0089	0.0205	0.0182	0.0017	0.00064

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
1990	0.0482	0.8306	0.1838	0.6314	0.01533	0.0124	0.0033	0.0028
1991	0.0482	0.9853	0.2043	0.7667	0.01421	0.0124	0.0033	0.0029
1992	0.0482	0.9637	0.1999	0.7499	0.01394	0.0124	0.0033	0.0028
1993	0.0482	0.9455	0.1961	0.7358	0.01367	0.0124	0.0033	0.0028
1994	0.0482	1.0215	0.2094	0.7987	0.01339	0.0124	0.0033	0.0028
1995	0.0482	0.9955	0.2040	0.7783	0.01311	0.0124	0.0034	0.0028
1996	0.0482	0.9586	0.1965	0.7493	0.01283	0.0124	0.0025	0.0029
1997	0.0482	0.9277	0.1901	0.7251	0.01253	0.0124	0.0026	0.0029
1998	0.0482	0.6521	0.1647	0.4751	0.01224	0.0124	0.0027	0.0028
1999	0.0482	0.6377	0.1611	0.4646	0.01193	0.0124	0.0025	0.0028
2000	0.0482	0.6403	0.1622	0.4675	0.01065	0.0124	0.0026	0.0029
2001	0.0482	0.6430	0.1632	0.4705	0.00927	0.0124	0.0026	0.0029
2002	0.0482	0.6447	0.1640	0.4728	0.00788	0.0124	0.0025	0.0029
2003	0.0482	0.5919	0.1509	0.4345	0.00644	0.0124	0.0025	0.0029
2004	0.0482	0.5923	0.1514	0.4359	0.00494	0.0124	0.0025	0.0029
2005	0.0482	0.5921	0.1518	0.4369	0.00342	0.0124	0.0025	0.0029
2006	0.0482	0.5920	0.1522	0.4380	0.00186	0.0124	0.0025	0.0029
2007	0.0482	0.0275	0.0241	0.0023	0.00118	0.0124	0.0921	0.0029
2008	0.0482	0.0230	0.0203	0.0019	0.00088	0.0124	0.0905	0.0029
2009	0.0482	0.0229	0.0203	0.0019	0.00077	0.0124	0.0905	0.0029



<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
2010	0.0482	0.0218	0.0194	0.0018	0.00066	0.0124	0.0662	0.0029
2011	0.0482	0.0217	0.0193	0.0018	0.00062	0.0124	0.0660	0.0029
2012	0.0482	0.0217	0.0193	0.0018	0.00062	0.0124	0.0659	0.0029
2013	0.0482	0.0199	0.0176	0.0017	0.00062	0.0124	0.0640	0.0029
2014	0.0482	0.0199	0.0176	0.0017	0.00062	0.0124	0.0640	0.0029
2015	0.0482	0.0199	0.0176	0.0017	0.00062	0.0124	0.0641	0.0029
2016	0.0482	0.0199	0.0176	0.0017	0.00062	0.0124	0.0641	0.0029
2017	0.0482	0.0199	0.0176	0.0017	0.00062	0.0124	0.0642	0.0029
2018	0.0482	0.0199	0.0176	0.0017	0.00062	0.0124	0.0642	0.0029
2019	0.0482	0.0199	0.0176	0.0017	0.00062	0.0124	0.0643	0.0029
2020	0.0482	0.0199	0.0176	0.0017	0.00062	0.0124	0.0644	0.0029

**Table A11 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for gasoline school buses for model years 1990–2020**

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
1990	4.2683	1.6193	143.5246	6.8414	0.0863	0.0471	0.0364	0.0101	0.00051
1991	4.4230	1.5671	148.0245	6.9044	0.0745	0.0453	0.0357	0.0092	0.00044
1992	4.4232	1.5377	147.2027	6.8841	0.0721	0.0440	0.0347	0.0089	0.00043
1993	4.4268	1.5140	146.4709	6.8660	0.0706	0.0429	0.0337	0.0087	0.00042
1994	4.3795	1.4860	144.5000	6.8960	0.0687	0.0525	0.0437	0.0084	0.00041
1995	4.1975	1.3784	139.3796	6.7872	0.0672	0.0301	0.0233	0.0063	0.00040
1996	4.3437	0.6439	134.5730	6.6766	0.0650	0.0261	0.0201	0.0056	0.00039
1997	4.2497	0.6287	130.4011	6.5811	0.0634	0.0264	0.0208	0.0052	0.00038
1998	3.3601	0.3811	78.5631	4.9106	0.0615	0.0211	0.0163	0.0045	0.00037
1999	3.3172	0.3167	77.1984	4.8500	0.0602	0.0177	0.0134	0.0040	0.00036
2000	3.3710	0.3241	78.8293	4.8551	0.0525	0.0160	0.0120	0.0037	0.00031
2001	3.5925	0.3370	89.6292	5.4360	0.0451	0.0178	0.0139	0.0037	0.00027
2002	3.5874	0.3450	89.3820	5.3356	0.0379	0.0148	0.0112	0.0033	0.00023
2003	3.5698	0.3536	88.9320	5.2302	0.0309	0.0150	0.0114	0.0034	0.00018

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
2004	3.8599	0.3273	88.8299	4.6171	0.0238	0.0163	0.0127	0.0035	0.00014
2005	2.2488	0.3334	88.8744	3.8423	0.0192	0.0164	0.0128	0.0035	0.00011
2006	2.1753	0.3376	86.9731	3.8348	0.0171	0.0165	0.0129	0.0035	0.00010
2007	2.1681	0.3389	86.1447	3.7843	0.0155	0.0165	0.0129	0.0035	0.00009
2008	1.3834	0.3553	86.0592	2.7982	0.0144	0.0165	0.0129	0.0035	0.00009
2009	1.3825	0.3052	85.9645	2.7891	0.0137	0.0165	0.0129	0.0035	0.00008
2010	1.3821	0.3094	85.5154	2.7828	0.0136	0.0163	0.0128	0.0035	0.00008
2011	1.3860	0.3140	85.1457	2.7768	0.0134	0.0161	0.0126	0.0034	0.00008
2012	1.3913	0.3206	85.0000	2.7720	0.0132	0.0159	0.0124	0.0033	0.00008
2013	1.3964	0.3147	85.0395	2.7712	0.0132	0.0157	0.0123	0.0033	0.00008
2014	1.3964	0.3093	85.1450	2.7709	0.0132	0.0157	0.0123	0.0033	0.00008
2015	1.3906	0.2995	85.2705	2.7707	0.0132	0.0157	0.0123	0.0033	0.00008
2016	1.3884	0.2983	85.4217	2.7708	0.0132	0.0157	0.0123	0.0033	0.00008
2017	1.3981	0.2975	85.5996	2.7712	0.0132	0.0157	0.0124	0.0033	0.00008
2018	1.3994	0.2937	85.7948	2.7719	0.0132	0.0158	0.0124	0.0033	0.00008
2019	1.4008	0.2902	85.9961	2.7727	0.0132	0.0158	0.0124	0.0033	0.00008
2020	1.3961	0.2867	86.1949	2.7735	0.0132	0.0158	0.0124	0.0033	0.00008

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
1990	0.0484	0.0434	0.0335	0.0093	0.00047	0.0125	0.4753	0.1279
1991	0.0484	0.0417	0.0329	0.0084	0.00041	0.0125	0.4755	0.1298
1992	0.0484	0.0406	0.0319	0.0082	0.00040	0.0125	0.4760	0.1303
1993	0.0484	0.0395	0.0311	0.0080	0.00039	0.0125	0.4765	0.1308
1994	0.0484	0.0483	0.0402	0.0077	0.00038	0.0125	0.4897	0.1313
1995	0.0484	0.0277	0.0215	0.0058	0.00037	0.0125	0.5017	0.1317
1996	0.0484	0.0240	0.0185	0.0052	0.00036	0.0125	0.1957	0.2523
1997	0.0484	0.0243	0.0192	0.0048	0.00035	0.0125	0.1553	0.2715
1998	0.0484	0.0195	0.0150	0.0041	0.00034	0.0125	0.1149	0.2780
1999	0.0484	0.0163	0.0123	0.0036	0.00033	0.0125	0.1007	0.2366

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
2000	0.0484	0.0148	0.0111	0.0034	0.00029	0.0125	0.0963	0.1838
2001	0.0484	0.0164	0.0128	0.0034	0.00025	0.0125	0.0897	0.0842
2002	0.0484	0.0136	0.0103	0.0030	0.00021	0.0125	0.0861	0.0853
2003	0.0484	0.0138	0.0105	0.0031	0.00017	0.0125	0.0878	0.0862
2004	0.0484	0.0150	0.0117	0.0032	0.00013	0.0125	0.0935	0.0870
2005	0.0484	0.0151	0.0118	0.0032	0.00011	0.0125	0.0981	0.0875
2006	0.0484	0.0152	0.0118	0.0032	0.00009	0.0125	0.0913	0.0880
2007	0.0485	0.0152	0.0119	0.0033	0.00009	0.0125	0.0904	0.0883
2008	0.0485	0.0152	0.0119	0.0033	0.00008	0.0125	0.0922	0.0884
2009	0.0485	0.0152	0.0119	0.0033	0.00008	0.0125	0.0942	0.0885
2010	0.0486	0.0150	0.0117	0.0032	0.00007	0.0125	0.0945	0.0881
2011	0.0486	0.0148	0.0116	0.0031	0.00007	0.0125	0.0907	0.0239
2012	0.0486	0.0146	0.0115	0.0031	0.00007	0.0125	0.0871	0.0239
2013	0.0486	0.0144	0.0113	0.0030	0.00007	0.0125	0.0848	0.0239
2014	0.0486	0.0144	0.0113	0.0030	0.00007	0.0125	0.0849	0.0240
2015	0.0486	0.0144	0.0113	0.0030	0.00007	0.0125	0.0910	0.0240
2016	0.0486	0.0145	0.0114	0.0030	0.00007	0.0125	0.0939	0.0241
2017	0.0486	0.0145	0.0114	0.0030	0.00007	0.0125	0.0855	0.0241
2018	0.0486	0.0145	0.0114	0.0030	0.00007	0.0125	0.0856	0.0242
2019	0.0486	0.0145	0.0114	0.0030	0.00007	0.0125	0.0858	0.0242
2020	0.0486	0.0146	0.0114	0.0031	0.00007	0.0125	0.0920	0.0243

**Table A12 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for diesel school buses for model years 1990–2020**

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
1990	0.9735		5.6551	14.4661	0.1411	0.7220	0.2863	0.4255	0.01013
1991	1.0079		5.8286	13.5339	0.1310	0.6594	0.2419	0.4081	0.00940
1992	1.0059		5.8341	13.5507	0.1272	0.6592	0.2419	0.4081	0.00913
1993	1.0047		5.8398	13.5654	0.1240	0.6590	0.2420	0.4081	0.00890

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
1994	1.0094		5.8612	13.5449	0.1204	0.7700	0.2961	0.4653	0.00864
1995	1.0142		5.8812	13.5596	0.1173	0.7679	0.2953	0.4641	0.00842
1996	0.9733		5.7247	13.5649	0.1136	0.7443	0.2862	0.4499	0.00815
1997	0.9376		5.5925	13.5765	0.1101	0.7242	0.2785	0.4378	0.00790
1998	0.9096		5.4904	12.5042	0.1066	0.4655	0.1916	0.2663	0.00765
1999	0.8855		5.4039	8.9835	0.1031	0.4575	0.1884	0.2617	0.00740
2000	0.8934		5.4843	8.9909	0.0907	0.4583	0.1891	0.2627	0.00651
2001	0.9015		5.5607	8.9976	0.0780	0.4593	0.1900	0.2637	0.00560
2002	0.9061		5.6107	9.0021	0.0656	0.4595	0.1905	0.2644	0.00471
2003	0.7294		4.6600	5.6901	0.0532	0.4245	0.1764	0.2443	0.00382
2004	0.7329		4.6952	5.6934	0.0407	0.4244	0.1768	0.2447	0.00292
2005	0.7355		4.7205	5.6957	0.0285	0.4242	0.1770	0.2451	0.00205
2006	0.7394		4.7480	5.6977	0.0164	0.4245	0.1775	0.2458	0.00118
2007	0.1321		3.0959	3.0092	0.0111	0.0221	0.0195	0.0018	0.00080
2008	0.1303		3.0923	3.0083	0.0085	0.0185	0.0164	0.0015	0.00061
2009	0.1304		3.0952	3.0086	0.0076	0.0185	0.0164	0.0015	0.00055
2010	0.1140		2.9421	1.2027	0.0068	0.0175	0.0155	0.0015	0.00049
2011	0.1138		2.9312	1.1998	0.0065	0.0174	0.0155	0.0015	0.00047
2012	0.1137		2.9279	1.1985	0.0065	0.0174	0.0155	0.0015	0.00047
2013	0.1123		2.9172	1.1142	0.0065	0.0156	0.0139	0.0013	0.00047
2014	0.1124		2.9213	1.1133	0.0065	0.0156	0.0138	0.0013	0.00047
2015	0.1125		2.9262	1.1137	0.0065	0.0156	0.0138	0.0013	0.00047
2016	0.1126		2.9319	1.1142	0.0065	0.0156	0.0138	0.0013	0.00047
2017	0.1127		2.9385	1.1149	0.0065	0.0156	0.0138	0.0013	0.00047
2018	0.1129		2.9455	1.1158	0.0065	0.0156	0.0138	0.0013	0.00047
2019	0.1130		2.9527	1.1169	0.0065	0.0156	0.0138	0.0013	0.00047
2020	0.1132		2.9598	1.1179	0.0065	0.0156	0.0138	0.0013	0.00047

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
1990	0.0786	0.7004	0.2777	0.4128	0.00987	0.0202	0.0035	0.0040
1991	0.0786	0.6397	0.2347	0.3959	0.00916	0.0202	0.0035	0.0040
1992	0.0786	0.6395	0.2347	0.3959	0.00890	0.0202	0.0035	0.0040
1993	0.0786	0.6393	0.2347	0.3959	0.00867	0.0202	0.0035	0.0040
1994	0.0786	0.7470	0.2873	0.4513	0.00842	0.0202	0.0035	0.0040
1995	0.0786	0.7449	0.2864	0.4502	0.00820	0.0202	0.0035	0.0040
1996	0.0786	0.7220	0.2777	0.4364	0.00794	0.0202	0.0027	0.0042
1997	0.0786	0.7026	0.2702	0.4247	0.00770	0.0202	0.0028	0.0042
1998	0.0786	0.4516	0.1858	0.2583	0.00745	0.0202	0.0028	0.0042
1999	0.0786	0.4438	0.1827	0.2539	0.00721	0.0202	0.0029	0.0042
2000	0.0786	0.4446	0.1835	0.2548	0.00635	0.0202	0.0029	0.0042
2001	0.0786	0.4456	0.1843	0.2558	0.00546	0.0202	0.0028	0.0043
2002	0.0786	0.4458	0.1848	0.2564	0.00459	0.0202	0.0029	0.0043
2003	0.0786	0.4117	0.1711	0.2369	0.00372	0.0202	0.0029	0.0043
2004	0.0786	0.4117	0.1715	0.2374	0.00285	0.0202	0.0029	0.0044
2005	0.0786	0.4115	0.1717	0.2377	0.00199	0.0202	0.0029	0.0044
2006	0.0786	0.4117	0.1722	0.2384	0.00115	0.0202	0.0029	0.0044
2007	0.0786	0.0214	0.0189	0.0018	0.00078	0.0202	0.1411	0.0044
2008	0.0786	0.0180	0.0159	0.0015	0.00059	0.0202	0.1386	0.0044
2009	0.0786	0.0179	0.0159	0.0015	0.00053	0.0202	0.1387	0.0044
2010	0.0786	0.0169	0.0151	0.0014	0.00048	0.0202	0.1163	0.0044
2011	0.0786	0.0169	0.0150	0.0014	0.00045	0.0202	0.1160	0.0044
2012	0.0786	0.0169	0.0150	0.0014	0.00045	0.0202	0.1159	0.0044
2013	0.0786	0.0152	0.0134	0.0013	0.00045	0.0202	0.1140	0.0044
2014	0.0786	0.0151	0.0134	0.0013	0.00045	0.0202	0.1141	0.0044
2015	0.0786	0.0151	0.0134	0.0013	0.00045	0.0202	0.1142	0.0044
2016	0.0786	0.0151	0.0134	0.0013	0.00045	0.0202	0.1143	0.0044
2017	0.0786	0.0151	0.0134	0.0013	0.00045	0.0202	0.1145	0.0044
2018	0.0786	0.0151	0.0134	0.0013	0.00045	0.0202	0.1147	0.0044
2019	0.0786	0.0151	0.0134	0.0013	0.00045	0.0202	0.1149	0.0044

Model Year	PM <sub>10</sub> , TBW	PM <sub>2.5</sub> , exhaust	PM <sub>2.5</sub> , OC	PM <sub>2.5</sub> , BC	PM <sub>2.5</sub> , Sulfate	PM <sub>2.5</sub> , TBW	CH <sub>4</sub>	N <sub>2</sub> O
2020	0.0786	0.0151	0.0134	0.0013	0.00045	0.0202	0.1151	0.0044

**Table A13 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for gasoline refuse trucks for model years 1990–2020**

Model Year	VOC, exhaust	VOC, evaporation	CO	NO <sub>x</sub>	SO <sub>2</sub>	PM <sub>10</sub> , exhaust	PM <sub>10</sub> , OC	PM <sub>10</sub> , BC	PM <sub>10</sub> , Sulfate
1990	4.1489	0.8067	187.2385	10.1755	0.2174	0.0379	0.0325	0.0041	0.00129
1991	4.5955	0.7479	205.7045	10.2370	0.1680	0.0355	0.0306	0.0039	0.00100
1992	4.5383	0.7230	203.6979	10.1817	0.1658	0.0336	0.0289	0.0036	0.00099
1993	4.4779	0.6983	201.6821	10.1246	0.1643	0.0317	0.0274	0.0033	0.00098
1994	4.4131	0.6669	192.3036	10.2294	0.1625	0.0455	0.0405	0.0040	0.00097
1995	4.0470	0.5779	176.6592	10.0026	0.1607	0.0220	0.0188	0.0022	0.00096
1996	3.8701	0.2598	163.2137	9.8044	0.1588	0.0173	0.0146	0.0017	0.00094
1997	3.6118	0.2631	151.2972	9.6282	0.1568	0.0188	0.0162	0.0017	0.00093
1998	1.9131	0.1512	31.4102	5.6598	0.1549	0.0138	0.0116	0.0013	0.00092
1999	1.8200	0.1179	29.2600	5.5661	0.1529	0.0114	0.0095	0.0011	0.00091
2000	1.7979	0.1210	28.8552	5.4924	0.1379	0.0100	0.0082	0.0009	0.00082
2001	1.8844	0.1264	33.8862	6.6096	0.1228	0.0111	0.0094	0.0010	0.00073
2002	1.8585	0.1297	33.0117	6.3827	0.1056	0.0084	0.0069	0.0008	0.00063
2003	1.8325	0.1338	32.1946	6.1210	0.0850	0.0088	0.0074	0.0008	0.00051
2004	1.9002	0.1246	31.1580	5.0841	0.0609	0.0094	0.0082	0.0009	0.00036
2005	1.7247	0.1268	31.0286	4.9022	0.0443	0.0094	0.0082	0.0009	0.00026
2006	1.7268	0.1277	30.7452	4.8747	0.0372	0.0094	0.0083	0.0009	0.00022
2007	1.7270	0.1283	30.2858	4.7666	0.0314	0.0094	0.0083	0.0009	0.00019
2008	1.6425	0.1318	30.1313	4.6082	0.0272	0.0094	0.0083	0.0009	0.00016
2009	1.6466	0.1123	30.0016	4.5724	0.0246	0.0094	0.0084	0.0009	0.00015
2010	1.6457	0.1155	29.7347	4.5566	0.0240	0.0093	0.0083	0.0009	0.00014
2011	1.6446	0.1171	29.5005	4.5398	0.0233	0.0093	0.0082	0.0009	0.00014
2012	1.6445	0.1192	29.3681	4.5233	0.0224	0.0092	0.0082	0.0009	0.00013

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
2013	1.6446	0.1169	29.3355	4.5220	0.0224	0.0092	0.0082	0.0009	0.00013
2014	1.6439	0.1148	29.3332	4.5214	0.0224	0.0092	0.0082	0.0009	0.00013
2015	1.6416	0.1106	29.3402	4.5210	0.0224	0.0092	0.0082	0.0009	0.00013
2016	1.6413	0.1101	29.3604	4.5210	0.0225	0.0092	0.0082	0.0009	0.00013
2017	1.6442	0.1098	29.3953	4.5216	0.0225	0.0092	0.0082	0.0009	0.00013
2018	1.6453	0.1083	29.4382	4.5224	0.0225	0.0092	0.0082	0.0009	0.00013
2019	1.6463	0.1069	29.4827	4.5232	0.0225	0.0092	0.0082	0.0009	0.00013
2020	1.6453	0.1055	29.5266	4.5240	0.0225	0.0092	0.0082	0.0009	0.00013

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
1990	0.0528	0.0349	0.0299	0.0038	0.00119	0.0136	0.2041	0.0477
1991	0.0528	0.0327	0.0282	0.0036	0.00092	0.0136	0.2054	0.0509
1992	0.0528	0.0309	0.0266	0.0034	0.00091	0.0136	0.1990	0.0487
1993	0.0528	0.0292	0.0252	0.0031	0.00090	0.0136	0.1921	0.0463
1994	0.0528	0.0419	0.0373	0.0037	0.00089	0.0136	0.2018	0.0443
1995	0.0528	0.0203	0.0173	0.0020	0.00088	0.0136	0.2050	0.0425
1996	0.0528	0.0159	0.0135	0.0016	0.00087	0.0136	0.0676	0.0780
1997	0.0528	0.0173	0.0149	0.0016	0.00086	0.0136	0.0478	0.0807
1998	0.0528	0.0127	0.0107	0.0012	0.00085	0.0136	0.0258	0.0794
1999	0.0528	0.0105	0.0087	0.0010	0.00084	0.0136	0.0207	0.0651
2000	0.0527	0.0092	0.0076	0.0009	0.00076	0.0136	0.0201	0.0495
2001	0.0527	0.0102	0.0086	0.0009	0.00067	0.0136	0.0182	0.0223
2002	0.0527	0.0077	0.0064	0.0007	0.00058	0.0136	0.0167	0.0223
2003	0.0526	0.0081	0.0068	0.0008	0.00047	0.0136	0.0172	0.0223
2004	0.0526	0.0087	0.0075	0.0008	0.00033	0.0136	0.0175	0.0224
2005	0.0527	0.0086	0.0076	0.0008	0.00024	0.0136	0.0178	0.0225
2006	0.0527	0.0087	0.0076	0.0008	0.00020	0.0136	0.0171	0.0226
2007	0.0528	0.0087	0.0077	0.0008	0.00017	0.0136	0.0169	0.0227
2008	0.0529	0.0087	0.0077	0.0008	0.00015	0.0136	0.0170	0.0227

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
2009	0.0529	0.0087	0.0077	0.0008	0.00014	0.0136	0.0175	0.0227
2010	0.0529	0.0086	0.0076	0.0008	0.00013	0.0136	0.0175	0.0226
2011	0.0530	0.0085	0.0076	0.0008	0.00013	0.0137	0.0167	0.0061
2012	0.0530	0.0085	0.0075	0.0008	0.00012	0.0137	0.0160	0.0061
2013	0.0530	0.0084	0.0075	0.0008	0.00012	0.0137	0.0149	0.0061
2014	0.0530	0.0084	0.0075	0.0008	0.00012	0.0137	0.0149	0.0061
2015	0.0530	0.0084	0.0075	0.0008	0.00012	0.0137	0.0169	0.0061
2016	0.0530	0.0084	0.0075	0.0008	0.00012	0.0137	0.0173	0.0061
2017	0.0530	0.0084	0.0075	0.0008	0.00012	0.0137	0.0151	0.0061
2018	0.0530	0.0085	0.0075	0.0008	0.00012	0.0137	0.0150	0.0061
2019	0.0530	0.0085	0.0075	0.0008	0.00012	0.0137	0.0150	0.0062
2020	0.0530	0.0085	0.0075	0.0008	0.00012	0.0137	0.0170	0.0062

**Table A14 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for diesel refuse trucks for model years 1990–2020**

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
1990	0.9698		5.5503	27.3391	0.3318	1.1298	0.2850	0.8210	0.02380
1991	1.2375		5.7592	25.5972	0.3076	1.1278	0.2798	0.8260	0.02207
1992	1.1456		6.0985	25.6395	0.3039	1.1769	0.2749	0.8802	0.02181
1993	1.1172		6.1506	25.6761	0.3013	1.1903	0.2734	0.8952	0.02162
1994	1.1209		6.1267	25.6034	0.2982	1.3073	0.3051	0.9809	0.02139
1995	1.0903		6.2483	25.6415	0.2951	1.2824	0.2869	0.9743	0.02117
1996	0.9899		5.8249	25.6505	0.2918	1.2078	0.2634	0.9235	0.02093
1997	0.9115		5.4587	25.6802	0.2882	1.1502	0.2465	0.8830	0.02068
1998	0.8593		5.0850	23.6200	0.2849	0.7468	0.1817	0.5447	0.02044
1999	0.8149		4.7215	16.7976	0.2813	0.7171	0.1753	0.5216	0.02019
2000	0.8329		4.5937	16.4919	0.2607	0.6977	0.1737	0.5052	0.01871
2001	0.7631		4.8754	17.4155	0.2375	0.7422	0.1765	0.5486	0.01704
2002	0.7592		4.8611	17.4284	0.2106	0.7395	0.1762	0.5482	0.01511



<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
2003	0.6697		2.6680	9.1927	0.1782	0.6937	0.1657	0.5152	0.01279
2004	0.6715		2.6774	9.1931	0.1404	0.6919	0.1659	0.5159	0.01007
2005	0.6741		2.6915	9.1937	0.0962	0.6900	0.1662	0.5169	0.00690
2006	0.6786		2.7111	9.1940	0.0484	0.6890	0.1668	0.5187	0.00347
2007	0.1082		0.7966	4.6158	0.0271	0.0371	0.0321	0.0030	0.00195
2008	0.1072		0.7960	4.6136	0.0197	0.0310	0.0270	0.0025	0.00142
2009	0.1073		0.7969	4.6137	0.0163	0.0308	0.0271	0.0025	0.00118
2010	0.0946		0.6726	1.4312	0.0129	0.0291	0.0258	0.0024	0.00093
2011	0.0945		0.6683	1.4266	0.0115	0.0289	0.0257	0.0024	0.00083
2012	0.0944		0.6664	1.4241	0.0115	0.0289	0.0256	0.0024	0.00083
2013	0.0931		0.6539	1.3062	0.0115	0.0263	0.0232	0.0022	0.00083
2014	0.0931		0.6543	1.3056	0.0115	0.0262	0.0232	0.0022	0.00083
2015	0.0931		0.6548	1.3054	0.0115	0.0262	0.0232	0.0022	0.00083
2016	0.0932		0.6556	1.3053	0.0115	0.0262	0.0232	0.0022	0.00083
2017	0.0932		0.6565	1.3053	0.0115	0.0262	0.0232	0.0022	0.00083
2018	0.0932		0.6575	1.3056	0.0115	0.0262	0.0232	0.0022	0.00083
2019	0.0932		0.6585	1.3062	0.0115	0.0262	0.0232	0.0022	0.00083
2020	0.0932		0.6596	1.3068	0.0115	0.0263	0.0232	0.0022	0.00083

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
1990	0.0931	1.0960	0.2765	0.7964	0.02321	0.0240	0.0032	0.0027
1991	0.0795	1.0941	0.2714	0.8012	0.02151	0.0205	0.0033	0.0028
1992	0.0884	1.1417	0.2666	0.8538	0.02126	0.0228	0.0031	0.0027
1993	0.0909	1.1547	0.2652	0.8684	0.02108	0.0234	0.0031	0.0027
1994	0.0910	1.2683	0.2959	0.9515	0.02086	0.0234	0.0032	0.0026
1995	0.0944	1.2441	0.2783	0.9451	0.02064	0.0243	0.0032	0.0026
1996	0.0963	1.1717	0.2555	0.8958	0.02041	0.0248	0.0025	0.0026
1997	0.0975	1.1158	0.2391	0.8565	0.02016	0.0251	0.0026	0.0026
1998	0.0971	0.7245	0.1762	0.5284	0.01993	0.0250	0.0025	0.0026

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
1999	0.0959	0.6957	0.1701	0.5060	0.01968	0.0247	0.0026	0.0026
2000	0.0928	0.6768	0.1685	0.4901	0.01824	0.0239	0.0025	0.0026
2001	0.1022	0.7200	0.1712	0.5322	0.01661	0.0263	0.0025	0.0026
2002	0.1023	0.7174	0.1710	0.5318	0.01473	0.0263	0.0026	0.0026
2003	0.1023	0.6730	0.1607	0.4998	0.01247	0.0263	0.0023	0.0026
2004	0.1023	0.6712	0.1609	0.5004	0.00982	0.0263	0.0023	0.0026
2005	0.1023	0.6694	0.1613	0.5014	0.00673	0.0263	0.0023	0.0026
2006	0.1023	0.6683	0.1618	0.5031	0.00338	0.0263	0.0023	0.0026
2007	0.1023	0.0360	0.0312	0.0029	0.00190	0.0263	0.0792	0.0026
2008	0.1023	0.0301	0.0262	0.0025	0.00138	0.0263	0.0779	0.0026
2009	0.1023	0.0299	0.0262	0.0025	0.00114	0.0263	0.0780	0.0026
2010	0.1023	0.0282	0.0250	0.0024	0.00090	0.0263	0.0606	0.0026
2011	0.1023	0.0281	0.0249	0.0023	0.00081	0.0263	0.0604	0.0026
2012	0.1023	0.0280	0.0249	0.0023	0.00081	0.0263	0.0603	0.0026
2013	0.1023	0.0255	0.0225	0.0021	0.00081	0.0263	0.0586	0.0026
2014	0.1023	0.0255	0.0225	0.0021	0.00081	0.0263	0.0586	0.0026
2015	0.1023	0.0254	0.0225	0.0021	0.00081	0.0263	0.0586	0.0026
2016	0.1023	0.0254	0.0225	0.0021	0.00081	0.0263	0.0586	0.0026
2017	0.1023	0.0254	0.0225	0.0021	0.00081	0.0263	0.0586	0.0026
2018	0.1023	0.0254	0.0225	0.0021	0.00081	0.0263	0.0586	0.0026
2019	0.1023	0.0255	0.0225	0.0021	0.00081	0.0263	0.0587	0.0026
2020	0.1023	0.0255	0.0225	0.0021	0.00081	0.0263	0.0587	0.0026

**Table A15 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for gasoline single-unit short-haul trucks for model years 1990–2020**

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
1990	3.2255	0.8239	105.0615	6.7528	0.1223	0.0365	0.0295	0.0063	0.00073
1991	3.4510	0.7594	111.9449	6.8458	0.1014	0.0378	0.0312	0.0060	0.00060
1992	3.3606	0.7310	108.6128	6.7462	0.0999	0.0353	0.0293	0.0054	0.00059

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
1993	3.2784	0.7036	105.5886	6.6558	0.0987	0.0331	0.0276	0.0050	0.00059
1994	3.1633	0.6693	99.6149	6.6353	0.0973	0.0514	0.0452	0.0056	0.00058
1995	2.8831	0.5786	91.4443	6.4269	0.0961	0.0217	0.0179	0.0032	0.00057
1996	2.8511	0.2271	84.0843	6.2373	0.0946	0.0168	0.0136	0.0026	0.00056
1997	2.6581	0.2298	77.4849	6.0677	0.0933	0.0181	0.0151	0.0024	0.00055
1998	1.6836	0.1294	34.9008	4.2723	0.0919	0.0131	0.0107	0.0018	0.00055
1999	1.5908	0.1004	32.2847	4.1602	0.0907	0.0096	0.0076	0.0014	0.00054
2000	1.5741	0.1030	32.0472	4.1087	0.0815	0.0086	0.0068	0.0013	0.00048
2001	1.5935	0.1075	36.6360	4.8485	0.0723	0.0115	0.0096	0.0015	0.00043
2002	1.5005	0.1103	35.8695	4.6924	0.0620	0.0078	0.0063	0.0012	0.00037
2003	1.4473	0.1134	35.2360	4.5203	0.0500	0.0078	0.0064	0.0012	0.00030
2004	1.5087	0.1020	34.6816	3.8139	0.0361	0.0089	0.0074	0.0012	0.00021
2005	1.0623	0.1042	34.7289	3.5564	0.0265	0.0089	0.0075	0.0013	0.00016
2006	1.0327	0.1055	34.2286	3.5405	0.0225	0.0089	0.0075	0.0013	0.00013
2007	1.0285	0.1061	33.8070	3.4695	0.0191	0.0090	0.0076	0.0013	0.00011
2008	0.8220	0.1106	33.7166	3.1775	0.0167	0.0090	0.0076	0.0013	0.00010
2009	0.8213	0.0936	33.6331	3.1555	0.0153	0.0090	0.0076	0.0013	0.00009
2010	0.8184	0.0962	33.2803	3.1437	0.0149	0.0089	0.0075	0.0013	0.00009
2011	0.8177	0.0979	32.9774	3.1318	0.0145	0.0087	0.0074	0.0012	0.00009
2012	0.8180	0.1001	32.8265	3.1208	0.0140	0.0087	0.0074	0.0012	0.00008
2013	0.8196	0.0981	32.8012	3.1197	0.0140	0.0086	0.0073	0.0012	0.00008
2014	0.8193	0.0964	32.8195	3.1191	0.0140	0.0086	0.0073	0.0012	0.00008
2015	0.8156	0.0932	32.8500	3.1189	0.0140	0.0086	0.0073	0.0012	0.00008
2016	0.8146	0.0930	32.8953	3.1190	0.0140	0.0086	0.0073	0.0012	0.00008
2017	0.8198	0.0928	32.9565	3.1196	0.0140	0.0086	0.0073	0.0012	0.00008
2018	0.8207	0.0917	33.0264	3.1204	0.0140	0.0086	0.0074	0.0012	0.00008
2019	0.8215	0.0906	33.0974	3.1212	0.0140	0.0086	0.0074	0.0012	0.00008
2020	0.8188	0.0897	33.1665	3.1221	0.0140	0.0087	0.0074	0.0012	0.00008

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
1990	0.0607	0.0337	0.0272	0.0058	0.00067	0.0157	0.4118	0.0941
1991	0.0609	0.0348	0.0287	0.0055	0.00056	0.0157	0.4195	0.0976
1992	0.0610	0.0325	0.0269	0.0050	0.00055	0.0158	0.3969	0.0920
1993	0.0614	0.0305	0.0254	0.0046	0.00054	0.0158	0.3759	0.0869
1994	0.0627	0.0473	0.0417	0.0051	0.00053	0.0162	0.3715	0.0822
1995	0.0618	0.0200	0.0165	0.0029	0.00053	0.0160	0.3658	0.0780
1996	0.0628	0.0154	0.0126	0.0024	0.00052	0.0162	0.1307	0.1413
1997	0.0630	0.0166	0.0139	0.0022	0.00051	0.0163	0.0970	0.1442
1998	0.0615	0.0121	0.0099	0.0017	0.00050	0.0159	0.0635	0.1400
1999	0.0637	0.0089	0.0070	0.0013	0.00050	0.0165	0.0516	0.1133
2000	0.0626	0.0079	0.0062	0.0012	0.00045	0.0162	0.0490	0.0863
2001	0.0647	0.0105	0.0088	0.0013	0.00040	0.0167	0.0446	0.0388
2002	0.0624	0.0072	0.0058	0.0011	0.00034	0.0161	0.0418	0.0388
2003	0.0624	0.0072	0.0059	0.0011	0.00027	0.0161	0.0426	0.0389
2004	0.0623	0.0082	0.0068	0.0012	0.00020	0.0161	0.0447	0.0392
2005	0.0624	0.0082	0.0069	0.0012	0.00015	0.0161	0.0468	0.0395
2006	0.0624	0.0082	0.0069	0.0012	0.00012	0.0161	0.0439	0.0397
2007	0.0625	0.0083	0.0070	0.0012	0.00010	0.0161	0.0434	0.0398
2008	0.0626	0.0083	0.0070	0.0012	0.00009	0.0162	0.0441	0.0399
2009	0.0627	0.0083	0.0070	0.0012	0.00008	0.0162	0.0453	0.0399
2010	0.0627	0.0082	0.0069	0.0012	0.00008	0.0162	0.0451	0.0396
2011	0.0627	0.0081	0.0068	0.0011	0.00008	0.0162	0.0429	0.0107
2012	0.0628	0.0080	0.0068	0.0011	0.00008	0.0162	0.0412	0.0107
2013	0.0628	0.0079	0.0067	0.0011	0.00008	0.0162	0.0396	0.0107
2014	0.0628	0.0079	0.0067	0.0011	0.00008	0.0162	0.0396	0.0107
2015	0.0628	0.0079	0.0068	0.0011	0.00008	0.0162	0.0432	0.0107
2016	0.0628	0.0079	0.0068	0.0011	0.00008	0.0162	0.0444	0.0107
2017	0.0628	0.0079	0.0068	0.0011	0.00008	0.0162	0.0400	0.0108
2018	0.0628	0.0079	0.0068	0.0011	0.00008	0.0162	0.0400	0.0108
2019	0.0628	0.0080	0.0068	0.0011	0.00008	0.0162	0.0401	0.0108

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
2020	0.0628	0.0080	0.0068	0.0011	0.00008	0.0162	0.0437	0.0108

**Table A16 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for diesel single-unit short-haul trucks for model years 1990–2020**

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
1990	1.2154		4.6775	15.0521	0.1918	0.9558	0.4675	0.4745	0.01376
1991	1.3470		4.9605	14.0953	0.1806	0.6720	0.3197	0.3393	0.01296
1992	1.2757		5.0213	14.1087	0.1783	0.6976	0.3243	0.3605	0.01279
1993	1.3030		4.7957	14.1202	0.1761	0.6788	0.3207	0.3455	0.01264
1994	1.3065		4.7794	14.0728	0.1739	0.9516	0.4679	0.4712	0.01248
1995	1.3164		4.7418	14.0861	0.1717	0.9452	0.4647	0.4682	0.01232
1996	1.2167		4.3669	14.0846	0.1694	0.9011	0.4437	0.4452	0.01216
1997	1.1492		4.0308	14.0945	0.1671	0.8684	0.4296	0.4267	0.01199
1998	1.0501		3.8550	13.0099	0.1647	0.4454	0.2123	0.2214	0.01182
1999	1.0105		3.5399	7.7812	0.1623	0.4216	0.2020	0.2080	0.01165
2000	0.9974		3.5394	7.8191	0.1497	0.4212	0.2020	0.2085	0.01074
2001	0.9983		3.4902	7.7516	0.1356	0.4157	0.2002	0.2058	0.00973
2002	0.9757		3.5347	7.9085	0.1196	0.4205	0.2021	0.2098	0.00858
2003	0.7417		3.0913	6.2672	0.1007	0.3965	0.1911	0.1982	0.00723
2004	0.7447		3.1076	6.2683	0.0790	0.3956	0.1914	0.1986	0.00567
2005	0.7488		3.1296	6.2696	0.0541	0.3948	0.1919	0.1991	0.00388
2006	0.7545		3.1538	6.2704	0.0275	0.3944	0.1926	0.1998	0.00198
2007	0.0979		1.1975	3.1856	0.0158	0.0196	0.0169	0.0016	0.00113
2008	0.0967		1.1968	3.1843	0.0115	0.0164	0.0142	0.0013	0.00083
2009	0.0968		1.1982	3.1844	0.0096	0.0162	0.0142	0.0013	0.00069
2010	0.0788		1.0359	1.0189	0.0077	0.0154	0.0135	0.0013	0.00056
2011	0.0786		1.0278	1.0148	0.0070	0.0152	0.0135	0.0013	0.00050
2012	0.0785		1.0243	1.0126	0.0070	0.0152	0.0134	0.0013	0.00050
2013	0.0770		1.0118	0.9382	0.0070	0.0139	0.0122	0.0012	0.00050

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
2014	0.0771		1.0128	0.9379	0.0070	0.0139	0.0122	0.0012	0.00050
2015	0.0771		1.0141	0.9379	0.0070	0.0139	0.0122	0.0012	0.00050
2016	0.0771		1.0158	0.9380	0.0070	0.0139	0.0122	0.0012	0.00050
2017	0.0772		1.0177	0.9383	0.0070	0.0139	0.0122	0.0012	0.00050
2018	0.0772		1.0199	0.9388	0.0070	0.0139	0.0122	0.0012	0.00050
2019	0.0773		1.0221	0.9394	0.0070	0.0139	0.0122	0.0012	0.00050
2020	0.0774		1.0243	0.9401	0.0070	0.0139	0.0122	0.0012	0.00050

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
1990	0.0767	0.9272	0.4535	0.4602	0.01342	0.0198	0.0032	0.0035
1991	0.0734	0.6519	0.3101	0.3292	0.01263	0.0189	0.0033	0.0035
1992	0.0800	0.6767	0.3145	0.3497	0.01247	0.0207	0.0031	0.0034
1993	0.0753	0.6585	0.3111	0.3351	0.01232	0.0194	0.0032	0.0034
1994	0.0762	0.9231	0.4538	0.4571	0.01217	0.0197	0.0032	0.0033
1995	0.0761	0.9169	0.4508	0.4542	0.01201	0.0196	0.0031	0.0032
1996	0.0753	0.8741	0.4304	0.4318	0.01185	0.0194	0.0024	0.0032
1997	0.0736	0.8424	0.4168	0.4139	0.01169	0.0190	0.0025	0.0032
1998	0.0775	0.4321	0.2059	0.2147	0.01152	0.0200	0.0025	0.0031
1999	0.0739	0.4090	0.1959	0.2017	0.01135	0.0191	0.0026	0.0030
2000	0.0746	0.4087	0.1959	0.2023	0.01047	0.0192	0.0025	0.0030
2001	0.0734	0.4033	0.1942	0.1996	0.00949	0.0189	0.0024	0.0030
2002	0.0761	0.4079	0.1960	0.2035	0.00837	0.0197	0.0026	0.0030
2003	0.0761	0.3847	0.1853	0.1923	0.00705	0.0197	0.0024	0.0031
2004	0.0761	0.3838	0.1857	0.1926	0.00552	0.0197	0.0024	0.0031
2005	0.0761	0.3830	0.1861	0.1931	0.00378	0.0197	0.0024	0.0031
2006	0.0761	0.3825	0.1868	0.1938	0.00193	0.0197	0.0024	0.0031
2007	0.0761	0.0190	0.0163	0.0015	0.00110	0.0197	0.1038	0.0031
2008	0.0761	0.0159	0.0138	0.0013	0.00081	0.0197	0.1021	0.0031
2009	0.0761	0.0157	0.0138	0.0013	0.00067	0.0197	0.1022	0.0031

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
2010	0.0761	0.0149	0.0131	0.0012	0.00054	0.0197	0.0777	0.0031
2011	0.0761	0.0148	0.0131	0.0012	0.00049	0.0197	0.0773	0.0031
2012	0.0761	0.0148	0.0130	0.0012	0.00049	0.0197	0.0772	0.0031
2013	0.0761	0.0135	0.0119	0.0011	0.00049	0.0197	0.0752	0.0031
2014	0.0761	0.0135	0.0119	0.0011	0.00049	0.0197	0.0752	0.0031
2015	0.0761	0.0135	0.0119	0.0011	0.00049	0.0197	0.0753	0.0031
2016	0.0761	0.0135	0.0119	0.0011	0.00049	0.0197	0.0753	0.0031
2017	0.0761	0.0135	0.0119	0.0011	0.00049	0.0197	0.0754	0.0031
2018	0.0761	0.0135	0.0119	0.0011	0.00049	0.0197	0.0755	0.0031
2019	0.0761	0.0135	0.0119	0.0011	0.00049	0.0197	0.0755	0.0031
2020	0.0761	0.0135	0.0119	0.0011	0.00049	0.0197	0.0756	0.0031

**Table A17 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for gasoline single-unit long-haul trucks for model years 1990–2020**

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
1990	2.9805	0.8328	88.4357	6.0649	0.1021	0.0342	0.0283	0.0053	0.00061
1991	3.0842	0.7811	91.3019	6.1001	0.0895	0.0350	0.0295	0.0049	0.00053
1992	3.0154	0.7564	88.9251	6.0346	0.0884	0.0328	0.0278	0.0045	0.00053
1993	2.9585	0.7333	86.9292	5.9795	0.0873	0.0311	0.0264	0.0042	0.00052
1994	2.8850	0.7043	83.1373	5.9762	0.0859	0.0513	0.0456	0.0051	0.00051
1995	2.6616	0.6234	77.2320	5.8154	0.0845	0.0208	0.0175	0.0028	0.00050
1996	2.6191	0.2354	71.7287	5.6655	0.0831	0.0162	0.0134	0.0022	0.00049
1997	2.4582	0.2351	66.6946	5.5285	0.0818	0.0177	0.0151	0.0022	0.00049
1998	1.5577	0.1336	31.8647	4.0235	0.0803	0.0129	0.0107	0.0017	0.00048
1999	1.4842	0.1056	29.8569	3.9324	0.0790	0.0095	0.0077	0.0013	0.00047
2000	1.4729	0.1082	29.6468	3.8865	0.0707	0.0084	0.0068	0.0012	0.00042
2001	1.5170	0.1126	33.8254	4.5307	0.0625	0.0118	0.0100	0.0014	0.00037
2002	1.4715	0.1154	33.1507	4.3908	0.0535	0.0077	0.0063	0.0011	0.00032
2003	1.4409	0.1184	32.5882	4.2394	0.0432	0.0078	0.0064	0.0011	0.00026

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
2004	1.4912	0.1044	32.1548	3.6084	0.0315	0.0088	0.0075	0.0012	0.00019
2005	1.0868	0.1067	32.1787	3.3964	0.0236	0.0088	0.0075	0.0012	0.00014
2006	1.0541	0.1085	31.7220	3.3830	0.0202	0.0089	0.0076	0.0012	0.00012
2007	1.0505	0.1092	31.3302	3.3195	0.0174	0.0089	0.0076	0.0012	0.00010
2008	0.8702	0.1149	31.2429	3.0810	0.0154	0.0089	0.0076	0.0012	0.00009
2009	0.8700	0.0972	31.1617	3.0624	0.0142	0.0089	0.0076	0.0012	0.00008
2010	0.8675	0.0998	30.8747	3.0517	0.0139	0.0088	0.0076	0.0012	0.00008
2011	0.8663	0.1017	30.6318	3.0411	0.0136	0.0087	0.0075	0.0011	0.00008
2012	0.8666	0.1042	30.5125	3.0317	0.0132	0.0086	0.0074	0.0011	0.00008
2013	0.8678	0.1022	30.4952	3.0306	0.0132	0.0086	0.0074	0.0011	0.00008
2014	0.8675	0.1005	30.5130	3.0302	0.0132	0.0086	0.0074	0.0011	0.00008
2015	0.8647	0.0974	30.5408	3.0299	0.0132	0.0086	0.0074	0.0011	0.00008
2016	0.8641	0.0972	30.5810	3.0301	0.0132	0.0086	0.0074	0.0011	0.00008
2017	0.8682	0.0970	30.6340	3.0307	0.0132	0.0086	0.0074	0.0011	0.00008
2018	0.8690	0.0960	30.6937	3.0315	0.0132	0.0086	0.0074	0.0011	0.00008
2019	0.8698	0.0950	30.7535	3.0324	0.0132	0.0086	0.0074	0.0011	0.00008
2020	0.8679	0.0940	30.8110	3.0332	0.0132	0.0086	0.0074	0.0011	0.00008

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
1990	0.0604	0.0315	0.0261	0.0049	0.00056	0.0156	0.2698	0.0697
1991	0.0607	0.0322	0.0272	0.0045	0.00049	0.0157	0.2689	0.0706
1992	0.0607	0.0302	0.0256	0.0042	0.00048	0.0157	0.2586	0.0674
1993	0.0611	0.0286	0.0243	0.0039	0.00048	0.0158	0.2499	0.0647
1994	0.0624	0.0472	0.0420	0.0047	0.00047	0.0161	0.2559	0.0625
1995	0.0616	0.0191	0.0161	0.0026	0.00046	0.0159	0.2592	0.0605
1996	0.0625	0.0149	0.0124	0.0021	0.00046	0.0161	0.0901	0.1114
1997	0.0627	0.0163	0.0139	0.0020	0.00045	0.0162	0.0665	0.1155
1998	0.0613	0.0119	0.0099	0.0015	0.00044	0.0158	0.0415	0.1142
1999	0.0635	0.0087	0.0071	0.0012	0.00043	0.0164	0.0341	0.0939



<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
2000	0.0623	0.0078	0.0063	0.0011	0.00039	0.0161	0.0327	0.0715
2001	0.0644	0.0108	0.0092	0.0013	0.00034	0.0166	0.0296	0.0322
2002	0.0622	0.0071	0.0058	0.0010	0.00029	0.0161	0.0276	0.0322
2003	0.0621	0.0071	0.0059	0.0010	0.00024	0.0160	0.0282	0.0323
2004	0.0621	0.0081	0.0069	0.0011	0.00017	0.0160	0.0294	0.0324
2005	0.0622	0.0081	0.0069	0.0011	0.00013	0.0161	0.0305	0.0327
2006	0.0622	0.0082	0.0070	0.0011	0.00011	0.0161	0.0289	0.0328
2007	0.0623	0.0082	0.0070	0.0011	0.00010	0.0161	0.0285	0.0328
2008	0.0624	0.0082	0.0070	0.0011	0.00008	0.0161	0.0290	0.0329
2009	0.0624	0.0082	0.0070	0.0011	0.00008	0.0161	0.0298	0.0329
2010	0.0625	0.0081	0.0070	0.0011	0.00008	0.0161	0.0297	0.0327
2011	0.0625	0.0080	0.0069	0.0010	0.00007	0.0161	0.0285	0.0089
2012	0.0625	0.0079	0.0068	0.0010	0.00007	0.0161	0.0272	0.0088
2013	0.0625	0.0079	0.0068	0.0010	0.00007	0.0161	0.0259	0.0088
2014	0.0625	0.0079	0.0068	0.0010	0.00007	0.0161	0.0259	0.0089
2015	0.0625	0.0079	0.0068	0.0010	0.00007	0.0161	0.0286	0.0089
2016	0.0625	0.0079	0.0068	0.0010	0.00007	0.0161	0.0295	0.0089
2017	0.0625	0.0079	0.0068	0.0010	0.00007	0.0161	0.0261	0.0089
2018	0.0625	0.0079	0.0068	0.0010	0.00007	0.0161	0.0261	0.0089
2019	0.0625	0.0079	0.0068	0.0010	0.00007	0.0161	0.0261	0.0089
2020	0.0625	0.0079	0.0069	0.0010	0.00007	0.0161	0.0289	0.0089

**Table A18 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for diesel single-unit long-haul trucks for model years 1990–2020**

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
1990	1.2378		4.5208	13.9252	0.1695	0.9490	0.4866	0.4503	0.01216
1991	1.3183		4.6154	13.0212	0.1604	0.6334	0.3203	0.3016	0.01151
1992	1.2496		4.6976	13.0372	0.1589	0.6589	0.3267	0.3208	0.01140
1993	1.2797		4.5097	13.0518	0.1568	0.6404	0.3220	0.3072	0.01125

Model Year	VOC, exhaust	VOC, evaporation	CO	NO <sub>x</sub>	SO <sub>2</sub>	PM <sub>10</sub> , exhaust	PM <sub>10</sub> , OC	PM <sub>10</sub> , BC	PM <sub>10</sub> , Sulfate
1994	1.2830		4.5182	13.0153	0.1543	0.8992	0.4691	0.4190	0.01107
1995	1.2931		4.5049	13.0303	0.1518	0.8939	0.4664	0.4166	0.01089
1996	1.2099		4.1972	13.0325	0.1494	0.8577	0.4482	0.3988	0.01072
1997	1.1524		3.9139	13.0440	0.1470	0.8307	0.4359	0.3842	0.01055
1998	1.0608		3.7824	12.0191	0.1445	0.4342	0.2191	0.2047	0.01036
1999	1.0284		3.5062	7.2365	0.1419	0.4123	0.2087	0.1934	0.01018
2000	1.0194		3.5069	7.2726	0.1299	0.4120	0.2089	0.1939	0.00932
2001	1.0201		3.4610	7.2084	0.1168	0.4068	0.2069	0.1915	0.00838
2002	0.9982		3.5070	7.3579	0.1023	0.4118	0.2094	0.1951	0.00734
2003	0.7577		3.0701	5.9829	0.0855	0.3862	0.1968	0.1833	0.00613
2004	0.7606		3.0848	5.9836	0.0666	0.3856	0.1972	0.1836	0.00478
2005	0.7645		3.1040	5.9845	0.0456	0.3849	0.1976	0.1840	0.00327
2006	0.7697		3.1256	5.9850	0.0237	0.3847	0.1983	0.1846	0.00170
2007	0.0970		1.1255	3.0304	0.0141	0.0192	0.0166	0.0016	0.00101
2008	0.0957		1.1243	3.0290	0.0103	0.0160	0.0140	0.0013	0.00074
2009	0.0958		1.1251	3.0291	0.0087	0.0159	0.0140	0.0013	0.00063
2010	0.0765		0.9547	0.9738	0.0072	0.0151	0.0133	0.0013	0.00052
2011	0.0763		0.9486	0.9704	0.0066	0.0150	0.0133	0.0012	0.00048
2012	0.0762		0.9460	0.9685	0.0066	0.0150	0.0132	0.0012	0.00048
2013	0.0747		0.9328	0.8928	0.0066	0.0136	0.0120	0.0011	0.00048
2014	0.0747		0.9337	0.8924	0.0066	0.0136	0.0120	0.0011	0.00048
2015	0.0747		0.9349	0.8924	0.0066	0.0136	0.0120	0.0011	0.00048
2016	0.0748		0.9364	0.8925	0.0066	0.0136	0.0120	0.0011	0.00048
2017	0.0748		0.9380	0.8927	0.0066	0.0136	0.0120	0.0011	0.00048
2018	0.0749		0.9398	0.8931	0.0066	0.0136	0.0120	0.0011	0.00048
2019	0.0749		0.9416	0.8937	0.0066	0.0136	0.0120	0.0011	0.00048
2020	0.0749		0.9434	0.8942	0.0066	0.0136	0.0120	0.0011	0.00048

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
1990	0.0763	0.9207	0.4720	0.4368	0.01185	0.0197	0.0032	0.0031
1991	0.0730	0.6145	0.3107	0.2925	0.01122	0.0188	0.0032	0.0031
1992	0.0796	0.6392	0.3169	0.3112	0.01111	0.0205	0.0031	0.0030
1993	0.0750	0.6213	0.3123	0.2980	0.01097	0.0194	0.0032	0.0030
1994	0.0758	0.8723	0.4550	0.4065	0.01080	0.0196	0.0031	0.0029
1995	0.0757	0.8672	0.4524	0.4041	0.01062	0.0195	0.0031	0.0029
1996	0.0749	0.8321	0.4348	0.3868	0.01045	0.0193	0.0024	0.0029
1997	0.0732	0.8058	0.4229	0.3727	0.01028	0.0189	0.0025	0.0029
1998	0.0771	0.4212	0.2125	0.1986	0.01010	0.0199	0.0025	0.0029
1999	0.0735	0.4000	0.2024	0.1876	0.00992	0.0190	0.0025	0.0029
2000	0.0742	0.3997	0.2026	0.1881	0.00908	0.0191	0.0025	0.0029
2001	0.0730	0.3947	0.2007	0.1858	0.00817	0.0188	0.0024	0.0029
2002	0.0758	0.3995	0.2031	0.1892	0.00715	0.0196	0.0025	0.0029
2003	0.0758	0.3747	0.1909	0.1778	0.00598	0.0196	0.0024	0.0029
2004	0.0758	0.3740	0.1913	0.1781	0.00466	0.0196	0.0024	0.0029
2005	0.0758	0.3734	0.1917	0.1785	0.00319	0.0196	0.0024	0.0029
2006	0.0758	0.3731	0.1924	0.1791	0.00166	0.0196	0.0024	0.0029
2007	0.0758	0.0186	0.0161	0.0015	0.00098	0.0196	0.1010	0.0029
2008	0.0758	0.0156	0.0136	0.0013	0.00072	0.0196	0.0993	0.0029
2009	0.0758	0.0155	0.0136	0.0013	0.00061	0.0196	0.0993	0.0029
2010	0.0758	0.0146	0.0129	0.0012	0.00050	0.0196	0.0729	0.0029
2011	0.0758	0.0145	0.0129	0.0012	0.00046	0.0196	0.0727	0.0029
2012	0.0758	0.0145	0.0128	0.0012	0.00046	0.0196	0.0726	0.0029
2013	0.0758	0.0132	0.0116	0.0011	0.00046	0.0196	0.0705	0.0029
2014	0.0758	0.0132	0.0116	0.0011	0.00046	0.0196	0.0705	0.0029
2015	0.0758	0.0132	0.0116	0.0011	0.00046	0.0196	0.0705	0.0029
2016	0.0758	0.0132	0.0116	0.0011	0.00046	0.0196	0.0706	0.0029
2017	0.0758	0.0132	0.0116	0.0011	0.00046	0.0196	0.0706	0.0029
2018	0.0758	0.0132	0.0116	0.0011	0.00046	0.0196	0.0707	0.0029
2019	0.0758	0.0132	0.0116	0.0011	0.00046	0.0196	0.0707	0.0029

Model Year	PM <sub>10</sub> , TBW	PM <sub>2.5</sub> , exhaust	PM <sub>2.5</sub> , OC	PM <sub>2.5</sub> , BC	PM <sub>2.5</sub> , Sulfate	PM <sub>2.5</sub> , TBW	CH <sub>4</sub>	N <sub>2</sub> O
2020	0.0758	0.0132	0.0116	0.0011	0.00046	0.0196	0.0708	0.0029

**Table A19 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for gasoline motor homes for model years 1990–2020**

Model Year	VOC, exhaust	VOC, evaporation	CO	NO <sub>x</sub>	SO <sub>2</sub>	PM <sub>10</sub> , exhaust	PM <sub>10</sub> , OC	PM <sub>10</sub> , BC	PM <sub>10</sub> , Sulfate
1990	2.7442	1.8123	87.8130	6.1530	0.0953	0.0318	0.0275	0.0037	0.00057
1991	2.8745	1.7619	91.5536	6.1748	0.0752	0.0336	0.0295	0.0037	0.00045
1992	2.8677	1.7361	91.0883	6.1648	0.0732	0.0326	0.0285	0.0036	0.00044
1993	2.8614	1.7151	90.6186	6.1550	0.0713	0.0316	0.0277	0.0035	0.00042
1994	2.8693	1.6882	90.4841	6.1670	0.0694	0.0558	0.0505	0.0049	0.00041
1995	2.7437	1.5773	86.8557	6.0817	0.0675	0.0221	0.0192	0.0025	0.00040
1996	2.7479	0.7122	83.3889	5.9999	0.0655	0.0178	0.0153	0.0021	0.00039
1997	2.6584	0.6930	80.0979	5.9228	0.0637	0.0204	0.0179	0.0022	0.00038
1998	1.6667	0.4181	33.2650	4.1141	0.0616	0.0149	0.0129	0.0017	0.00037
1999	1.6326	0.3476	32.3251	4.0642	0.0600	0.0116	0.0098	0.0014	0.00036
2000	1.6242	0.3554	32.1644	4.0307	0.0531	0.0101	0.0085	0.0013	0.00032
2001	1.6990	0.3691	36.2862	4.4710	0.0466	0.0141	0.0123	0.0015	0.00028
2002	1.6834	0.3775	35.7177	4.3665	0.0399	0.0091	0.0078	0.0011	0.00024
2003	1.6696	0.3865	35.2422	4.2614	0.0329	0.0094	0.0081	0.0011	0.00020
2004	1.7816	0.3539	35.0969	3.7429	0.0256	0.0108	0.0094	0.0012	0.00015
2005	1.4292	0.3604	35.0674	3.5795	0.0207	0.0108	0.0094	0.0012	0.00012
2006	1.4160	0.3650	34.5918	3.5721	0.0185	0.0108	0.0095	0.0012	0.00011
2007	1.4114	0.3665	34.1812	3.5203	0.0168	0.0108	0.0095	0.0012	0.00010
2008	1.2401	0.3837	34.0969	3.3332	0.0156	0.0108	0.0095	0.0012	0.00009
2009	1.2402	0.3290	34.0201	3.3218	0.0149	0.0108	0.0095	0.0012	0.00009
2010	1.2387	0.3361	33.8500	3.3146	0.0147	0.0107	0.0094	0.0012	0.00009
2011	1.2376	0.3413	33.7136	3.3078	0.0145	0.0106	0.0094	0.0012	0.00009
2012	1.2385	0.3484	33.6517	3.3024	0.0143	0.0106	0.0093	0.0012	0.00008
2013	1.2394	0.3418	33.6516	3.3017	0.0143	0.0105	0.0093	0.0012	0.00008

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
2014	1.2393	0.3360	33.6720	3.3015	0.0143	0.0106	0.0093	0.0012	0.00008
2015	1.2376	0.3257	33.6985	3.3015	0.0143	0.0106	0.0093	0.0012	0.00008
2016	1.2371	0.3244	33.7325	3.3017	0.0143	0.0106	0.0093	0.0012	0.00008
2017	1.2404	0.3235	33.7738	3.3023	0.0143	0.0106	0.0093	0.0012	0.00008
2018	1.2411	0.3195	33.8175	3.3031	0.0143	0.0106	0.0093	0.0012	0.00008
2019	1.2418	0.3158	33.8591	3.3038	0.0143	0.0106	0.0093	0.0012	0.00008
2020	1.2406	0.3122	33.8972	3.3045	0.0143	0.0106	0.0093	0.0012	0.00008

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
1990	0.0569	0.0293	0.0253	0.0034	0.00052	0.0147	0.1680	0.0401
1991	0.0568	0.0309	0.0271	0.0034	0.00041	0.0147	0.1629	0.0402
1992	0.0569	0.0300	0.0263	0.0033	0.00040	0.0147	0.1624	0.0402
1993	0.0569	0.0291	0.0255	0.0032	0.00039	0.0147	0.1618	0.0402
1994	0.0569	0.0514	0.0465	0.0045	0.00038	0.0147	0.1709	0.0402
1995	0.0569	0.0203	0.0177	0.0023	0.00037	0.0147	0.1776	0.0402
1996	0.0569	0.0164	0.0141	0.0019	0.00036	0.0147	0.0597	0.0768
1997	0.0569	0.0188	0.0165	0.0020	0.00035	0.0147	0.0433	0.0824
1998	0.0569	0.0138	0.0119	0.0016	0.00034	0.0147	0.0253	0.0840
1999	0.0569	0.0106	0.0090	0.0013	0.00033	0.0147	0.0213	0.0713
2000	0.0569	0.0093	0.0079	0.0012	0.00029	0.0147	0.0205	0.0543
2001	0.0569	0.0130	0.0114	0.0014	0.00026	0.0147	0.0185	0.0244
2002	0.0569	0.0084	0.0072	0.0010	0.00022	0.0147	0.0173	0.0244
2003	0.0569	0.0087	0.0074	0.0010	0.00018	0.0147	0.0177	0.0245
2004	0.0569	0.0099	0.0086	0.0011	0.00014	0.0147	0.0186	0.0245
2005	0.0569	0.0099	0.0087	0.0011	0.00011	0.0147	0.0191	0.0246
2006	0.0569	0.0099	0.0087	0.0011	0.00010	0.0147	0.0183	0.0246
2007	0.0570	0.0100	0.0087	0.0011	0.00009	0.0147	0.0181	0.0246
2008	0.0571	0.0100	0.0087	0.0011	0.00009	0.0147	0.0183	0.0247
2009	0.0571	0.0099	0.0087	0.0011	0.00008	0.0147	0.0189	0.0247

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
2010	0.0571	0.0099	0.0087	0.0011	0.00008	0.0147	0.0189	0.0246
2011	0.0571	0.0098	0.0086	0.0011	0.00008	0.0147	0.0186	0.0067
2012	0.0571	0.0098	0.0086	0.0011	0.00008	0.0147	0.0173	0.0067
2013	0.0571	0.0097	0.0085	0.0011	0.00008	0.0147	0.0165	0.0067
2014	0.0571	0.0097	0.0086	0.0011	0.00008	0.0147	0.0165	0.0067
2015	0.0571	0.0097	0.0086	0.0011	0.00008	0.0147	0.0183	0.0067
2016	0.0571	0.0097	0.0086	0.0011	0.00008	0.0147	0.0192	0.0067
2017	0.0571	0.0097	0.0086	0.0011	0.00008	0.0147	0.0166	0.0067
2018	0.0571	0.0097	0.0086	0.0011	0.00008	0.0147	0.0165	0.0067
2019	0.0571	0.0098	0.0086	0.0011	0.00008	0.0147	0.0166	0.0067
2020	0.0571	0.0098	0.0086	0.0011	0.00008	0.0147	0.0184	0.0067

**Table A20 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for diesel motor homes for model years 1990–2020**

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
1990	1.3314		3.8550	15.8327	0.1531	1.0396	0.5157	0.5129	0.01099
1991	1.4131		4.0715	14.7588	0.1364	0.6327	0.3097	0.3133	0.00979
1992	1.3934		4.0861	14.7776	0.1328	0.6377	0.3107	0.3175	0.00953
1993	1.3905		4.0608	14.7948	0.1289	0.6359	0.3104	0.3163	0.00925
1994	1.4026		4.0731	14.7718	0.1252	1.0360	0.5224	0.5047	0.00898
1995	1.4141		4.0908	14.7871	0.1212	1.0324	0.5210	0.5028	0.00870
1996	1.3621		3.9718	14.7937	0.1173	1.0045	0.5065	0.4896	0.00841
1997	1.3210		3.8572	14.8068	0.1136	0.9823	0.4956	0.4786	0.00815
1998	1.2768		3.7709	13.6811	0.1095	0.4395	0.2150	0.2166	0.00785
1999	1.2436		3.6584	7.3564	0.1059	0.4294	0.2104	0.2114	0.00760
2000	1.2404		3.6508	7.3565	0.0944	0.4279	0.2101	0.2111	0.00677
2001	1.2354		3.6380	7.3566	0.0827	0.4262	0.2096	0.2107	0.00593
2002	1.2333		3.6337	7.3566	0.0706	0.4251	0.2095	0.2105	0.00507
2003	0.8662		3.4980	6.5039	0.0579	0.3925	0.1937	0.1946	0.00415

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
2004	0.8686		3.5095	6.5042	0.0447	0.3921	0.1940	0.1949	0.00320
2005	0.8715		3.5228	6.5044	0.0311	0.3918	0.1943	0.1952	0.00223
2006	0.8751		3.5374	6.5046	0.0181	0.3917	0.1948	0.1956	0.00130
2007	0.1109		1.1871	3.2751	0.0124	0.0192	0.0168	0.0016	0.00089
2008	0.1095		1.1845	3.2736	0.0095	0.0161	0.0141	0.0013	0.00068
2009	0.1095		1.1844	3.2736	0.0085	0.0160	0.0141	0.0013	0.00061
2010	0.0836		0.9549	1.0910	0.0076	0.0152	0.0134	0.0013	0.00055
2011	0.0835		0.9521	1.0887	0.0073	0.0151	0.0133	0.0013	0.00052
2012	0.0834		0.9513	1.0875	0.0073	0.0151	0.0133	0.0013	0.00052
2013	0.0815		0.9350	0.9901	0.0073	0.0136	0.0120	0.0011	0.00052
2014	0.0815		0.9357	0.9886	0.0073	0.0136	0.0119	0.0011	0.00052
2015	0.0815		0.9367	0.9886	0.0073	0.0136	0.0119	0.0011	0.00052
2016	0.0816		0.9378	0.9887	0.0073	0.0136	0.0119	0.0011	0.00052
2017	0.0816		0.9390	0.9889	0.0073	0.0136	0.0119	0.0011	0.00052
2018	0.0816		0.9402	0.9892	0.0073	0.0136	0.0119	0.0011	0.00052
2019	0.0816		0.9413	0.9896	0.0073	0.0136	0.0119	0.0011	0.00052
2020	0.0817		0.9423	0.9900	0.0073	0.0136	0.0120	0.0011	0.00052

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
1990	0.0582	1.0085	0.5003	0.4975	0.01071	0.0150	0.0031	0.0026
1991	0.0583	0.6138	0.3004	0.3039	0.00954	0.0150	0.0031	0.0026
1992	0.0596	0.6186	0.3014	0.3080	0.00929	0.0154	0.0030	0.0026
1993	0.0592	0.6169	0.3011	0.3068	0.00902	0.0153	0.0031	0.0026
1994	0.0588	1.0050	0.5067	0.4896	0.00875	0.0152	0.0031	0.0026
1995	0.0586	1.0015	0.5054	0.4877	0.00848	0.0151	0.0030	0.0026
1996	0.0589	0.9745	0.4913	0.4750	0.00820	0.0152	0.0023	0.0026
1997	0.0588	0.9529	0.4807	0.4643	0.00795	0.0152	0.0024	0.0026
1998	0.0593	0.4263	0.2086	0.2101	0.00766	0.0153	0.0024	0.0026
1999	0.0588	0.4165	0.2040	0.2051	0.00741	0.0152	0.0025	0.0026

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
2000	0.0588	0.4151	0.2038	0.2048	0.00660	0.0152	0.0024	0.0026
2001	0.0588	0.4135	0.2034	0.2044	0.00579	0.0152	0.0024	0.0026
2002	0.0588	0.4124	0.2032	0.2042	0.00494	0.0152	0.0024	0.0026
2003	0.0588	0.3807	0.1879	0.1888	0.00405	0.0152	0.0024	0.0026
2004	0.0588	0.3804	0.1882	0.1890	0.00312	0.0152	0.0024	0.0026
2005	0.0588	0.3800	0.1885	0.1894	0.00217	0.0152	0.0024	0.0026
2006	0.0588	0.3800	0.1889	0.1898	0.00127	0.0152	0.0024	0.0026
2007	0.0588	0.0187	0.0163	0.0015	0.00087	0.0152	0.1072	0.0026
2008	0.0588	0.0156	0.0137	0.0013	0.00066	0.0152	0.1053	0.0026
2009	0.0588	0.0155	0.0137	0.0013	0.00059	0.0152	0.1053	0.0026
2010	0.0588	0.0147	0.0130	0.0012	0.00053	0.0152	0.0698	0.0026
2011	0.0588	0.0147	0.0129	0.0012	0.00051	0.0152	0.0697	0.0026
2012	0.0588	0.0146	0.0129	0.0012	0.00051	0.0152	0.0696	0.0026
2013	0.0588	0.0132	0.0116	0.0011	0.00051	0.0152	0.0670	0.0026
2014	0.0588	0.0132	0.0116	0.0011	0.00051	0.0152	0.0670	0.0026
2015	0.0588	0.0132	0.0116	0.0011	0.00051	0.0152	0.0670	0.0026
2016	0.0588	0.0132	0.0116	0.0011	0.00051	0.0152	0.0670	0.0026
2017	0.0588	0.0132	0.0116	0.0011	0.00051	0.0152	0.0671	0.0026
2018	0.0588	0.0132	0.0116	0.0011	0.00051	0.0152	0.0671	0.0026
2019	0.0588	0.0132	0.0116	0.0011	0.00051	0.0152	0.0671	0.0026
2020	0.0588	0.0132	0.0116	0.0011	0.00051	0.0152	0.0672	0.0026

**Table A21 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for diesel combination short-haul trucks for model years 1990–2020**

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
1990	0.9330		5.2059	32.4210	0.3838	1.2667	0.2140	1.0252	0.02753
1991	1.0415		6.2190	30.3628	0.3531	1.3695	0.2044	1.1397	0.02534
1992	1.0552		6.0255	30.4085	0.3490	1.3465	0.2048	1.1166	0.02504
1993	1.0225		6.2797	30.4474	0.3451	1.3854	0.2040	1.1567	0.02476



Model Year	VOC, exhaust	VOC, evaporation	CO	NO <sub>x</sub>	SO <sub>2</sub>	PM <sub>10</sub> , exhaust	PM <sub>10</sub> , OC	PM <sub>10</sub> , BC	PM <sub>10</sub> , Sulfate
1994	1.0424		6.1079	30.3741	0.3411	1.4625	0.2130	1.2251	0.02447
1995	1.0323		6.2022	30.4152	0.3370	1.4567	0.2059	1.2266	0.02418
1996	0.9679		5.5866	30.4254	0.3327	1.3867	0.2026	1.1602	0.02387
1997	0.8778		5.4196	30.4567	0.3284	1.3241	0.1797	1.1208	0.02356
1998	0.8417		4.9348	27.5819	0.3238	0.7692	0.1282	0.6178	0.02324
1999	0.7933		4.6644	19.7491	0.3193	0.7496	0.1244	0.6023	0.02291
2000	0.7884		4.7205	19.8729	0.2932	0.7559	0.1248	0.6101	0.02104
2001	0.7784		4.7853	20.0547	0.2643	0.7647	0.1252	0.6205	0.01896
2002	0.8031		4.5507	19.5003	0.2316	0.7270	0.1237	0.5867	0.01662
2003	0.6070		2.3845	10.1715	0.1941	0.6820	0.1164	0.5517	0.01393
2004	0.6095		2.3945	10.1714	0.1514	0.6805	0.1167	0.5529	0.01087
2005	0.6125		2.4063	10.1713	0.1032	0.6787	0.1170	0.5543	0.00740
2006	0.6167		2.4228	10.1711	0.0517	0.6775	0.1174	0.5564	0.00371
2007	0.1079		0.5957	5.0958	0.0302	0.0364	0.0313	0.0029	0.00217
2008	0.1070		0.5927	5.0930	0.0221	0.0304	0.0263	0.0025	0.00159
2009	0.1070		0.5906	5.0926	0.0185	0.0302	0.0264	0.0025	0.00133
2010	0.0944		0.4601	1.5754	0.0149	0.0285	0.0251	0.0024	0.00107
2011	0.0942		0.4556	1.5687	0.0135	0.0283	0.0250	0.0024	0.00097
2012	0.0941		0.4521	1.5634	0.0135	0.0282	0.0249	0.0023	0.00097
2013	0.0928		0.4376	1.4290	0.0135	0.0256	0.0225	0.0021	0.00097
2014	0.0928		0.4355	1.4266	0.0135	0.0255	0.0225	0.0021	0.00097
2015	0.0927		0.4338	1.4246	0.0135	0.0255	0.0224	0.0021	0.00097
2016	0.0927		0.4324	1.4226	0.0135	0.0255	0.0224	0.0021	0.00097
2017	0.0926		0.4312	1.4207	0.0135	0.0255	0.0224	0.0021	0.00097
2018	0.0926		0.4301	1.4192	0.0135	0.0254	0.0223	0.0021	0.00097
2019	0.0926		0.4294	1.4181	0.0135	0.0254	0.0223	0.0021	0.00097
2020	0.0925		0.4289	1.4175	0.0135	0.0254	0.0223	0.0021	0.00097

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
1990	0.0680	1.2289	0.2076	0.9944	0.02684	0.0175	0.0028	0.0022
1991	0.0711	1.3286	0.1983	1.1056	0.02470	0.0182	0.0028	0.0022
1992	0.0689	1.3063	0.1987	1.0832	0.02441	0.0177	0.0028	0.0022
1993	0.0727	1.3440	0.1979	1.1220	0.02414	0.0187	0.0028	0.0022
1994	0.0705	1.4188	0.2066	1.1884	0.02386	0.0181	0.0028	0.0021
1995	0.0720	1.4131	0.1998	1.1898	0.02357	0.0185	0.0028	0.0021
1996	0.0702	1.3452	0.1965	1.1254	0.02327	0.0180	0.0021	0.0022
1997	0.0738	1.2845	0.1743	1.0873	0.02297	0.0189	0.0022	0.0021
1998	0.0714	0.7463	0.1243	0.5993	0.02265	0.0183	0.0022	0.0021
1999	0.0717	0.7272	0.1207	0.5842	0.02234	0.0184	0.0022	0.0021
2000	0.0727	0.7334	0.1211	0.5918	0.02051	0.0187	0.0022	0.0021
2001	0.0740	0.7418	0.1214	0.6019	0.01849	0.0190	0.0022	0.0021
2002	0.0699	0.7053	0.1200	0.5692	0.01620	0.0179	0.0022	0.0021
2003	0.0699	0.6617	0.1129	0.5352	0.01358	0.0179	0.0019	0.0021
2004	0.0699	0.6601	0.1132	0.5364	0.01059	0.0179	0.0019	0.0021
2005	0.0699	0.6584	0.1135	0.5377	0.00722	0.0179	0.0019	0.0021
2006	0.0699	0.6572	0.1139	0.5397	0.00362	0.0179	0.0019	0.0021
2007	0.0699	0.0353	0.0303	0.0029	0.00211	0.0179	0.0682	0.0021
2008	0.0699	0.0295	0.0255	0.0024	0.00154	0.0179	0.0670	0.0021
2009	0.0699	0.0293	0.0256	0.0024	0.00129	0.0179	0.0669	0.0021
2010	0.0699	0.0276	0.0243	0.0023	0.00104	0.0179	0.0497	0.0021
2011	0.0699	0.0274	0.0242	0.0023	0.00094	0.0179	0.0495	0.0021
2012	0.0699	0.0273	0.0241	0.0023	0.00094	0.0179	0.0493	0.0021
2013	0.0699	0.0248	0.0218	0.0021	0.00094	0.0179	0.0475	0.0021
2014	0.0699	0.0248	0.0218	0.0021	0.00094	0.0179	0.0474	0.0021
2015	0.0699	0.0248	0.0218	0.0020	0.00094	0.0179	0.0474	0.0021
2016	0.0699	0.0247	0.0217	0.0020	0.00094	0.0179	0.0473	0.0021
2017	0.0699	0.0247	0.0217	0.0020	0.00094	0.0179	0.0472	0.0021
2018	0.0699	0.0247	0.0217	0.0020	0.00094	0.0179	0.0472	0.0021
2019	0.0699	0.0246	0.0217	0.0020	0.00094	0.0179	0.0472	0.0021

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
2020	0.0699	0.0246	0.0217	0.0020	0.00094	0.0179	0.0471	0.0021

**Table A22 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for diesel combination long-haul trucks for model years 1990–2020**

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
1990	2.1621		5.4841	35.2963	0.4549	1.2918	0.2580	1.0012	0.03264
1991	1.7973		7.8393	34.9949	0.3740	1.5825	0.2732	1.2825	0.02683
1992	1.7960		7.8293	35.0470	0.3695	1.5835	0.2733	1.2837	0.02651
1993	1.7841		7.4986	34.9322	0.3633	1.5437	0.2714	1.2462	0.02607
1994	1.7963		7.8472	35.0417	0.3587	1.5986	0.2283	1.3445	0.02574
1995	1.7967		7.8382	35.0842	0.3537	1.5973	0.2280	1.3439	0.02538
1996	1.7258		7.2705	35.0439	0.3478	1.5305	0.2243	1.2812	0.02495
1997	1.6749		7.0092	35.1416	0.3425	1.4753	0.2117	1.2391	0.02458
1998	1.6256		6.6330	31.8578	0.3366	0.9059	0.1723	0.7094	0.02415
1999	1.5902		6.4530	24.6709	0.3304	0.8961	0.1698	0.7027	0.02370
2000	1.5944		6.5157	24.8066	0.3013	0.9015	0.1704	0.7096	0.02162
2001	1.5890		6.4406	24.6548	0.2700	0.8906	0.1697	0.7016	0.01937
2002	1.5876		6.4170	24.5976	0.2347	0.8853	0.1695	0.6990	0.01684
2003	1.4007		3.6131	13.9777	0.1954	0.8302	0.1614	0.6548	0.01402
2004	1.4030		3.6216	13.9776	0.1516	0.8286	0.1616	0.6561	0.01088
2005	1.4055		3.6314	13.9775	0.1032	0.8269	0.1619	0.6576	0.00741
2006	1.4092		3.6457	13.9773	0.0528	0.8258	0.1623	0.6598	0.00379
2007	0.4260		1.8181	8.3454	0.0317	0.0478	0.0416	0.0039	0.00228
2008	0.4192		1.8115	8.3411	0.0233	0.0400	0.0350	0.0033	0.00168
2009	0.4192		1.8093	8.3408	0.0197	0.0397	0.0350	0.0033	0.00142
2010	0.4068		1.6812	4.7516	0.0163	0.0378	0.0335	0.0032	0.00117
2011	0.4067		1.6772	4.7453	0.0149	0.0376	0.0334	0.0031	0.00107
2012	0.4066		1.6740	4.7402	0.0149	0.0375	0.0333	0.0031	0.00107
2013	0.4053		1.6590	4.5930	0.0149	0.0344	0.0304	0.0029	0.00107

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
2014	0.4052		1.6572	4.5906	0.0149	0.0343	0.0304	0.0029	0.00107
2015	0.4052		1.6557	4.5887	0.0149	0.0343	0.0304	0.0029	0.00107
2016	0.4052		1.6544	4.5868	0.0149	0.0343	0.0303	0.0029	0.00107
2017	0.4051		1.6532	4.5850	0.0149	0.0342	0.0303	0.0029	0.00107
2018	0.4051		1.6523	4.5835	0.0149	0.0342	0.0303	0.0029	0.00107
2019	0.4051		1.6516	4.5825	0.0149	0.0342	0.0303	0.0029	0.00107
2020	0.4051		1.6511	4.5819	0.0149	0.0342	0.0302	0.0028	0.00107

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
1990	0.0705	1.2533	0.2503	0.9712	0.03182	0.0181	0.0098	0.0020
1991	0.0752	1.5352	0.2650	1.2440	0.02616	0.0193	0.0049	0.0021
1992	0.0753	1.5362	0.2651	1.2453	0.02585	0.0193	0.0049	0.0021
1993	0.0720	1.4976	0.2633	1.2089	0.02541	0.0185	0.0048	0.0021
1994	0.0759	1.5508	0.2215	1.3042	0.02509	0.0195	0.0050	0.0021
1995	0.0759	1.5496	0.2211	1.3037	0.02474	0.0195	0.0049	0.0021
1996	0.0748	1.4847	0.2176	1.2428	0.02433	0.0192	0.0044	0.0021
1997	0.0762	1.4312	0.2053	1.2019	0.02396	0.0196	0.0046	0.0021
1998	0.0755	0.8788	0.1672	0.6881	0.02355	0.0194	0.0047	0.0021
1999	0.0769	0.8694	0.1647	0.6816	0.02311	0.0197	0.0049	0.0021
2000	0.0777	0.8746	0.1652	0.6883	0.02107	0.0199	0.0049	0.0021
2001	0.0768	0.8640	0.1646	0.6806	0.01888	0.0197	0.0051	0.0021
2002	0.0765	0.8588	0.1644	0.6780	0.01642	0.0196	0.0052	0.0021
2003	0.0765	0.8054	0.1565	0.6352	0.01367	0.0196	0.0048	0.0021
2004	0.0765	0.8038	0.1568	0.6365	0.01061	0.0196	0.0048	0.0021
2005	0.0765	0.8021	0.1570	0.6379	0.00722	0.0196	0.0048	0.0021
2006	0.0765	0.8011	0.1574	0.6400	0.00369	0.0196	0.0048	0.0021
2007	0.0765	0.0464	0.0403	0.0038	0.00222	0.0196	0.4921	0.0021
2008	0.0765	0.0388	0.0339	0.0032	0.00163	0.0196	0.4829	0.0020
2009	0.0765	0.0385	0.0340	0.0032	0.00138	0.0196	0.4828	0.0020

<b>Model Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>PM<sub>2.5</sub>, Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
2010	0.0765	0.0367	0.0325	0.0031	0.00114	0.0196	0.4659	0.0020
2011	0.0765	0.0365	0.0324	0.0030	0.00104	0.0196	0.4657	0.0020
2012	0.0765	0.0364	0.0323	0.0030	0.00104	0.0196	0.4656	0.0020
2013	0.0765	0.0334	0.0295	0.0028	0.00104	0.0196	0.4638	0.0020
2014	0.0765	0.0333	0.0295	0.0028	0.00104	0.0196	0.4637	0.0020
2015	0.0765	0.0333	0.0295	0.0028	0.00104	0.0196	0.4636	0.0020
2016	0.0765	0.0332	0.0294	0.0028	0.00104	0.0196	0.4636	0.0020
2017	0.0765	0.0332	0.0294	0.0028	0.00104	0.0196	0.4635	0.0020
2018	0.0765	0.0332	0.0294	0.0028	0.00104	0.0196	0.4635	0.0020
2019	0.0765	0.0332	0.0294	0.0028	0.00104	0.0196	0.4634	0.0020
2020	0.0765	0.0331	0.0293	0.0028	0.00104	0.0196	0.4634	0.0020

**Table A23 Lifetime mileage-weighted average air pollutant emission factors (g/mile) for gasoline motorcycles for model years 1990–2020**

<b>Model Year</b>	<b>VOC, exhaust</b>	<b>VOC, evaporation</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub>, exhaust</b>	<b>PM<sub>10</sub>, OC</b>	<b>PM<sub>10</sub>, BC</b>	<b>PM<sub>10</sub>, Sulfate</b>
1990	2.0193	0.2921	33.1019	1.1284	0.0592	0.0384	0.0311	0.0069	0.00035
1991	1.9087	0.2921	28.9454	1.0718	0.0341	0.0391	0.0317	0.0073	0.00020
1992	1.9039	0.2921	28.7810	1.0684	0.0344	0.0391	0.0316	0.0073	0.00020
1993	1.8996	0.2921	28.6207	1.0650	0.0348	0.0390	0.0315	0.0072	0.00021
1994	2.0705	0.2908	30.0130	1.0957	0.0354	0.0389	0.0315	0.0072	0.00021
1995	2.0697	0.2908	29.8618	1.0928	0.0360	0.0388	0.0314	0.0072	0.00021
1996	2.1039	0.4452	29.7104	1.0901	0.0369	0.0387	0.0314	0.0071	0.00022
1997	2.1061	0.4449	29.5683	1.0879	0.0381	0.0386	0.0313	0.0071	0.00023
1998	2.1134	0.4441	29.4375	1.0864	0.0399	0.0384	0.0312	0.0070	0.00024
1999	2.1373	0.2892	29.3407	1.0873	0.0435	0.0382	0.0310	0.0069	0.00026
2000	2.0825	0.3044	28.9134	1.0733	0.0393	0.0382	0.0310	0.0070	0.00023
2001	2.3660	0.3044	40.4361	1.9070	0.0351	0.0383	0.0311	0.0070	0.00021
2002	2.2848	0.3043	38.8127	1.7772	0.0307	0.0383	0.0311	0.0070	0.00018
2003	2.1853	0.3063	36.8378	1.6218	0.0254	0.0382	0.0311	0.0070	0.00015

Model Year	VOC, exhaust	VOC, evaporation	CO	NO <sub>x</sub>	SO <sub>2</sub>	PM <sub>10</sub> , exhaust	PM <sub>10</sub> , OC	PM <sub>10</sub> , BC	PM <sub>10</sub> , Sulfate
2004	1.4817	0.4702	23.8174	0.8811	0.0177	0.0381	0.0310	0.0070	0.00010
2005	1.4500	0.4702	22.8473	0.8303	0.0122	0.0381	0.0311	0.0070	0.00007
2006	1.4072	0.4701	20.8447	0.8318	0.0104	0.0380	0.0310	0.0070	0.00006
2007	1.3749	0.4701	19.8796	0.7752	0.0088	0.0380	0.0310	0.0070	0.00005
2008	0.9669	0.4701	13.3372	0.7101	0.0074	0.0381	0.0311	0.0070	0.00004
2009	0.9590	0.4701	13.0734	0.6901	0.0065	0.0381	0.0311	0.0070	0.00004
2010	0.9648	0.4701	13.0468	0.6877	0.0063	0.0381	0.0311	0.0070	0.00004
2011	0.9721	0.4706	13.0391	0.6840	0.0061	0.0382	0.0312	0.0070	0.00004
2012	0.9776	0.4706	13.0000	0.6753	0.0056	0.0383	0.0312	0.0070	0.00003
2013	0.9822	0.4706	13.0265	0.6760	0.0056	0.0383	0.0312	0.0070	0.00003
2014	0.9842	0.4706	13.0432	0.6764	0.0056	0.0383	0.0312	0.0070	0.00003
2015	0.9855	0.4706	13.0542	0.6767	0.0056	0.0383	0.0312	0.0070	0.00003
2016	0.9863	0.4706	13.0608	0.6769	0.0056	0.0383	0.0312	0.0070	0.00003
2017	0.9868	0.4706	13.0638	0.6770	0.0056	0.0383	0.0312	0.0070	0.00003
2018	0.9868	0.4707	13.0641	0.6770	0.0056	0.0383	0.0312	0.0070	0.00003
2019	0.9867	0.4707	13.0623	0.6770	0.0056	0.0383	0.0312	0.0070	0.00003
2020	0.9864	0.4708	13.0590	0.6769	0.0056	0.0383	0.0312	0.0070	0.00003

Model Year	PM <sub>10</sub> , TBW	PM <sub>2.5</sub> , exhaust	PM <sub>2.5</sub> , OC	PM <sub>2.5</sub> , BC	PM <sub>2.5</sub> , Sulfate	PM <sub>2.5</sub> , TBW	CH <sub>4</sub>	N <sub>2</sub> O
1990	0.0038	0.0353	0.0286	0.0064	0.00032	0.0009	0.0985	0.0074
1991	0.0038	0.0360	0.0292	0.0067	0.00019	0.0009	0.1552	0.0128
1992	0.0038	0.0360	0.0291	0.0067	0.00019	0.0009	0.1501	0.0124
1993	0.0038	0.0359	0.0291	0.0067	0.00019	0.0009	0.1449	0.0119
1994	0.0038	0.0358	0.0290	0.0066	0.00019	0.0009	0.1440	0.0114
1995	0.0038	0.0357	0.0289	0.0066	0.00020	0.0009	0.1382	0.0109
1996	0.0038	0.0356	0.0289	0.0066	0.00020	0.0009	0.0983	0.0082
1997	0.0038	0.0355	0.0288	0.0065	0.00021	0.0009	0.0928	0.0077
1998	0.0038	0.0354	0.0287	0.0065	0.00022	0.0009	0.0861	0.0070
1999	0.0038	0.0352	0.0286	0.0064	0.00024	0.0009	0.0756	0.0060

<b>Model</b>					<b>PM<sub>2.5</sub>,</b>			
<b>Year</b>	<b>PM<sub>10</sub>, TBW</b>	<b>PM<sub>2.5</sub>, exhaust</b>	<b>PM<sub>2.5</sub>, OC</b>	<b>PM<sub>2.5</sub>, BC</b>	<b>Sulfate</b>	<b>PM<sub>2.5</sub>, TBW</b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>
2000	0.0038	0.0352	0.0286	0.0064	0.00021	0.0009	0.0776	0.0063
2001	0.0038	0.0353	0.0286	0.0064	0.00019	0.0009	0.0922	0.0067
2002	0.0038	0.0352	0.0286	0.0064	0.00017	0.0009	0.0910	0.0068
2003	0.0038	0.0352	0.0286	0.0064	0.00014	0.0009	0.0885	0.0069
2004	0.0038	0.0351	0.0286	0.0064	0.00010	0.0009	0.0988	0.0069
2005	0.0038	0.0351	0.0286	0.0064	0.00007	0.0009	0.0966	0.0069
2006	0.0038	0.0350	0.0285	0.0064	0.00006	0.0009	0.0639	0.0068
2007	0.0038	0.0350	0.0286	0.0064	0.00005	0.0009	0.0615	0.0067
2008	0.0038	0.0351	0.0286	0.0064	0.00004	0.0009	0.0572	0.0066
2009	0.0038	0.0351	0.0286	0.0064	0.00004	0.0009	0.0563	0.0065
2010	0.0038	0.0351	0.0287	0.0064	0.00003	0.0009	0.0568	0.0066
2011	0.0038	0.0352	0.0287	0.0064	0.00003	0.0009	0.0578	0.0067
2012	0.0038	0.0352	0.0287	0.0065	0.00003	0.0009	0.0587	0.0069
2013	0.0038	0.0352	0.0287	0.0065	0.00003	0.0009	0.0594	0.0070
2014	0.0038	0.0352	0.0287	0.0065	0.00003	0.0009	0.0598	0.0070
2015	0.0038	0.0352	0.0287	0.0065	0.00003	0.0009	0.0600	0.0070
2016	0.0038	0.0352	0.0288	0.0065	0.00003	0.0009	0.0601	0.0071
2017	0.0038	0.0352	0.0288	0.0065	0.00003	0.0009	0.0602	0.0071
2018	0.0038	0.0352	0.0288	0.0065	0.00003	0.0009	0.0602	0.0071
2019	0.0038	0.0352	0.0288	0.0065	0.00003	0.0009	0.0602	0.0071
2020	0.0038	0.0352	0.0288	0.0065	0.00003	0.0009	0.0601	0.0071

**Table A24 Lifetime VMT shares of various vehicle types by model year<sup>a</sup>**

	1990	1995	2000	2005	2010	2015	2020
Combination long-haul trucks, diesel	17048 (0.0157)	57703 (0.03)	115695 (0.0338)	122255 (0.0358)	72334 (0.0258)	93682 (0.0241)	107256 (0.0265)
Combination short-haul trucks, diesel	21365 (0.0196)	42190 (0.0219)	77847 (0.0228)	81816 (0.0239)	48469 (0.0173)	63240 (0.0163)	72618 (0.018)
Combination short-haul trucks, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Intercity buses, diesel	1565 (0.0014)	2369 (0.0012)	3372 (0.001)	4157 (0.0012)	3704 (0.0013)	4852 (0.0012)	5611 (0.0014)
Light commercial trucks, diesel	7091 (0.0065)	19180 (0.01)	40846 (0.0119)	40268 (0.0118)	27788 (0.0099)	32806 (0.0084)	30068 (0.0074)
Light commercial trucks, gasoline	77542 (0.0713)	141730 (0.0736)	292533 (0.0856)	329128 (0.0963)	236058 (0.0841)	278684 (0.0716)	255425 (0.0632)
Motor homes, diesel	294 (0.0003)	630 (0.0003)	1511 (0.0004)	2535 (0.0007)	2588 (0.0009)	3389 (0.0009)	3933 (0.001)
Motor homes, gasoline	1668 (0.0015)	2371 (0.0012)	2934 (0.0009)	3226 (0.0009)	2588 (0.0009)	3389 (0.0009)	3933 (0.001)
Motorcycles, gasoline	2915 (0.0027)	3064 (0.0016)	11954 (0.0035)	17516 (0.0051)	14008 (0.005)	18827 (0.0048)	18730 (0.0046)
Passenger cars, diesel	0 (0)	0 (0)	0 (0)	6157 (0.0018)	5806 (0.0021)	8956 (0.0023)	9770 (0.0024)
Passenger cars, gasoline	699189 (0.6426)	1127412 (0.5856)	1787017 (0.5228)	1595464 (0.4667)	1504359 (0.5362)	2320540 (0.5964)	2531496 (0.6261)
Passenger trucks, diesel	3142 (0.0029)	7191 (0.0037)	23111 (0.0068)	14374 (0.0042)	18291 (0.0065)	21594 (0.0056)	19792 (0.0049)
Passenger trucks, gasoline	231360 (0.2126)	474456 (0.2464)	974780 (0.2852)	1091327 (0.3192)	771472 (0.275)	910779 (0.2341)	834767 (0.2065)
Refuse trucks, diesel	922 (0.0008)	2082 (0.0011)	1688 (0.0005)	1671 (0.0005)	895 (0.0003)	1068 (0.0003)	1162 (0.0003)
Refuse trucks, gasoline	38 (0)	87 (0)	70 (0)	70 (0)	37 (0)	45 (0)	48 (0)
School buses, diesel	2111 (0.0019)	2811 (0.0015)	3545 (0.001)	4371 (0.0013)	3895 (0.0014)	5101 (0.0013)	5899 (0.0015)
School buses, gasoline	299 (0.0003)	363 (0.0002)	154 (0)	189 (0.0001)	169 (0.0001)	221 (0.0001)	256 (0.0001)
Single-unit long-haul trucks, diesel	1087 (0.001)	1580 (0.0008)	7070 (0.0021)	9391 (0.0027)	8423 (0.003)	11124 (0.0029)	12852 (0.0032)
Single-unit long-haul trucks, gasoline	725 (0.0007)	894 (0.0005)	3374 (0.001)	4025 (0.0012)	3610 (0.0013)	4767 (0.0012)	5508 (0.0014)



	<b>1990</b>	<b>1995</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>
Single-unit short-haul trucks, diesel	11436 (0.0105)	24562 (0.0128)	47361 (0.0139)	62768 (0.0184)	56219 (0.02)	74467 (0.0191)	85953 (0.0213)
Single-unit short-haul trucks, gasoline	7624 (0.007)	13909 (0.0072)	22604 (0.0066)	26900 (0.0079)	24094 (0.0086)	31914 (0.0082)	36837 (0.0091)
Transit buses, compressed natural gas (CNG)	1 (0)	29 (0)	20 (0)	44 (0)	59 (0)	78 (0)	90 (0)
Transit buses, diesel	711 (0.0007)	608 (0.0003)	853 (0.0002)	1033 (0.0003)	918 (0.0003)	1207 (0.0003)	1394 (0.0003)
Transit buses, gasoline	0 (0)	7 (0)	9 (0)	11 (0)	10 (0)	13 (0)	15 (0)

<sup>a</sup> The numbers outside and inside the parentheses are the lifetime VMT in million miles and the shares, respectively.

**Table A25 Lifetime pollutant emission shares of various vehicle types by model year<sup>a</sup>**

	1990	1995	2000	2005	2010	2015	2020
<b>CH<sub>4</sub></b>							
Combination long-haul trucks, diesel	167.7 (0.0019)	285.4 (0.0029)	562.8 (0.0071)	583.9 (0.0081)	33698.9 (0.3765)	43432.8 (0.3557)	49705.1 (0.3864)
Combination short-haul trucks, diesel	59 (0.0007)	117.7 (0.0012)	171.3 (0.0022)	155.8 (0.0022)	2407.8 (0.0269)	2995.9 (0.0245)	3422.7 (0.0266)
Combination short-haul trucks, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Intercity buses, diesel	5 (0.0001)	7.6 (0.0001)	8.5 (0.0001)	9.3 (0.0001)	219 (0.0024)	274.7 (0.0022)	318.2 (0.0025)
Light commercial trucks, diesel	21.9 (0.0002)	45.9 (0.0005)	98.4 (0.0012)	92.7 (0.0013)	2676.5 (0.0299)	3101.2 (0.0254)	2795.4 (0.0217)
Light commercial trucks, gasoline	10186.1 (0.1144)	15504.8 (0.1552)	11614.5 (0.1466)	11144 (0.1539)	6184.2 (0.0691)	8026.1 (0.0657)	7200.7 (0.056)
Motor homes, diesel	0.9 (0)	1.9 (0)	3.6 (0)	6 (0.0001)	180.6 (0.002)	227.1 (0.0019)	264.1 (0.0021)
Motor homes, gasoline	280.3 (0.0031)	421.1 (0.0042)	60.2 (0.0008)	61.5 (0.0008)	49 (0.0005)	62.1 (0.0005)	72.4 (0.0006)
Motorcycles, gasoline	287 (0.0032)	423.4 (0.0042)	927.2 (0.0117)	1691.5 (0.0234)	795.9 (0.0089)	1129.5 (0.0093)	1126.5 (0.0088)
Passenger cars, diesel	0 (0)	0 (0)	0 (0)	3.7 (0.0001)	544.6 (0.0061)	837.2 (0.0069)	898.6 (0.007)
Passenger cars, gasoline	46559.5 (0.5229)	37412.7 (0.3745)	27713 (0.3498)	22220.8 (0.3068)	15872.3 (0.1773)	27160.8 (0.2224)	29261.6 (0.2275)
Passenger trucks, diesel	6.9 (0.0001)	14.5 (0.0001)	49.6 (0.0006)	32.2 (0.0004)	1724.3 (0.0193)	1998.2 (0.0164)	1801.4 (0.014)
Passenger trucks, gasoline	27931.9 (0.3137)	40031.1 (0.4007)	36640.3 (0.4624)	34826.2 (0.4809)	18393.4 (0.2055)	24210.9 (0.1983)	21720.8 (0.1689)
Refuse trucks, diesel	3 (0)	6.7 (0.0001)	4.2 (0.0001)	3.9 (0.0001)	54.3 (0.0006)	62.6 (0.0005)	68.2 (0.0005)
Refuse trucks, gasoline	7.8 (0.0001)	17.8 (0.0002)	1.4 (0)	1.2 (0)	0.7 (0)	0.8 (0)	0.8 (0)
School buses, diesel	7.5 (0.0001)	9.8 (0.0001)	10.1 (0.0001)	12.6 (0.0002)	453.1 (0.0051)	582.4 (0.0048)	679 (0.0053)
School buses,	142.1 (0.0016)	181.9 (0.0018)	14.8 (0.0002)	18.6 (0.0003)	16 (0.0002)	20.1 (0.0002)	23.5 (0.0002)

	1990	1995	2000	2005	2010	2015	2020
gasoline							
Single-unit long-haul trucks, diesel	3.4 (0)	4.9 (0)	17.4 (0.0002)	22.5 (0.0003)	614.3 (0.0069)	784.4 (0.0064)	909.7 (0.0071)
Single-unit long-haul trucks, gasoline	195.5 (0.0022)	231.9 (0.0023)	110.2 (0.0014)	122.8 (0.0017)	107.3 (0.0012)	136.4 (0.0011)	159.1 (0.0012)
Single-unit short-haul trucks, diesel	36.9 (0.0004)	77.1 (0.0008)	117.2 (0.0015)	152.1 (0.0021)	4365.4 (0.0488)	5603.8 (0.0459)	6499.6 (0.0505)
Single-unit short-haul trucks, gasoline	3140 (0.0353)	5088.4 (0.0509)	1108.6 (0.014)	1257.8 (0.0174)	1086.4 (0.0121)	1378.2 (0.0113)	1609.3 (0.0125)
Transit buses, CNG	0.1 (0)	4.1 (0)	0.2 (0)	0.4 (0)	0.6 (0)	0.8 (0)	0.9 (0)
Transit buses, diesel	2.4 (0)	2 (0)	2.2 (0)	2.6 (0)	60.8 (0.0007)	77.3 (0.0006)	89.8 (0.0007)
Transit buses, gasoline	0 (0)	2 (0)	0.4 (0)	0.4 (0)	0.4 (0)	0.5 (0)	0.6 (0)
<b>CO</b>							
Combination long-haul trucks, diesel	93492.3 (0.0045)	452284.6 (0.0145)	753830.7 (0.0265)	443959.6 (0.0222)	121607.5 (0.0109)	155105.4 (0.0105)	177094.3 (0.0117)
Combination short-haul trucks, diesel	111225.7 (0.0053)	261671.3 (0.0084)	367478.9 (0.0129)	196871.2 (0.0098)	22298.7 (0.002)	27436.5 (0.0018)	31142.4 (0.0021)
Combination short-haul trucks, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Intercity buses, diesel	9924.7 (0.0005)	15471.3 (0.0005)	19100.4 (0.0007)	12202.4 (0.0006)	2479.5 (0.0002)	3160 (0.0002)	3675.9 (0.0002)
Light commercial trucks, diesel	29050.2 (0.0014)	83105.4 (0.0027)	136419 (0.0048)	94121.7 (0.0047)	35241.7 (0.0032)	41168.7 (0.0028)	37429.4 (0.0025)
Light commercial trucks, gasoline	2416848.3 (0.1156)	4106224.4 (0.1317)	3715990.3 (0.1305)	2814176 (0.1406)	1484044.3 (0.1328)	1724188.7 (0.1162)	1560740.1 (0.1034)
Motor homes, diesel	1134.9 (0.0001)	2577.9 (0.0001)	5517.7 (0.0002)	8929.5 (0.0004)	2471 (0.0002)	3174.8 (0.0002)	3706.1 (0.0002)
Motor homes, gasoline	146492.8 (0.007)	205902.6 (0.0066)	94365.6 (0.0033)	113130.5 (0.0057)	87593 (0.0078)	114217 (0.0077)	133313.6 (0.0088)

	1990	1995	2000	2005	2010	2015	2020
Motorcycles, gasoline	96494.5 (0.0046)	91497 (0.0029)	345640.4 (0.0121)	400190.6 (0.02)	182765.7 (0.0164)	245772.4 (0.0166)	244595.2 (0.0162)
Passenger cars, diesel	0 (0)	0 (0)	0 (0)	1847 (0.0001)	15834.4 (0.0014)	24500.1 (0.0017)	26687.8 (0.0018)
Passenger cars, gasoline	9718125.7 (0.465)	11428353.6 (0.3666)	10653154.4 (0.3741)	6752879.3 (0.3373)	4310830.2 (0.3859)	6648700.4 (0.448)	7226438.3 (0.4788)
Passenger trucks, diesel	11304.8 (0.0005)	28393.7 (0.0009)	68870 (0.0024)	33084.6 (0.0017)	24504.4 (0.0022)	28640 (0.0019)	26052.5 (0.0017)
Passenger trucks, gasoline	7268540.8 (0.3478)	12927844.7 (0.4147)	11254346.5 (0.3952)	7812113.6 (0.3902)	3872123.8 (0.3466)	4505959.9 (0.3036)	4085672.1 (0.2707)
Refuse trucks, diesel	5118.4 (0.0002)	13011.1 (0.0004)	7752.9 (0.0003)	4497.2 (0.0002)	602.2 (0.0001)	699.5 (0)	766.3 (0.0001)
Refuse trucks, gasoline	7194.6 (0.0003)	15327.7 (0.0005)	2029.1 (0.0001)	2160.3 (0.0001)	1109.3 (0.0001)	1306 (0.0001)	1429.5 (0.0001)
School buses, diesel	11936.5 (0.0006)	16530.9 (0.0005)	19443.5 (0.0007)	20634 (0.001)	11458.6 (0.001)	14926.5 (0.001)	17460.9 (0.0012)
School buses, gasoline	42898.3 (0.0021)	50548 (0.0016)	12112.5 (0.0004)	16836.8 (0.0008)	14435.1 (0.0013)	18851.3 (0.0013)	22038.2 (0.0015)
Single-unit long-haul trucks, diesel	4914.1 (0.0002)	7115.8 (0.0002)	24794.3 (0.0009)	29151.2 (0.0015)	8041.3 (0.0007)	10400.1 (0.0007)	12124.3 (0.0008)
Single-unit long-haul trucks, gasoline	64086 (0.0031)	69080.9 (0.0022)	100040 (0.0035)	129515.6 (0.0065)	111451.2 (0.01)	145596.8 (0.0098)	169707.4 (0.0112)
Single-unit short-haul trucks, diesel	53493.9 (0.0026)	116470.6 (0.0037)	167629.1 (0.0059)	196437.5 (0.0098)	58237.2 (0.0052)	75517.1 (0.0051)	88039.2 (0.0058)
Single-unit short-haul trucks, gasoline	801013.1 (0.0383)	1271886.2 (0.0408)	724405.7 (0.0254)	934223.1 (0.0467)	801847 (0.0718)	1048385 (0.0706)	1221748.6 (0.0809)
Transit buses, CNG	120.4 (0)	4029.4 (0.0001)	442.7 (0)	919.1 (0)	1023.6 (0.0001)	1334.2 (0.0001)	1543.1 (0.0001)
Transit buses, diesel	5430.8 (0.0003)	4244.7 (0.0001)	4893 (0.0002)	3149.9 (0.0002)	1010.7 (0.0001)	1307.5 (0.0001)	1526 (0.0001)
Transit buses, gasoline	0 (0)	1079.8 (0)	330.2 (0)	452.3 (0)	389.1 (0)	507.8 (0)	591.4 (0)
<b>N<sub>2</sub>O</b>							
Combination long-haul trucks, diesel	34.6 (0.0005)	118.4 (0.0013)	238.2 (0.0022)	251.2 (0.0073)	147.9 (0.0056)	190.6 (0.009)	217.8 (0.0103)
Combination	46.6	89.5	163.7	171.6	100.9	130.8	149.8

	1990	1995	2000	2005	2010	2015	2020
short-haul trucks, diesel	(0.0006)	(0.001)	(0.0015)	(0.005)	(0.0038)	(0.0062)	(0.0071)
Combination short-haul trucks, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Intercity buses, diesel	3.7 (0.0001)	5.6 (0.0001)	8.2 (0.0001)	10.1 (0.0003)	9 (0.0003)	11.8 (0.0006)	13.7 (0.0007)
Light commercial trucks, diesel	25 (0.0003)	60.3 (0.0007)	125 (0.0012)	118.6 (0.0035)	81 (0.003)	94.8 (0.0045)	86.3 (0.0041)
Light commercial trucks, gasoline	9712 (0.1334)	12599.8 (0.1409)	18315.2 (0.1697)	5594.5 (0.1632)	3895.5 (0.1463)	2376.9 (0.1124)	2135.1 (0.1012)
Motor homes, diesel	0.8 (0)	1.6 (0)	4 (0)	6.7 (0.0002)	6.8 (0.0003)	9 (0.0004)	10.4 (0.0005)
Motor homes, gasoline	67 (0.0009)	95.4 (0.0011)	159.2 (0.0015)	79.4 (0.0023)	63.7 (0.0024)	22.7 (0.0011)	26.5 (0.0013)
Motorcycles, gasoline	21.7 (0.0003)	33.5 (0.0004)	75.5 (0.0007)	121.2 (0.0035)	92.5 (0.0035)	132.6 (0.0063)	132.4 (0.0063)
Passenger cars, diesel	0 (0)	0 (0)	0 (0)	4.1 (0.0001)	3.9 (0.0001)	6 (0.0003)	6.5 (0.0003)
Passenger cars, gasoline	33246.4 (0.4566)	34685.6 (0.3878)	30961.4 (0.2869)	10790.6 (0.3149)	10148 (0.3811)	10243.3 (0.4844)	11009.2 (0.5219)
Passenger trucks, diesel	9.5 (0.0001)	20.4 (0.0002)	61.7 (0.0006)	41 (0.0012)	51.6 (0.0019)	60.4 (0.0029)	55 (0.0026)
Passenger trucks, gasoline	28787.8 (0.3953)	40431.3 (0.4521)	55380.6 (0.5132)	15616.6 (0.4557)	10714.6 (0.4023)	7180.6 (0.3395)	6449.8 (0.3058)
Refuse trucks, diesel	2.5 (0)	5.4 (0.0001)	4.4 (0)	4.3 (0.0001)	2.3 (0.0001)	2.8 (0.0001)	3 (0.0001)
Refuse trucks, gasoline	1.8 (0)	3.7 (0)	3.5 (0)	1.6 (0)	0.8 (0)	0.3 (0)	0.3 (0)
School buses, diesel	8.4 (0.0001)	11.4 (0.0001)	15 (0.0001)	19.1 (0.0006)	17.1 (0.0006)	22.3 (0.0011)	26 (0.0012)
School buses, gasoline	38.2 (0.0005)	47.8 (0.0005)	28.2 (0.0003)	16.6 (0.0005)	14.9 (0.0006)	5.3 (0.0003)	6.2 (0.0003)
Single-unit long-haul trucks, diesel	3.3 (0)	4.6 (0.0001)	20.2 (0.0002)	27 (0.0008)	24.2 (0.0009)	31.9 (0.0015)	37 (0.0018)
Single-unit long-haul trucks,	50.5 (0.0007)	54.1 (0.0006)	241.3 (0.0022)	131.5 (0.0038)	118 (0.0044)	42.3 (0.002)	49.2 (0.0023)

	1990	1995	2000	2005	2010	2015	2020
gasoline							
Single-unit short-haul trucks, diesel	39.8 (0.0005)	78.9 (0.0009)	144.3 (0.0013)	192.6 (0.0056)	172.6 (0.0065)	228 (0.0108)	264 (0.0125)
Single-unit short-haul trucks, gasoline	717.5 (0.0099)	1084.6 (0.0121)	1949.8 (0.0181)	1063.3 (0.031)	954.2 (0.0358)	341.9 (0.0162)	398.4 (0.0189)
Transit buses, CNG	0.2 (0)	4.9 (0.0001)	3.1 (0)	6.2 (0.0002)	7.8 (0.0003)	10.2 (0.0005)	11.9 (0.0006)
Transit buses, diesel	2 (0)	1.7 (0)	2.4 (0)	3 (0.0001)	2.7 (0.0001)	3.5 (0.0002)	4.1 (0.0002)
Transit buses, gasoline	0 (0)	0.4 (0)	0.7 (0)	0.4 (0)	0.4 (0)	0.1 (0)	0.2 (0)
<b>NO<sub>x</sub></b>							
Combination long-haul trucks, diesel	601725.6 (0.1294)	2024457.3 (0.2304)	2869994.5 (0.2972)	1708814.7 (0.3684)	343702.6 (0.2919)	429877 (0.2881)	491436.6 (0.3099)
Combination short-haul trucks, diesel	692680.1 (0.1489)	1283213.3 (0.146)	1547041.7 (0.1602)	832177 (0.1794)	76355.9 (0.0648)	90089.7 (0.0604)	102934.7 (0.0649)
Combination short-haul trucks, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Intercity buses, diesel	44344 (0.0095)	62748.3 (0.0071)	61200.5 (0.0063)	39025.9 (0.0084)	5851.4 (0.005)	6900.5 (0.0046)	7984.2 (0.005)
Light commercial trucks, diesel	52375.6 (0.0113)	114718.6 (0.0131)	197375.2 (0.0204)	204063.2 (0.044)	27402.2 (0.0233)	31999.7 (0.0214)	29053.1 (0.0183)
Light commercial trucks, gasoline	332782.2 (0.0715)	594839.3 (0.0677)	583387.6 (0.0604)	220542.8 (0.0475)	101333.6 (0.0861)	118638 (0.0795)	108273.4 (0.0683)
Motor homes, diesel	4661.1 (0.001)	9318.4 (0.0011)	11118.5 (0.0012)	16487.4 (0.0036)	2823.2 (0.0024)	3350.8 (0.0022)	3893.4 (0.0025)
Motor homes, gasoline	10264.7 (0.0022)	14417.5 (0.0016)	11825.6 (0.0012)	11547.7 (0.0025)	8577 (0.0073)	11189.9 (0.0075)	12996.2 (0.0082)
Motorcycles, gasoline	3289.4 (0.0007)	3348.5 (0.0004)	12830.9 (0.0013)	14544 (0.0031)	9633.1 (0.0082)	12740.8 (0.0085)	12679 (0.008)
Passenger cars, diesel	0 (0)	0 (0)	0 (0)	16249.1 (0.0035)	1358 (0.0012)	2092.2 (0.0014)	2257.7 (0.0014)
Passenger cars, gasoline	1541384.9 (0.3314)	2073757.5 (0.236)	1835390.6 (0.1901)	316466.9 (0.0682)	181322.6 (0.154)	278989 (0.187)	303145.7 (0.1912)
Passenger	19711.7	39356.8	99620.3	73253.9	17509.8	20454.2	18576.4

	1990	1995	2000	2005	2010	2015	2020
trucks, diesel	(0.0042)	(0.0045)	(0.0103)	(0.0158)	(0.0149)	(0.0137)	(0.0117)
Passenger trucks, gasoline	1029842.3 (0.2214)	1996415.6 (0.2272)	1825357.1 (0.189)	576458.4 (0.1243)	241376.3 (0.205)	282208.1 (0.1892)	257230.1 (0.1622)
Refuse trucks, diesel	25212.1 (0.0054)	53394.5 (0.0061)	27833.7 (0.0029)	15361.8 (0.0033)	1281.5 (0.0011)	1394.5 (0.0009)	1518.4 (0.001)
Refuse trucks, gasoline	391 (0.0001)	867.9 (0.0001)	386.2 (0)	341.3 (0.0001)	170 (0.0001)	201.2 (0.0001)	219 (0.0001)
School buses, diesel	30534.2 (0.0066)	38113.5 (0.0043)	31875.3 (0.0033)	24896.5 (0.0054)	4684.2 (0.004)	5680.9 (0.0038)	6595 (0.0042)
School buses, gasoline	2044.8 (0.0004)	2461.5 (0.0003)	746 (0.0001)	727.9 (0.0002)	469.7 (0.0004)	612.5 (0.0004)	709.1 (0.0004)
Single-unit long-haul trucks, diesel	15136.6 (0.0033)	20582.4 (0.0023)	51418.5 (0.0053)	56202.6 (0.0121)	8202.4 (0.007)	9926.8 (0.0067)	11492.8 (0.0072)
Single-unit long-haul trucks, gasoline	4395 (0.0009)	5201.6 (0.0006)	13114.4 (0.0014)	13670.1 (0.0029)	11016 (0.0094)	14444.5 (0.0097)	16706.9 (0.0105)
Single-unit short-haul trucks, diesel	172140.7 (0.037)	345989.9 (0.0394)	370325.9 (0.0383)	393528.5 (0.0848)	57282.9 (0.0486)	69841.4 (0.0468)	80806.6 (0.051)
Single-unit short-haul trucks, gasoline	51484.9 (0.0111)	89390.9 (0.0102)	92873.8 (0.0096)	95669.2 (0.0206)	75744.6 (0.0643)	99536.1 (0.0667)	115006.9 (0.0725)
Transit buses, CNG	5.2 (0)	173.2 (0)	72.1 (0)	154.5 (0)	197.9 (0.0002)	259.8 (0.0002)	300.1 (0.0002)
Transit buses, diesel	17103.7 (0.0037)	13759.7 (0.0016)	12716.2 (0.0013)	8721.1 (0.0019)	1202.3 (0.001)	1459.3 (0.001)	1688.2 (0.0011)
Transit buses, gasoline	0 (0)	55.9 (0)	41.2 (0)	43.8 (0)	35.1 (0)	45.9 (0)	53 (0)
<b>PM<sub>10</sub></b>							
Combination long-haul trucks, diesel	22023 (0.1875)	92169.3 (0.3777)	104304.3 (0.4129)	101088.7 (0.4256)	2734.2 (0.0859)	3213.3 (0.0778)	3665 (0.0862)
Combination short-haul trucks, diesel	27063.2 (0.2305)	61457.7 (0.2518)	58846.7 (0.233)	55527.2 (0.2338)	1381.2 (0.0434)	1613.6 (0.0391)	1844.2 (0.0434)
Combination short-haul trucks, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Intercity	1827.6	2951.3	2742.4	3112.2	120.6	140.9	163

	<b>1990</b>	<b>1995</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>
buses, diesel	(0.0156)	(0.0121)	(0.0109)	(0.0131)	(0.0038)	(0.0034)	(0.0038)
Light commercial trucks, diesel	5564.9 (0.0474)	13602.6 (0.0557)	12005.5 (0.0475)	8871.7 (0.0373)	305.2 (0.0096)	331.7 (0.008)	303.6 (0.0071)
Light commercial trucks, gasoline	4224.9 (0.036)	4210.9 (0.0173)	4971.7 (0.0197)	4464.2 (0.0188)	3140.7 (0.0987)	3620.6 (0.0876)	3303.3 (0.0777)
Motor homes, diesel	306 (0.0026)	650.6 (0.0027)	646.7 (0.0026)	993.1 (0.0042)	39.2 (0.0012)	46 (0.0011)	53.5 (0.0013)
Motor homes, gasoline	53.1 (0.0005)	52.4 (0.0002)	29.7 (0.0001)	34.8 (0.0001)	27.7 (0.0009)	35.8 (0.0009)	41.7 (0.001)
Motorcycles, gasoline	111.9 (0.001)	118.9 (0.0005)	457.2 (0.0018)	667.8 (0.0028)	534.3 (0.0168)	720.5 (0.0174)	716.9 (0.0169)
Passenger cars, diesel	0 (0)	0 (0)	0 (0)	42.9 (0.0002)	29.4 (0.0009)	44.9 (0.0011)	49 (0.0012)
Passenger cars, gasoline	24813 (0.2113)	19190 (0.0786)	18361 (0.0727)	12254.4 (0.0516)	11518.9 (0.3618)	17628.5 (0.4267)	19262.5 (0.4532)
Passenger trucks, diesel	2349.3 (0.02)	4598.5 (0.0188)	6255.5 (0.0248)	3108.1 (0.0131)	201.9 (0.0063)	219.8 (0.0053)	201.2 (0.0047)
Passenger trucks, gasoline	13634.3 (0.1161)	14637.8 (0.06)	17533.8 (0.0694)	15053.6 (0.0634)	10447.9 (0.3282)	12062.7 (0.292)	11010.4 (0.259)
Refuse trucks, diesel	1041.9 (0.0089)	2670.4 (0.0109)	1177.4 (0.0047)	1153 (0.0049)	26.1 (0.0008)	28 (0.0007)	30.5 (0.0007)
Refuse trucks, gasoline	1.5 (0)	1.9 (0)	0.7 (0)	0.7 (0)	0.3 (0)	0.4 (0)	0.4 (0)
School buses, diesel	1523.9 (0.013)	2158.3 (0.0088)	1625 (0.0064)	1854.1 (0.0078)	68 (0.0021)	79.6 (0.0019)	92 (0.0022)
School buses, gasoline	14.1 (0.0001)	10.9 (0)	2.5 (0)	3.1 (0)	2.8 (0.0001)	3.5 (0.0001)	4 (0.0001)
Single-unit long-haul trucks, diesel	1031.6 (0.0088)	1412 (0.0058)	2913.2 (0.0115)	3615 (0.0152)	127 (0.004)	151.3 (0.0037)	175 (0.0041)
Single-unit long-haul trucks, gasoline	24.8 (0.0002)	18.6 (0.0001)	28.5 (0.0001)	35.6 (0.0001)	31.7 (0.001)	40.9 (0.001)	47.5 (0.0011)
Single-unit short-haul trucks, diesel	10930.3 (0.0931)	23216.9 (0.0951)	19949.9 (0.079)	24781.8 (0.1043)	863.3 (0.0271)	1034.1 (0.025)	1194.8 (0.0281)
Single-unit short-haul	278.6 (0.0024)	301.8 (0.0012)	193.7 (0.0008)	239.6 (0.001)	213.3 (0.0067)	274.6 (0.0066)	319 (0.0075)



	1990	1995	2000	2005	2010	2015	2020
trucks, gasoline							
Transit buses, CNG	0 (0)	0.6 (0)	0.2 (0)	0.4 (0)	0.4 (0)	0.5 (0)	0.6 (0)
Transit buses, diesel	608.4 (0.0052)	623.8 (0.0026)	563 (0.0022)	630.3 (0.0027)	20.7 (0.0006)	24.7 (0.0006)	28.6 (0.0007)
Transit buses, gasoline	0 (0)	0.2 (0)	0.1 (0)	0.1 (0)	0.1 (0)	0.1 (0)	0.2 (0)
<b>PM<sub>10</sub>, Brake Wear</b>							
Combination long-haul trucks, diesel	923.2 (0.0495)	3357.5 (0.0951)	6887.4 (0.1059)	7171.6 (0.1061)	4243.2 (0.0804)	5495.5 (0.0777)	6291.7 (0.0852)
Combination short-haul trucks, diesel	1118 (0.0599)	2330.7 (0.066)	4342.3 (0.0668)	4393.1 (0.065)	2602.5 (0.0493)	3395.7 (0.048)	3899.2 (0.0528)
Combination short-haul trucks, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Intercity buses, diesel	136.3 (0.0073)	206.3 (0.0058)	293.7 (0.0045)	362.1 (0.0054)	322.6 (0.0061)	422.6 (0.006)	488.7 (0.0066)
Light commercial trucks, diesel	190.6 (0.0102)	419.2 (0.0119)	915.6 (0.0141)	821.7 (0.0122)	567 (0.0108)	669.4 (0.0095)	613.5 (0.0083)
Light commercial trucks, gasoline	1558.9 (0.0836)	2827.9 (0.0801)	5814.8 (0.0894)	6548.8 (0.0969)	4714.3 (0.0894)	5570.4 (0.0788)	5105.5 (0.0691)
Motor homes, diesel	14.2 (0.0008)	30.7 (0.0009)	73.7 (0.0011)	123.6 (0.0018)	126.2 (0.0024)	165.3 (0.0023)	191.8 (0.0026)
Motor homes, gasoline	78.9 (0.0042)	112 (0.0032)	138.7 (0.0021)	152.6 (0.0023)	122.7 (0.0023)	160.9 (0.0023)	186.7 (0.0025)
Motorcycles, gasoline	2.9 (0.0002)	3.1 (0.0001)	12.1 (0.0002)	17.6 (0.0003)	14.1 (0.0003)	19.1 (0.0003)	19 (0.0003)
Passenger cars, diesel	0 (0)	0 (0)	0 (0)	75.4 (0.0011)	71.1 (0.0013)	109.7 (0.0016)	119.6 (0.0016)
Passenger cars, gasoline	8515 (0.4566)	13702.8 (0.388)	21721.4 (0.3339)	19406.1 (0.2871)	18371.7 (0.3483)	28366.1 (0.4011)	30944.8 (0.419)
Passenger trucks, diesel	59.2 (0.0032)	136.9 (0.0039)	442.1 (0.0068)	271.5 (0.004)	345.5 (0.0065)	407.8 (0.0058)	373.8 (0.0051)
Passenger trucks, gasoline	4586.5 (0.2459)	9389.7 (0.2659)	19274.9 (0.2963)	21600.3 (0.3195)	15325.7 (0.2906)	18108.9 (0.2561)	16597.6 (0.2247)
Refuse trucks,	68.9 (0.0037)	157.7 (0.0045)	125.7 (0.0019)	136.9 (0.002)	73.4 (0.0014)	87.5 (0.0012)	95.2 (0.0013)

	1990	1995	2000	2005	2010	2015	2020
diesel							
Refuse trucks, gasoline	1.7 (0.0001)	3.7 (0.0001)	3 (0)	3 (0)	1.6 (0)	1.9 (0)	2.1 (0)
School buses, diesel	130.9 (0.007)	174.3 (0.0049)	219.9 (0.0034)	271.1 (0.004)	241.5 (0.0046)	316.3 (0.0045)	365.8 (0.005)
School buses, gasoline	11.6 (0.0006)	14.1 (0.0004)	6 (0.0001)	7.4 (0.0001)	6.6 (0.0001)	8.6 (0.0001)	10 (0.0001)
Single-unit long-haul trucks, diesel	69.1 (0.0037)	99.6 (0.0028)	437.1 (0.0067)	592.4 (0.0088)	531.3 (0.0101)	701.7 (0.0099)	810.7 (0.011)
Single-unit long-haul trucks, gasoline	36.8 (0.002)	46.2 (0.0013)	176.6 (0.0027)	210.1 (0.0031)	189.2 (0.0036)	250.2 (0.0035)	289 (0.0039)
Single-unit short-haul trucks, diesel	731.2 (0.0392)	1558.3 (0.0441)	2945.5 (0.0453)	3983.5 (0.0589)	3567.8 (0.0676)	4725.9 (0.0668)	5454.9 (0.0739)
Single-unit short-haul trucks, gasoline	389.1 (0.0209)	722.7 (0.0205)	1188.7 (0.0183)	1410.3 (0.0209)	1269.2 (0.0241)	1683.2 (0.0238)	1942.8 (0.0263)
Transit buses, CNG	0 (0)	1.1 (0)	0.8 (0)	1.7 (0)	2.2 (0)	2.9 (0)	3.4 (0)
Transit buses, diesel	26.4 (0.0014)	22.6 (0.0006)	31.7 (0.0005)	38.4 (0.0006)	34.1 (0.0006)	44.9 (0.0006)	51.8 (0.0007)
Transit buses, gasoline	0 (0)	0.3 (0)	0.3 (0)	0.4 (0)	0.4 (0)	0.5 (0)	0.6 (0)
<b>PM<sub>10</sub>, BC</b>							
Combination long-haul trucks, diesel	17067.8 (0.277)	77549.7 (0.465)	82094.1 (0.4981)	80392.8 (0.5053)	228.1 (0.0469)	268 (0.0415)	305.6 (0.0458)
Combination short-haul trucks, diesel	21903 (0.3555)	51749.5 (0.3103)	47493.3 (0.2881)	45351.8 (0.2851)	114.4 (0.0235)	133.6 (0.0207)	152.7 (0.0229)
Combination short-haul trucks, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Intercity buses, diesel	1424.6 (0.0231)	2399.4 (0.0144)	2121.6 (0.0129)	2431.3 (0.0153)	10.1 (0.0021)	11.8 (0.0018)	13.6 (0.002)
Light commercial trucks, diesel	3813 (0.0619)	9029.5 (0.0541)	8280.7 (0.0502)	6220.8 (0.0391)	27.9 (0.0057)	30.5 (0.0047)	27.9 (0.0042)
Light commercial	565.9 (0.0092)	585.5 (0.0035)	660.7 (0.004)	614.1 (0.0039)	424.7 (0.0874)	474 (0.0734)	428.3 (0.0641)

	1990	1995	2000	2005	2010	2015	2020
trucks, gasoline							
Motor homes, diesel	151 (0.0025)	316.8 (0.0019)	319 (0.0019)	494.8 (0.0031)	3.3 (0.0007)	3.8 (0.0006)	4.4 (0.0007)
Motor homes, gasoline	6.2 (0.0001)	5.9 (0)	3.7 (0)	4 (0)	3.2 (0.0007)	4 (0.0006)	4.7 (0.0007)
Motorcycles, gasoline	20.2 (0.0003)	21.9 (0.0001)	83.2 (0.0005)	122.5 (0.0008)	97.9 (0.0201)	132.1 (0.0204)	131.4 (0.0197)
Passenger cars, diesel	0 (0)	0 (0)	0 (0)	7.4 (0)	5.8 (0.0012)	9.1 (0.0014)	9.9 (0.0015)
Passenger cars, gasoline	5220.9 (0.0847)	4071.2 (0.0244)	3795.8 (0.023)	2590 (0.0163)	2433.2 (0.5007)	3692 (0.5715)	4021.7 (0.6023)
Passenger trucks, diesel	1583.1 (0.0257)	3062.2 (0.0184)	4282.5 (0.026)	2190.8 (0.0138)	18.5 (0.0038)	20.2 (0.0031)	18.4 (0.0028)
Passenger trucks, gasoline	1766.1 (0.0287)	1946.2 (0.0117)	2212.9 (0.0134)	2001.6 (0.0126)	1365.9 (0.2811)	1527.5 (0.2365)	1381.1 (0.2068)
Refuse trucks, diesel	757.1 (0.0123)	2028.8 (0.0122)	852.6 (0.0052)	863.7 (0.0054)	2.2 (0.0004)	2.3 (0.0004)	2.5 (0.0004)
Refuse trucks, gasoline	0.2 (0)	0.2 (0)	0.1 (0)	0.1 (0)	0 (0)	0 (0)	0 (0)
School buses, diesel	898.2 (0.0146)	1304.6 (0.0078)	931.3 (0.0057)	1071.3 (0.0067)	5.7 (0.0012)	6.6 (0.001)	7.7 (0.0012)
School buses, gasoline	3 (0)	2.3 (0)	0.6 (0)	0.7 (0)	0.6 (0.0001)	0.7 (0.0001)	0.8 (0.0001)
Single-unit long-haul trucks, diesel	489.5 (0.0079)	658.1 (0.0039)	1370.7 (0.0083)	1728.2 (0.0109)	10.6 (0.0022)	12.6 (0.0019)	14.5 (0.0022)
Single-unit long-haul trucks, gasoline	3.8 (0.0001)	2.5 (0)	4 (0)	4.7 (0)	4.2 (0.0009)	5.2 (0.0008)	6.1 (0.0009)
Single-unit short-haul trucks, diesel	5426.2 (0.0881)	11500.3 (0.069)	9875.3 (0.0599)	12493.9 (0.0785)	71.6 (0.0147)	85.8 (0.0133)	99.1 (0.0148)
Single-unit short-haul trucks, gasoline	48.1 (0.0008)	44.5 (0.0003)	29.7 (0.0002)	34 (0.0002)	30.2 (0.0062)	38 (0.0059)	44.3 (0.0066)
Transit buses, CNG	0 (0)	0.1 (0)	0 (0)	0 (0)	0.1 (0)	0.1 (0)	0.1 (0)
Transit buses, diesel	462.6 (0.0075)	487.8 (0.0029)	411.1 (0.0025)	465.1 (0.0029)	1.7 (0.0004)	2.1 (0.0003)	2.4 (0.0004)
Transit buses,	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

	1990	1995	2000	2005	2010	2015	2020
gasoline							
<b>PM<sub>10</sub>, OC</b>							
Combination long-haul trucks, diesel	4398.7 (0.0814)	13155 (0.1783)	19709.2 (0.2401)	19790.3 (0.2594)	2421.2 (0.0908)	2844.8 (0.0824)	3244.3 (0.0915)
Combination short-haul trucks, diesel	4572 (0.0846)	8688 (0.1177)	9715.8 (0.1184)	9569.8 (0.1254)	1214.7 (0.0455)	1418.5 (0.0411)	1621 (0.0457)
Combination short-haul trucks, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Intercity buses, diesel	374 (0.0069)	515 (0.007)	580.2 (0.0071)	665.2 (0.0087)	107.2 (0.004)	125 (0.0036)	144.6 (0.0041)
Light commercial trucks, diesel	1700.4 (0.0315)	4448.9 (0.0603)	3516.6 (0.0428)	2568.9 (0.0337)	266.8 (0.01)	290.4 (0.0084)	265.9 (0.0075)
Light commercial trucks, gasoline	3629.4 (0.0672)	3589.4 (0.0486)	4250 (0.0518)	3825.8 (0.0501)	2705.8 (0.1014)	3137.1 (0.0909)	2866.7 (0.0808)
Motor homes, diesel	151.8 (0.0028)	328.3 (0.0044)	317.5 (0.0039)	492.6 (0.0065)	34.6 (0.0013)	40.5 (0.0012)	47 (0.0013)
Motor homes, gasoline	45.9 (0.0008)	45.5 (0.0006)	25.1 (0.0003)	30.4 (0.0004)	24.3 (0.0009)	31.5 (0.0009)	36.7 (0.001)
Motorcycles, gasoline	90.6 (0.0017)	96.3 (0.0013)	371.2 (0.0045)	544 (0.0071)	436 (0.0163)	587.8 (0.017)	584.9 (0.0165)
Passenger cars, diesel	0 (0)	0 (0)	0 (0)	28 (0.0004)	22.2 (0.0008)	34.5 (0.001)	37.7 (0.0011)
Passenger cars, gasoline	19383 (0.3589)	14891.1 (0.2018)	14296.1 (0.1742)	9579.1 (0.1255)	9036.1 (0.3387)	13875.2 (0.402)	15177.8 (0.428)
Passenger trucks, diesel	744.9 (0.0138)	1489.4 (0.0202)	1851.6 (0.0226)	887.6 (0.0116)	176.5 (0.0066)	192.5 (0.0056)	176.3 (0.005)
Passenger trucks, gasoline	11785.2 (0.2182)	12569.7 (0.1703)	15115.3 (0.1842)	12970.5 (0.17)	9048.4 (0.3392)	10504.6 (0.3043)	9602.7 (0.2708)
Refuse trucks, diesel	262.8 (0.0049)	597.5 (0.0081)	293.2 (0.0036)	277.8 (0.0036)	23.1 (0.0009)	24.8 (0.0007)	27 (0.0008)
Refuse trucks, gasoline	1.2 (0)	1.6 (0)	0.6 (0)	0.6 (0)	0.3 (0)	0.4 (0)	0.4 (0)
School buses, diesel	604.4 (0.0112)	830 (0.0112)	670.6 (0.0082)	773.9 (0.0101)	60.4 (0.0023)	70.5 (0.002)	81.6 (0.0023)
School buses,	10.9 (0.0002)	8.5 (0.0001)	1.8 (0)	2.4 (0)	2.2 (0.0001)	2.7 (0.0001)	3.2 (0.0001)

	1990	1995	2000	2005	2010	2015	2020
gasoline							
Single-unit long-haul trucks, diesel	528.9 (0.0098)	736.7 (0.01)	1476.6 (0.018)	1856.1 (0.0243)	112.1 (0.0042)	133.4 (0.0039)	154.3 (0.0044)
Single-unit long-haul trucks, gasoline	20.5 (0.0004)	15.6 (0.0002)	23 (0.0003)	30.3 (0.0004)	27.3 (0.001)	35.3 (0.001)	41 (0.0012)
Single-unit short-haul trucks, diesel	5346.7 (0.099)	11413.9 (0.1547)	9566.1 (0.1166)	12044.4 (0.1579)	760.3 (0.0285)	910.8 (0.0264)	1052.4 (0.0297)
Single-unit short-haul trucks, gasoline	225 (0.0042)	249.4 (0.0034)	153.1 (0.0019)	201.4 (0.0026)	180.9 (0.0068)	234 (0.0068)	271.7 (0.0077)
Transit buses, CNG	0 (0)	0.5 (0)	0.2 (0)	0.3 (0)	0.3 (0)	0.5 (0)	0.5 (0)
Transit buses, diesel	134.7 (0.0025)	127.9 (0.0017)	142.6 (0.0017)	161.6 (0.0021)	18.3 (0.0007)	21.9 (0.0006)	25.3 (0.0007)
Transit buses, gasoline	0 (0)	0.1 (0)	0.1 (0)	0.1 (0)	0.1 (0)	0.1 (0)	0.1 (0)
<b>PM<sub>10</sub>, Sulfate</b>							
Combination long-haul trucks, diesel	556.4 (0.3083)	1464.5 (0.4196)	2501 (0.4381)	905.5 (0.4217)	84.9 (0.2867)	100.5 (0.2962)	115.1 (0.314)
Combination short-haul trucks, diesel	588.3 (0.3259)	1020.2 (0.2923)	1637.6 (0.2868)	605.6 (0.282)	52.1 (0.1759)	61.4 (0.181)	70.5 (0.1924)
Combination short-haul trucks, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Intercity buses, diesel	29 (0.0161)	36.9 (0.0106)	40.6 (0.0071)	15.6 (0.0073)	3.3 (0.0112)	4.2 (0.0123)	4.8 (0.0131)
Light commercial trucks, diesel	51.6 (0.0286)	124.3 (0.0356)	208.2 (0.0365)	82 (0.0382)	10.5 (0.0353)	10.7 (0.0316)	9.8 (0.0266)
Light commercial trucks, gasoline	29.7 (0.0164)	36 (0.0103)	61 (0.0107)	24.3 (0.0113)	10.2 (0.0345)	9.5 (0.0279)	8.3 (0.0225)
Motor homes, diesel	3.2 (0.0018)	5.5 (0.0016)	10.2 (0.0018)	5.7 (0.0026)	1.4 (0.0048)	1.8 (0.0052)	2.1 (0.0056)
Motor homes, gasoline	0.9 (0.0005)	1 (0.0003)	0.9 (0.0002)	0.4 (0.0002)	0.2 (0.0008)	0.3 (0.0008)	0.3 (0.0009)

	1990	1995	2000	2005	2010	2015	2020
Motorcycles, gasoline	1 (0.0006)	0.7 (0.0002)	2.8 (0.0005)	1.3 (0.0006)	0.5 (0.0018)	0.6 (0.0018)	0.6 (0.0017)
Passenger cars, diesel	0 (0)	0 (0)	0 (0)	7.5 (0.0035)	1.3 (0.0044)	1.4 (0.0041)	1.4 (0.0039)
Passenger cars, gasoline	209.1 (0.1158)	227.8 (0.0653)	269.2 (0.0471)	85.4 (0.0398)	49.5 (0.1673)	61.4 (0.1809)	63 (0.172)
Passenger trucks, diesel	21.3 (0.0118)	46.9 (0.0135)	121.4 (0.0213)	29.8 (0.0139)	7 (0.0235)	7.1 (0.021)	6.5 (0.0176)
Passenger trucks, gasoline	83.1 (0.046)	121.8 (0.0349)	205.6 (0.036)	81.5 (0.0379)	33.5 (0.1132)	30.6 (0.0903)	26.6 (0.0727)
Refuse trucks, diesel	22 (0.0122)	44.1 (0.0126)	31.6 (0.0055)	11.5 (0.0054)	0.8 (0.0028)	0.9 (0.0026)	1 (0.0026)
Refuse trucks, gasoline	0 (0)	0.1 (0)	0.1 (0)	0 (0)	0 (0)	0 (0)	0 (0)
School buses, diesel	21.4 (0.0118)	23.7 (0.0068)	23.1 (0.004)	8.9 (0.0042)	1.9 (0.0064)	2.4 (0.007)	2.8 (0.0075)
School buses, gasoline	0.2 (0.0001)	0.1 (0)	0 (0)	0 (0)	0 (0)	0 (0.0001)	0 (0.0001)
Single-unit long-haul trucks, diesel	13.2 (0.0073)	17.2 (0.0049)	65.9 (0.0115)	30.7 (0.0143)	4.4 (0.0148)	5.3 (0.0156)	6.1 (0.0167)
Single-unit long-haul trucks, gasoline	0.4 (0.0002)	0.4 (0.0001)	1.4 (0.0002)	0.6 (0.0003)	0.3 (0.001)	0.4 (0.0011)	0.4 (0.0012)
Single-unit short-haul trucks, diesel	157.4 (0.0872)	302.6 (0.0867)	508.6 (0.0891)	243.4 (0.1134)	31.4 (0.1061)	37.5 (0.1104)	43.3 (0.1181)
Single-unit short-haul trucks, gasoline	5.5 (0.0031)	7.9 (0.0023)	11 (0.0019)	4.2 (0.002)	2.1 (0.0072)	2.7 (0.0078)	3.1 (0.0084)
Transit buses, diesel	11.2 (0.0062)	8.2 (0.0023)	9.3 (0.0016)	3.6 (0.0017)	0.6 (0.0021)	0.8 (0.0023)	0.9 (0.0024)
Transit buses, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>PM<sub>10</sub>, Tire Wear</b>							
Combination long-haul trucks, diesel	278.2 (0.0404)	1021.2 (0.0807)	2100.5 (0.0923)	2183.3 (0.0951)	1291.8 (0.0702)	1673 (0.0661)	1915.4 (0.0721)
Combination short-haul trucks,	335.7 (0.0488)	705 (0.0557)	1315.1 (0.0578)	1323.8 (0.0577)	784.2 (0.0426)	1023.2 (0.0404)	1175 (0.0442)

	1990	1995	2000	2005	2010	2015	2020
diesel							
Combination short-haul trucks, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Intercity buses, diesel	32.1 (0.0047)	48.6 (0.0038)	69.2 (0.003)	85.4 (0.0037)	76.1 (0.0041)	99.6 (0.0039)	115.2 (0.0043)
Light commercial trucks, diesel	58.5 (0.0085)	147 (0.0116)	312.7 (0.0137)	299.8 (0.0131)	206.9 (0.0112)	244.3 (0.0096)	223.9 (0.0084)
Light commercial trucks, gasoline	459.7 (0.0668)	848.8 (0.0671)	1748.5 (0.0768)	1958.5 (0.0853)	1409.8 (0.0766)	1665.8 (0.0658)	1526.8 (0.0574)
Motor homes, diesel	2.9 (0.0004)	6.3 (0.0005)	15.1 (0.0007)	25.3 (0.0011)	25.9 (0.0014)	33.9 (0.0013)	39.3 (0.0015)
Motor homes, gasoline	16 (0.0023)	22.8 (0.0018)	28.2 (0.0012)	31.1 (0.0014)	25 (0.0014)	32.7 (0.0013)	38 (0.0014)
Motorcycles, gasoline	8.2 (0.0012)	8.6 (0.0007)	33.6 (0.0015)	49.1 (0.0021)	39.4 (0.0021)	53.1 (0.0021)	52.8 (0.002)
Passenger cars, diesel	0 (0)	0 (0)	0 (0)	35.5 (0.0015)	33.5 (0.0018)	51.7 (0.002)	56.4 (0.0021)
Passenger cars, gasoline	4011.9 (0.5832)	6456.1 (0.51)	10234.2 (0.4496)	9143.3 (0.3983)	8655.9 (0.4706)	13364.8 (0.5279)	14579.8 (0.5485)
Passenger trucks, diesel	23.2 (0.0034)	52.4 (0.0041)	165.7 (0.0073)	105.3 (0.0046)	134 (0.0073)	158.2 (0.0062)	145 (0.0055)
Passenger trucks, gasoline	1348.9 (0.1961)	2768.7 (0.2187)	5703.7 (0.2506)	6369.4 (0.2775)	4519.2 (0.2457)	5339.9 (0.2109)	4894.2 (0.1841)
Refuse trucks, diesel	17 (0.0025)	38.8 (0.0031)	30.9 (0.0014)	34.1 (0.0015)	18.3 (0.001)	21.8 (0.0009)	23.7 (0.0009)
Refuse trucks, gasoline	0.4 (0.0001)	0.8 (0.0001)	0.7 (0)	0.7 (0)	0.4 (0)	0.4 (0)	0.5 (0)
School buses, diesel	35 (0.0051)	46.6 (0.0037)	58.8 (0.0026)	72.5 (0.0032)	64.6 (0.0035)	84.6 (0.0033)	97.9 (0.0037)
School buses, gasoline	2.8 (0.0004)	3.5 (0.0003)	1.5 (0.0001)	1.8 (0.0001)	1.6 (0.0001)	2.1 (0.0001)	2.4 (0.0001)
Single-unit long-haul trucks, diesel	13.9 (0.002)	20 (0.0016)	87.4 (0.0038)	119 (0.0052)	106.7 (0.0058)	141 (0.0056)	162.9 (0.0061)
Single-unit long-haul trucks, gasoline	7 (0.001)	8.8 (0.0007)	33.8 (0.0015)	40.2 (0.0018)	36.2 (0.002)	47.9 (0.0019)	55.3 (0.0021)

	1990	1995	2000	2005	2010	2015	2020
Single-unit short-haul trucks, diesel	146.2 (0.0213)	311.1 (0.0246)	585.4 (0.0257)	795.4 (0.0347)	712.4 (0.0387)	943.6 (0.0373)	1089.2 (0.041)
Single-unit short-haul trucks, gasoline	73.5 (0.0107)	137.3 (0.0108)	226.5 (0.01)	268.6 (0.0117)	241.7 (0.0131)	320.6 (0.0127)	370 (0.0139)
Transit buses, CNG	0 (0)	0.3 (0)	0.2 (0)	0.4 (0)	0.6 (0)	0.8 (0)	0.9 (0)
Transit buses, diesel	7.8 (0.0011)	6.7 (0.0005)	9.4 (0.0004)	11.4 (0.0005)	10.1 (0.0006)	13.3 (0.0005)	15.4 (0.0006)
Transit buses, gasoline	0 (0)	0.1 (0)	0.1 (0)	0.1 (0)	0.1 (0)	0.1 (0)	0.1 (0)
<b>PM<sub>2.5</sub></b>							
Combination long-haul trucks, diesel	21365.6 (0.1911)	89413.7 (0.3807)	101190 (0.4164)	98063.1 (0.4286)	2652.3 (0.0896)	3117 (0.0812)	3555.2 (0.0899)
Combination short-haul trucks, diesel	26254.9 (0.2349)	59620.5 (0.2539)	57090.8 (0.2349)	53865.8 (0.2354)	1339.8 (0.0453)	1565.2 (0.0408)	1788.9 (0.0453)
Combination short-haul trucks, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Intercity buses, diesel	1773 (0.0159)	2863.1 (0.0122)	2660.4 (0.0109)	3019 (0.0132)	117 (0.004)	136.7 (0.0036)	158.2 (0.004)
Light commercial trucks, diesel	5398.4 (0.0483)	13195.5 (0.0562)	11646.7 (0.0479)	8606.2 (0.0376)	296 (0.01)	321.7 (0.0084)	294.5 (0.0074)
Light commercial trucks, gasoline	3890.4 (0.0348)	3877.5 (0.0165)	4578 (0.0188)	4110.7 (0.018)	2892 (0.0977)	3333.9 (0.0869)	3041.7 (0.077)
Motor homes, diesel	296.9 (0.0027)	631.1 (0.0027)	627.4 (0.0026)	963.3 (0.0042)	38.1 (0.0013)	44.7 (0.0012)	51.9 (0.0013)
Motor homes, gasoline	48.9 (0.0004)	48.2 (0.0002)	27.3 (0.0001)	32 (0.0001)	25.5 (0.0009)	32.9 (0.0009)	38.4 (0.001)
Motorcycles, gasoline	103 (0.0009)	109.5 (0.0005)	421 (0.0017)	614.9 (0.0027)	492 (0.0166)	663.5 (0.0173)	660.2 (0.0167)
Passenger cars, diesel	0 (0)	0 (0)	0 (0)	41.6 (0.0002)	28.5 (0.001)	43.6 (0.0011)	47.5 (0.0012)
Passenger cars, gasoline	22848.2 (0.2044)	17670.5 (0.0752)	16907.2 (0.0696)	11284.1 (0.0493)	10606.8 (0.3583)	16232.6 (0.4229)	17737.2 (0.4488)
Passenger trucks,	2279 (0.0204)	4460.9 (0.019)	6068.6 (0.025)	3015.1 (0.0132)	195.9 (0.0066)	213.2 (0.0056)	195.2 (0.0049)



	1990	1995	2000	2005	2010	2015	2020
diesel							
Passenger trucks, gasoline	12554.7 (0.1123)	13478.7 (0.0574)	16145.5 (0.0664)	13861.6 (0.0606)	9620.6 (0.325)	11107.5 (0.2894)	10138.5 (0.2565)
Refuse trucks, diesel	1010.8 (0.009)	2590.6 (0.011)	1142.3 (0.0047)	1118.5 (0.0049)	25.3 (0.0009)	27.2 (0.0007)	29.6 (0.0007)
Refuse trucks, gasoline	1.3 (0)	1.8 (0)	0.6 (0)	0.6 (0)	0.3 (0)	0.4 (0)	0.4 (0)
School buses, diesel	1478.3 (0.0132)	2093.7 (0.0089)	1576.4 (0.0065)	1798.6 (0.0079)	66 (0.0022)	77.2 (0.002)	89.3 (0.0023)
School buses, gasoline	13 (0.0001)	10 (0)	2.3 (0)	2.9 (0)	2.5 (0.0001)	3.2 (0.0001)	3.7 (0.0001)
Single-unit long-haul trucks, diesel	1000.7 (0.009)	1369.7 (0.0058)	2826.2 (0.0116)	3506.8 (0.0153)	123.2 (0.0042)	146.8 (0.0038)	169.8 (0.0043)
Single-unit long-haul trucks, gasoline	22.8 (0.0002)	17.1 (0.0001)	26.2 (0.0001)	32.8 (0.0001)	29.2 (0.001)	37.7 (0.001)	43.8 (0.0011)
Single-unit short-haul trucks, diesel	10603.5 (0.0949)	22522.5 (0.0959)	19354.4 (0.0796)	24040.2 (0.1051)	837.5 (0.0283)	1003.1 (0.0261)	1159 (0.0293)
Single-unit short-haul trucks, gasoline	256.6 (0.0023)	277.9 (0.0012)	178.4 (0.0007)	220.6 (0.001)	196.4 (0.0066)	252.9 (0.0066)	293.8 (0.0074)
Transit buses, CNG	0 (0)	0.6 (0)	0.2 (0)	0.4 (0)	0.4 (0)	0.5 (0)	0.6 (0)
Transit buses, diesel	590.2 (0.0053)	605.2 (0.0026)	546.2 (0.0022)	611.4 (0.0027)	20 (0.0007)	24 (0.0006)	27.7 (0.0007)
Transit buses, gasoline	0 (0)	0.1 (0)	0.1 (0)	0.1 (0)	0.1 (0)	0.1 (0)	0.2 (0)
<b>PM<sub>2.5</sub>, Brake Wear</b>							
Combination long-haul trucks, diesel	241.7 (0.0495)	878.9 (0.0951)	1803 (0.1059)	1877.4 (0.1061)	1110.8 (0.0804)	1438.6 (0.0777)	1647 (0.0852)
Combination short-haul trucks, diesel	292.7 (0.0599)	610.1 (0.066)	1136.7 (0.0668)	1150 (0.065)	681.3 (0.0493)	888.9 (0.048)	1020.7 (0.0528)
Combination short-haul trucks, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Intercity buses, diesel	35.7 (0.0073)	54 (0.0058)	76.9 (0.0045)	94.8 (0.0054)	84.5 (0.0061)	110.6 (0.006)	127.9 (0.0066)

	1990	1995	2000	2005	2010	2015	2020
Light commercial trucks, diesel	49.9 (0.0102)	109.7 (0.0119)	239.7 (0.0141)	215.1 (0.0122)	148.4 (0.0108)	175.2 (0.0095)	160.6 (0.0083)
Light commercial trucks, gasoline	408.1 (0.0836)	740.3 (0.0801)	1522.2 (0.0894)	1714.4 (0.0969)	1234.1 (0.0894)	1458.2 (0.0788)	1336.5 (0.0691)
Motor homes, diesel	3.7 (0.0008)	8 (0.0009)	19.3 (0.0011)	32.4 (0.0018)	33 (0.0024)	43.3 (0.0023)	50.2 (0.0026)
Motor homes, gasoline	20.6 (0.0042)	29.3 (0.0032)	36.3 (0.0021)	40 (0.0023)	32.1 (0.0023)	42.1 (0.0023)	48.9 (0.0025)
Motorcycles, gasoline	0.8 (0.0002)	0.8 (0.0001)	3.2 (0.0002)	4.6 (0.0003)	3.7 (0.0003)	5 (0.0003)	5 (0.0003)
Passenger cars, diesel	0 (0)	0 (0)	0 (0)	19.7 (0.0011)	18.6 (0.0013)	28.7 (0.0016)	31.3 (0.0016)
Passenger cars, gasoline	2229.1 (0.4566)	3587.1 (0.388)	5686.2 (0.3339)	5080.1 (0.2871)	4809.4 (0.3483)	7425.7 (0.4011)	8100.7 (0.419)
Passenger trucks, diesel	15.5 (0.0032)	35.8 (0.0039)	115.7 (0.0068)	71.1 (0.004)	90.4 (0.0065)	106.8 (0.0058)	97.9 (0.0051)
Passenger trucks, gasoline	1200.7 (0.2459)	2458 (0.2659)	5045.8 (0.2963)	5654.5 (0.3195)	4012 (0.2906)	4740.6 (0.2561)	4344.9 (0.2247)
Refuse trucks, diesel	18 (0.0037)	41.3 (0.0045)	32.9 (0.0019)	35.8 (0.002)	19.2 (0.0014)	22.9 (0.0012)	24.9 (0.0013)
Refuse trucks, gasoline	0.4 (0.0001)	1 (0.0001)	0.8 (0)	0.8 (0)	0.4 (0)	0.5 (0)	0.5 (0)
School buses, diesel	34.3 (0.007)	45.6 (0.0049)	57.6 (0.0034)	71 (0.004)	63.2 (0.0046)	82.8 (0.0045)	95.8 (0.005)
School buses, gasoline	3 (0.0006)	3.7 (0.0004)	1.6 (0.0001)	1.9 (0.0001)	1.7 (0.0001)	2.3 (0.0001)	2.6 (0.0001)
Single-unit long-haul trucks, diesel	18.1 (0.0037)	26.1 (0.0028)	114.4 (0.0067)	155.1 (0.0088)	139.1 (0.0101)	183.7 (0.0099)	212.2 (0.011)
Single-unit long-haul trucks, gasoline	9.6 (0.002)	12.1 (0.0013)	46.2 (0.0027)	55 (0.0031)	49.5 (0.0036)	65.5 (0.0035)	75.7 (0.0039)
Single-unit short-haul trucks, diesel	191.4 (0.0392)	407.9 (0.0441)	771.1 (0.0453)	1042.8 (0.0589)	934 (0.0676)	1237.2 (0.0668)	1428 (0.0739)
Single-unit short-haul trucks, gasoline	101.8 (0.0209)	189.2 (0.0205)	311.2 (0.0183)	369.2 (0.0209)	332.2 (0.0241)	440.6 (0.0238)	508.6 (0.0263)

	<b>1990</b>	<b>1995</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>
Transit buses, CNG	0 (0)	0.3 (0)	0.2 (0)	0.4 (0)	0.6 (0)	0.8 (0)	0.9 (0)
Transit buses, diesel	6.9 (0.0014)	5.9 (0.0006)	8.3 (0.0005)	10 (0.0006)	8.9 (0.0006)	11.7 (0.0006)	13.6 (0.0007)
Transit buses, gasoline	0 (0)	0.1 (0)	0.1 (0)	0.1 (0)	0.1 (0)	0.1 (0)	0.1 (0)
<b>PM<sub>2.5</sub>, BC</b>							
Combination long-haul trucks, diesel	16556.2 (0.2788)	75225.3 (0.466)	79633.4 (0.4991)	77983.2 (0.5062)	221.3 (0.0492)	260 (0.0435)	296.5 (0.048)
Combination short-haul trucks, diesel	21246.4 (0.3578)	50198.3 (0.3109)	46069.7 (0.2888)	43992.4 (0.2856)	111 (0.0247)	129.6 (0.0217)	148.1 (0.024)
Combination short-haul trucks, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Intercity buses, diesel	1381.9 (0.0233)	2327.5 (0.0144)	2058 (0.0129)	2358.4 (0.0153)	9.8 (0.0022)	11.4 (0.0019)	13.2 (0.0021)
Light commercial trucks, diesel	3698.7 (0.0623)	8758.8 (0.0543)	8032.5 (0.0503)	6034.3 (0.0392)	27.1 (0.006)	29.6 (0.005)	27 (0.0044)
Light commercial trucks, gasoline	521.1 (0.0088)	539.1 (0.0033)	608.4 (0.0038)	565.5 (0.0037)	391.1 (0.0869)	436.5 (0.073)	394.4 (0.0638)
Motor homes, diesel	146.5 (0.0025)	307.3 (0.0019)	309.5 (0.0019)	480 (0.0031)	3.2 (0.0007)	3.7 (0.0006)	4.3 (0.0007)
Motor homes, gasoline	5.8 (0.0001)	5.4 (0)	3.4 (0)	3.7 (0)	2.9 (0.0006)	3.7 (0.0006)	4.3 (0.0007)
Motorcycles, gasoline	18.6 (0.0003)	20.2 (0.0001)	76.6 (0.0005)	112.8 (0.0007)	90.1 (0.02)	121.6 (0.0203)	121 (0.0196)
Passenger cars, diesel	0 (0)	0 (0)	0 (0)	7.2 (0)	5.7 (0.0013)	8.8 (0.0015)	9.6 (0.0015)
Passenger cars, gasoline	4807.4 (0.0809)	3748.8 (0.0232)	3495.2 (0.0219)	2384.9 (0.0155)	2240.6 (0.4979)	3399.6 (0.5687)	3703.2 (0.5991)
Passenger trucks, diesel	1535.6 (0.0259)	2970.4 (0.0184)	4154.2 (0.026)	2125.1 (0.0138)	17.9 (0.004)	19.6 (0.0033)	17.9 (0.0029)
Passenger trucks, gasoline	1626.2 (0.0274)	1792.1 (0.0111)	2037.7 (0.0128)	1843.1 (0.012)	1257.8 (0.2795)	1406.6 (0.2353)	1271.7 (0.2057)
Refuse trucks, diesel	734.4 (0.0124)	1968 (0.0122)	827.1 (0.0052)	837.8 (0.0054)	2.1 (0.0005)	2.3 (0.0004)	2.5 (0.0004)

	1990	1995	2000	2005	2010	2015	2020
Refuse trucks, gasoline	0.1 (0)	0.2 (0)	0.1 (0)	0.1 (0)	0 (0)	0 (0)	0 (0)
School buses, diesel	871.3 (0.0147)	1265.5 (0.0078)	903.4 (0.0057)	1039.2 (0.0067)	5.5 (0.0012)	6.4 (0.0011)	7.5 (0.0012)
School buses, gasoline	2.8 (0)	2.1 (0)	0.5 (0)	0.6 (0)	0.5 (0.0001)	0.7 (0.0001)	0.8 (0.0001)
Single-unit long-haul trucks, diesel	474.8 (0.008)	638.4 (0.004)	1329.6 (0.0083)	1676.4 (0.0109)	10.2 (0.0023)	12.2 (0.002)	14.1 (0.0023)
Single-unit long-haul trucks, gasoline	3.5 (0.0001)	2.3 (0)	3.7 (0)	4.3 (0)	3.8 (0.0009)	4.8 (0.0008)	5.6 (0.0009)
Single-unit short-haul trucks, diesel	5263.5 (0.0886)	11155.6 (0.0691)	9579.3 (0.06)	12119.5 (0.0787)	69.5 (0.0154)	83.2 (0.0139)	96.2 (0.0156)
Single-unit short-haul trucks, gasoline	44.2 (0.0007)	41 (0.0003)	27.4 (0.0002)	31.3 (0.0002)	27.8 (0.0062)	35 (0.0059)	40.8 (0.0066)
Transit buses, CNG	0 (0)	0.1 (0)	0 (0)	0 (0)	0.1 (0)	0.1 (0)	0.1 (0)
Transit buses, diesel	448.7 (0.0076)	473.2 (0.0029)	398.8 (0.0025)	451.1 (0.0029)	1.7 (0.0004)	2 (0.0003)	2.3 (0.0004)
Transit buses, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>PM<sub>2.5</sub>, OC</b>							
Combination long-haul trucks, diesel	4266.9 (0.0842)	12760.7 (0.1822)	19118.4 (0.2453)	19197.1 (0.2641)	2348.6 (0.0946)	2759.5 (0.086)	3147 (0.0954)
Combination short-haul trucks, diesel	4434.9 (0.0875)	8427.6 (0.1203)	9424.6 (0.1209)	9283 (0.1277)	1178.3 (0.0475)	1376 (0.0429)	1572.4 (0.0477)
Combination short-haul trucks, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Intercity buses, diesel	362.8 (0.0072)	499.6 (0.0071)	562.8 (0.0072)	645.3 (0.0089)	104 (0.0042)	121.3 (0.0038)	140.3 (0.0043)
Light commercial trucks, diesel	1649.4 (0.0326)	4315.5 (0.0616)	3411.2 (0.0438)	2491.9 (0.0343)	258.8 (0.0104)	281.7 (0.0088)	258 (0.0078)
Light commercial trucks, gasoline	3342 (0.066)	3305.1 (0.0472)	3913.4 (0.0502)	3522.9 (0.0485)	2491.5 (0.1004)	2888.7 (0.09)	2639.7 (0.08)

	<b>1990</b>	<b>1995</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>
Motor homes, diesel	147.3 (0.0029)	318.5 (0.0045)	308 (0.004)	477.8 (0.0066)	33.5 (0.0014)	39.2 (0.0012)	45.6 (0.0014)
Motor homes, gasoline	42.3 (0.0008)	41.9 (0.0006)	23.1 (0.0003)	28 (0.0004)	22.4 (0.0009)	29 (0.0009)	33.8 (0.001)
Motorcycles, gasoline	83.4 (0.0016)	88.7 (0.0013)	341.8 (0.0044)	501 (0.0069)	401.4 (0.0162)	541.3 (0.0169)	538.5 (0.0163)
Passenger cars, diesel	0 (0)	0 (0)	0 (0)	27.2 (0.0004)	21.6 (0.0009)	33.5 (0.001)	36.6 (0.0011)
Passenger cars, gasoline	17848.1 (0.3523)	13711.8 (0.1958)	13164 (0.1689)	8820.5 (0.1214)	8320.5 (0.3352)	12776.4 (0.3982)	13975.9 (0.4236)
Passenger trucks, diesel	722.6 (0.0143)	1444.8 (0.0206)	1796.1 (0.023)	861 (0.0118)	171.2 (0.0069)	186.7 (0.0058)	171 (0.0052)
Passenger trucks, gasoline	10851.9 (0.2142)	11574.3 (0.1653)	13918.3 (0.1786)	11943.4 (0.1643)	8331.9 (0.3356)	9672.7 (0.3015)	8842.2 (0.268)
Refuse trucks, diesel	255 (0.005)	579.6 (0.0083)	284.4 (0.0036)	269.5 (0.0037)	22.4 (0.0009)	24.1 (0.0007)	26.2 (0.0008)
Refuse trucks, gasoline	1.1 (0)	1.5 (0)	0.5 (0)	0.5 (0)	0.3 (0)	0.3 (0)	0.4 (0)
School buses, diesel	586.2 (0.0116)	805.1 (0.0115)	650.5 (0.0083)	750.7 (0.0103)	58.6 (0.0024)	68.4 (0.0021)	79.1 (0.0024)
School buses, gasoline	10 (0.0002)	7.8 (0.0001)	1.7 (0)	2.2 (0)	2 (0.0001)	2.5 (0.0001)	2.9 (0.0001)
Single-unit long-haul trucks, diesel	513.1 (0.0101)	714.6 (0.0102)	1432.4 (0.0184)	1800.5 (0.0248)	108.7 (0.0044)	129.4 (0.004)	149.7 (0.0045)
Single-unit long-haul trucks, gasoline	18.9 (0.0004)	14.4 (0.0002)	21.2 (0.0003)	27.9 (0.0004)	25.1 (0.001)	32.5 (0.001)	37.7 (0.0011)
Single-unit short-haul trucks, diesel	5186.5 (0.1024)	11071.8 (0.1581)	9279.4 (0.1191)	11683.4 (0.1608)	737.5 (0.0297)	883.5 (0.0275)	1020.8 (0.0309)
Single-unit short-haul trucks, gasoline	207.2 (0.0041)	229.6 (0.0033)	141 (0.0018)	185.4 (0.0026)	166.6 (0.0067)	215.5 (0.0067)	250.1 (0.0076)
Transit buses, CNG	0 (0)	0.5 (0)	0.2 (0)	0.3 (0)	0.3 (0)	0.5 (0)	0.5 (0)
Transit buses, diesel	130.6 (0.0026)	124 (0.0018)	138.3 (0.0018)	156.8 (0.0022)	17.8 (0.0007)	21.2 (0.0007)	24.6 (0.0007)
Transit buses, gasoline	0 (0)	0.1 (0)	0.1 (0)	0.1 (0)	0.1 (0)	0.1 (0)	0.1 (0)

	1990	1995	2000	2005	2010	2015	2020
<b>PM<sub>2.5</sub>, Sulfate</b>							
Combination long-haul trucks, diesel	542.4 (0.3114)	1427.8 (0.4223)	2438.3 (0.4404)	882.8 (0.4238)	82.4 (0.2915)	97.5 (0.3009)	111.6 (0.3185)
Combination short-haul trucks, diesel	573.5 (0.3292)	994.6 (0.2942)	1596.5 (0.2884)	590.4 (0.2834)	50.6 (0.1789)	59.6 (0.1838)	68.4 (0.1951)
Combination short-haul trucks, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Intercity buses, diesel	28.2 (0.0162)	36 (0.0106)	39.6 (0.0071)	15.3 (0.0073)	3.2 (0.0114)	4 (0.0125)	4.7 (0.0133)
Light commercial trucks, diesel	50.3 (0.0289)	121.2 (0.0358)	202.9 (0.0367)	79.9 (0.0384)	10.2 (0.0359)	10.4 (0.0321)	9.5 (0.027)
Light commercial trucks, gasoline	27.3 (0.0157)	33.2 (0.0098)	56.2 (0.0102)	22.4 (0.0107)	9.4 (0.0333)	8.7 (0.0269)	7.6 (0.0217)
Motor homes, diesel	3.2 (0.0018)	5.3 (0.0016)	10 (0.0018)	5.5 (0.0026)	1.4 (0.0049)	1.7 (0.0053)	2 (0.0057)
Motor homes, gasoline	0.9 (0.0005)	0.9 (0.0003)	0.9 (0.0002)	0.4 (0.0002)	0.2 (0.0007)	0.3 (0.0008)	0.3 (0.0009)
Motorcycles, gasoline	0.9 (0.0005)	0.6 (0.0002)	2.6 (0.0005)	1.2 (0.0006)	0.5 (0.0017)	0.6 (0.0018)	0.6 (0.0016)
Passenger cars, diesel	0 (0)	0 (0)	0 (0)	7.3 (0.0035)	1.3 (0.0045)	1.3 (0.0041)	1.4 (0.0039)
Passenger cars, gasoline	192.7 (0.1106)	209.9 (0.0621)	248 (0.0448)	78.7 (0.0378)	45.6 (0.1615)	56.6 (0.1745)	58.1 (0.1657)
Passenger trucks, diesel	20.7 (0.0119)	45.8 (0.0135)	118.3 (0.0214)	29 (0.0139)	6.8 (0.0239)	6.9 (0.0213)	6.3 (0.0179)
Passenger trucks, gasoline	76.6 (0.044)	112.3 (0.0332)	189.5 (0.0342)	75.1 (0.036)	30.9 (0.1093)	28.2 (0.0871)	24.5 (0.07)
Refuse trucks, diesel	21.4 (0.0123)	43 (0.0127)	30.8 (0.0056)	11.2 (0.0054)	0.8 (0.0029)	0.9 (0.0027)	0.9 (0.0027)
Refuse trucks, gasoline	0 (0)	0.1 (0)	0.1 (0)	0 (0)	0 (0)	0 (0)	0 (0)
School buses, diesel	20.8 (0.012)	23.1 (0.0068)	22.5 (0.0041)	8.7 (0.0042)	1.9 (0.0065)	2.3 (0.0071)	2.7 (0.0076)
School buses, gasoline	0.1 (0.0001)	0.1 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0.0001)

	1990	1995	2000	2005	2010	2015	2020
Single-unit long-haul trucks, diesel	12.9 (0.0074)	16.8 (0.005)	64.2 (0.0116)	29.9 (0.0144)	4.3 (0.015)	5.1 (0.0158)	5.9 (0.0169)
Single-unit long-haul trucks, gasoline	0.4 (0.0002)	0.4 (0.0001)	1.3 (0.0002)	0.5 (0.0002)	0.3 (0.001)	0.3 (0.0011)	0.4 (0.0011)
Single-unit short-haul trucks, diesel	153.5 (0.0881)	295 (0.0873)	495.8 (0.0896)	237.3 (0.1139)	30.5 (0.1078)	36.4 (0.1122)	42 (0.1197)
Single-unit short-haul trucks, gasoline	5.1 (0.0029)	7.3 (0.0022)	10.1 (0.0018)	3.9 (0.0019)	2 (0.007)	2.5 (0.0076)	2.8 (0.0081)
Transit buses, diesel	10.9 (0.0063)	8 (0.0024)	9.1 (0.0016)	3.5 (0.0017)	0.6 (0.0021)	0.7 (0.0023)	0.9 (0.0025)
Transit buses, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>PM<sub>2.5</sub>, Tire Wear</b>							
Combination long-haul trucks, diesel	66.7 (0.0404)	244.9 (0.0807)	503.7 (0.0923)	523.6 (0.0951)	309.8 (0.0702)	401.2 (0.0661)	459.3 (0.0721)
Combination short-haul trucks, diesel	80.5 (0.0488)	169.1 (0.0557)	315.4 (0.0578)	317.5 (0.0577)	188.1 (0.0426)	245.4 (0.0404)	281.8 (0.0442)
Combination short-haul trucks, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Intercity buses, diesel	7.7 (0.0047)	11.7 (0.0038)	16.6 (0.003)	20.5 (0.0037)	18.2 (0.0041)	23.9 (0.0039)	27.6 (0.0043)
Light commercial trucks, diesel	14 (0.0085)	35.2 (0.0116)	75 (0.0137)	71.9 (0.0131)	49.6 (0.0112)	58.6 (0.0096)	53.7 (0.0084)
Light commercial trucks, gasoline	110.2 (0.0668)	203.6 (0.0671)	419.3 (0.0768)	469.7 (0.0853)	338.1 (0.0766)	399.5 (0.0658)	366.1 (0.0574)
Motor homes, diesel	0.7 (0.0004)	1.5 (0.0005)	3.6 (0.0007)	6.1 (0.0011)	6.2 (0.0014)	8.1 (0.0013)	9.4 (0.0015)
Motor homes, gasoline	3.8 (0.0023)	5.5 (0.0018)	6.8 (0.0012)	7.4 (0.0014)	6 (0.0014)	7.8 (0.0013)	9.1 (0.0014)
Motorcycles, gasoline	2 (0.0012)	2.1 (0.0007)	8.1 (0.0015)	11.8 (0.0021)	9.4 (0.0021)	12.7 (0.0021)	12.7 (0.002)
Passenger cars, diesel	0 (0)	0 (0)	0 (0)	8.5 (0.0015)	8 (0.0018)	12.4 (0.002)	13.5 (0.0021)

	1990	1995	2000	2005	2010	2015	2020
Passenger cars, gasoline	962.1 (0.5832)	1548.2 (0.51)	2454.2 (0.4496)	2192.6 (0.3983)	2075.8 (0.4706)	3205 (0.5279)	3496.4 (0.5485)
Passenger trucks, diesel	5.6 (0.0034)	12.6 (0.0041)	39.7 (0.0073)	25.2 (0.0046)	32.1 (0.0073)	37.9 (0.0062)	34.8 (0.0055)
Passenger trucks, gasoline	323.5 (0.1961)	663.9 (0.2187)	1367.8 (0.2506)	1527.4 (0.2775)	1083.7 (0.2457)	1280.5 (0.2109)	1173.7 (0.1841)
Refuse trucks, diesel	4.1 (0.0025)	9.3 (0.0031)	7.4 (0.0014)	8.2 (0.0015)	4.4 (0.001)	5.2 (0.0009)	5.7 (0.0009)
Refuse trucks, gasoline	0.1 (0.0001)	0.2 (0.0001)	0.2 (0)	0.2 (0)	0.1 (0)	0.1 (0)	0.1 (0)
School buses, diesel	8.4 (0.0051)	11.2 (0.0037)	14.1 (0.0026)	17.4 (0.0032)	15.5 (0.0035)	20.3 (0.0033)	23.5 (0.0037)
School buses, gasoline	0.7 (0.0004)	0.8 (0.0003)	0.4 (0.0001)	0.4 (0.0001)	0.4 (0.0001)	0.5 (0.0001)	0.6 (0.0001)
Single-unit long-haul trucks, diesel	3.3 (0.002)	4.8 (0.0016)	21 (0.0038)	28.5 (0.0052)	25.6 (0.0058)	33.8 (0.0056)	39.1 (0.0061)
Single-unit long-haul trucks, gasoline	1.7 (0.001)	2.1 (0.0007)	8.1 (0.0015)	9.6 (0.0018)	8.7 (0.002)	11.5 (0.0019)	13.3 (0.0021)
Single-unit short-haul trucks, diesel	35.1 (0.0213)	74.6 (0.0246)	140.4 (0.0257)	190.7 (0.0347)	170.8 (0.0387)	226.3 (0.0373)	261.2 (0.041)
Single-unit short-haul trucks, gasoline	17.6 (0.0107)	32.9 (0.0108)	54.3 (0.01)	64.4 (0.0117)	58 (0.0131)	76.9 (0.0127)	88.7 (0.0139)
Transit buses, CNG	0 (0)	0.1 (0)	0 (0)	0.1 (0)	0.1 (0)	0.2 (0)	0.2 (0)
Transit buses, diesel	1.9 (0.0011)	1.6 (0.0005)	2.3 (0.0004)	2.7 (0.0005)	2.4 (0.0006)	3.2 (0.0005)	3.7 (0.0006)
Transit buses, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>SO<sub>2</sub></b>							
Combination long-haul trucks, diesel	7754.7 (0.102)	20411.7 (0.1861)	34857.6 (0.2117)	12620.4 (0.2089)	1177.7 (0.062)	1394.1 (0.0665)	1596 (0.0764)
Combination short-haul trucks, diesel	8198.9 (0.1078)	14218.7 (0.1296)	22823.5 (0.1386)	8439.7 (0.1397)	722.7 (0.0381)	851.7 (0.0406)	977.9 (0.0468)
Combination	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)



	1990	1995	2000	2005	2010	2015	2020
short-haul trucks, gasoline							
Intercity buses, diesel	403.8 (0.0053)	514.2 (0.0047)	565.8 (0.0034)	218.1 (0.0036)	46.2 (0.0024)	57.7 (0.0028)	66.8 (0.0032)
Light commercial trucks, diesel	718.8 (0.0095)	1732 (0.0158)	2901.1 (0.0176)	1142.8 (0.0189)	145.1 (0.0076)	148.9 (0.0071)	135.3 (0.0065)
Light commercial trucks, gasoline	4985.9 (0.0656)	6059.8 (0.0552)	10257.4 (0.0623)	4085.3 (0.0676)	1715.4 (0.0903)	1589.6 (0.0758)	1387.5 (0.0664)
Motor homes, diesel	45.1 (0.0006)	76.4 (0.0007)	142.6 (0.0009)	78.8 (0.0013)	19.7 (0.001)	24.6 (0.0012)	28.5 (0.0014)
Motor homes, gasoline	159 (0.0021)	160.1 (0.0015)	155.8 (0.0009)	66.8 (0.0011)	38 (0.002)	48.4 (0.0023)	56.1 (0.0027)
Motorcycles, gasoline	172.6 (0.0023)	110.4 (0.001)	469.5 (0.0029)	214.3 (0.0035)	88.5 (0.0047)	106.3 (0.0051)	105.7 (0.0051)
Passenger cars, diesel	0 (0)	0 (0)	0 (0)	104 (0.0017)	18.3 (0.001)	19.1 (0.0009)	19.6 (0.0009)
Passenger cars, gasoline	35154.3 (0.4623)	38292.1 (0.3491)	45256 (0.2748)	14357.2 (0.2376)	8329.7 (0.4386)	10320.2 (0.4921)	10599.3 (0.5076)
Passenger trucks, diesel	296.6 (0.0039)	654.3 (0.006)	1691.7 (0.0103)	414.8 (0.0069)	96.7 (0.0051)	98.7 (0.0047)	89.6 (0.0043)
Passenger trucks, gasoline	13970.5 (0.1837)	20483 (0.1868)	34575.4 (0.2099)	13700.8 (0.2268)	5636.7 (0.2968)	5150.3 (0.2456)	4478.2 (0.2144)
Refuse trucks, diesel	306 (0.004)	614.4 (0.0056)	440 (0.0027)	160.7 (0.0027)	11.6 (0.0006)	12.3 (0.0006)	13.4 (0.0006)
Refuse trucks, gasoline	8.4 (0.0001)	13.9 (0.0001)	9.7 (0.0001)	3.1 (0.0001)	0.9 (0)	1 (0)	1.1 (0.0001)
School buses, diesel	297.9 (0.0039)	329.7 (0.003)	321.6 (0.002)	124.6 (0.0021)	26.5 (0.0014)	33 (0.0016)	38.2 (0.0018)
School buses, gasoline	25.8 (0.0003)	24.4 (0.0002)	8.1 (0)	3.6 (0.0001)	2.3 (0.0001)	2.9 (0.0001)	3.4 (0.0002)
Single-unit long-haul trucks, diesel	184.2 (0.0024)	239.8 (0.0022)	918.2 (0.0056)	427.9 (0.0071)	60.8 (0.0032)	73.3 (0.0035)	84.7 (0.0041)
Single-unit long-haul trucks, gasoline	74 (0.001)	75.6 (0.0007)	238.6 (0.0014)	95 (0.0016)	50.1 (0.0026)	62.8 (0.003)	72.6 (0.0035)
Single-unit short-haul trucks,	2193.9 (0.0289)	4218.1 (0.0385)	7088.1 (0.043)	3392.7 (0.0562)	435.6 (0.0229)	519.8 (0.0248)	600.1 (0.0287)

	1990	1995	2000	2005	2010	2015	2020
diesel							
Single-unit short-haul trucks, gasoline	932.6 (0.0123)	1336.4 (0.0122)	1841.6 (0.0112)	714 (0.0118)	358.9 (0.0189)	447.2 (0.0213)	516.3 (0.0247)
Transit buses, diesel	155.8 (0.002)	114 (0.001)	129.9 (0.0008)	50.5 (0.0008)	8.7 (0.0005)	10.7 (0.0005)	12.4 (0.0006)
Transit buses, gasoline	0 (0)	0.8 (0)	0.8 (0)	0.3 (0)	0.2 (0)	0.2 (0)	0.3 (0)
<b>VOC</b>							
Combination long-haul trucks, diesel	36858.5 (0.0256)	103675.7 (0.0372)	184465.4 (0.0732)	171829.1 (0.1674)	29429.1 (0.0707)	37959.5 (0.0682)	43444.2 (0.0766)
Combination short-haul trucks, diesel	19934.5 (0.0139)	43553.9 (0.0156)	61375.2 (0.0243)	50109 (0.0488)	4575.3 (0.011)	5863 (0.0105)	6719.5 (0.0118)
Combination short-haul trucks, gasoline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Intercity buses, diesel	1475.3 (0.001)	2296.1 (0.0008)	2843.2 (0.0011)	3020.9 (0.0029)	358.3 (0.0009)	460.4 (0.0008)	532.8 (0.0009)
Light commercial trucks, diesel	7272.1 (0.0051)	19962.5 (0.0072)	32575.1 (0.0129)	22462.9 (0.0219)	2255.5 (0.0054)	2597.4 (0.0047)	2343.6 (0.0041)
Light commercial trucks, gasoline	149555.5 (0.1041)	374531.6 (0.1342)	343876.9 (0.1364)	103777.3 (0.1011)	43858.2 (0.1054)	50641.5 (0.091)	45601 (0.0804)
Motor homes, diesel	392 (0.0003)	891.1 (0.0003)	1874.7 (0.0007)	2209 (0.0022)	216.2 (0.0005)	276.4 (0.0005)	321.1 (0.0006)
Motor homes, gasoline	4578 (0.0032)	6504.3 (0.0023)	4765 (0.0019)	4610.8 (0.0045)	3205.3 (0.0077)	4194.7 (0.0075)	4879.2 (0.0086)
Motorcycles, gasoline	5886.4 (0.0041)	6341.5 (0.0023)	24894.5 (0.0099)	25397.2 (0.0247)	13514.7 (0.0325)	18554.4 (0.0334)	18475.6 (0.0326)
Passenger cars, diesel	0 (0)	0 (0)	0 (0)	983.1 (0.001)	435.2 (0.001)	653.7 (0.0012)	699.6 (0.0012)
Passenger cars, gasoline	709755.4 (0.4939)	914960.6 (0.3279)	654716.8 (0.2597)	250459.8 (0.244)	163131.2 (0.3919)	251969.4 (0.4529)	269692 (0.4756)
Passenger trucks, diesel	2865 (0.002)	6678.4 (0.0024)	15874.5 (0.0063)	7812.7 (0.0076)	1459.8 (0.0035)	1679.8 (0.003)	1515.8 (0.0027)
Passenger trucks, gasoline	451203.4 (0.314)	1226798.7 (0.4396)	1092687.6 (0.4334)	290884.4 (0.2834)	124975.4 (0.3002)	143539.8 (0.258)	128979.6 (0.2274)
Refuse	894.4	2270.3	1405.6	1126.4	84.7	99.5	108.3

	1990	1995	2000	2005	2010	2015	2020
trucks, diesel	(0.0006)	(0.0008)	(0.0006)	(0.0011)	(0.0002)	(0.0002)	(0.0002)
Refuse trucks, gasoline	159.4 (0.0001)	351.1 (0.0001)	126.4 (0.0001)	120.1 (0.0001)	61.4 (0.0001)	73.1 (0.0001)	79.7 (0.0001)
School buses, diesel	2054.8 (0.0014)	2850.7 (0.001)	3167.4 (0.0013)	3214.9 (0.0031)	444.2 (0.0011)	573.7 (0.001)	667.5 (0.0012)
School buses, gasoline	1275.8 (0.0009)	1522.3 (0.0005)	518 (0.0002)	426 (0.0004)	233.3 (0.0006)	307.4 (0.0006)	357 (0.0006)
Single-unit long-haul trucks, diesel	1345.4 (0.0009)	2042.6 (0.0007)	7207.3 (0.0029)	7179.3 (0.007)	644.5 (0.0015)	831.4 (0.0015)	963.2 (0.0017)
Single-unit long-haul trucks, gasoline	2159.9 (0.0015)	2380.7 (0.0009)	4970.1 (0.002)	4374.2 (0.0043)	3131.6 (0.0075)	4122.3 (0.0074)	4780.2 (0.0084)
Single-unit short-haul trucks, diesel	13899.9 (0.0097)	32333.7 (0.0116)	47239.3 (0.0187)	47003.4 (0.0458)	4432.2 (0.0106)	5740.5 (0.0103)	6649.1 (0.0117)
Single-unit short-haul trucks, gasoline	24591.8 (0.0171)	40101.1 (0.0144)	35580.9 (0.0141)	28577.1 (0.0278)	19719 (0.0474)	26029.8 (0.0468)	30161.3 (0.0532)
Transit buses, CNG	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Transit buses, diesel	829.1 (0.0006)	647.1 (0.0002)	742.2 (0.0003)	692.8 (0.0007)	81 (0.0002)	104.7 (0.0002)	121.2 (0.0002)
Transit buses, gasoline	0 (0)	25.8 (0)	18.7 (0)	20.2 (0)	15.5 (0)	20.3 (0)	23.5 (0)

<sup>a</sup> The numbers outside and inside the parentheses are the lifetime emissions in metric tonnes and the shares, respectively.

**Table A26 Probability distribution functions of air pollutant emission factors for passenger cars**

MY	Vehicle	Pollutant	PDF type	PDF parameters		
1990	Gasoline passenger cars	CO	Normal (sigma, mu)	4.1841	14.93	
		NO <sub>x</sub>	Weibull (alpha, gamma, beta)	6.1147	2.4319	
		CH <sub>4</sub>	Gamma (alpha, gamma, beta)	50.334	0.0014	0
		N <sub>2</sub> O	Lognormal (sigma, mu)	0.06344	-3.0481	
		SO <sub>2</sub>	Normal	0.02543	0.05054	
		VOC, exhaust	Logistic (sigma, mu)	0.15245	1.0852	
		VOC, evaporative	Lognormal	0.43376	-0.73084	
		PM <sub>10</sub> , exhaust	Lognormal	0.47341	-3.4163	
		PM <sub>10</sub> , OC	Lognormal	0.47899	-3.6651	
		PM <sub>10</sub> , BC	Lognormal	0.49874	-4.9859	

MY	Vehicle	Pollutant	PDF type	PDF parameters		
		PM <sub>10</sub> , Sulfate	Normal	1.5124E-4	3.0059E-4	
		PM <sub>2.5</sub> , exhaust	Lognormal	0.4734	-3.4988	
		PM <sub>2.5</sub> , OC	Lognormal	0.479	-3.7476	
		PM <sub>2.5</sub> , BC	Lognormal	0.49872	-5.0684	
		PM <sub>2.5</sub> , Sulfate	Normal	1.3935E-4	2.7696E-4	
1995	Gasoline passenger cars	CO	Lognormal	0.30986	2.3397	
		NO <sub>x</sub>	Normal	0.37946	1.8795	
		CH <sub>4</sub>	Lognormal	0.15071	-3.3633	
		N <sub>2</sub> O	Lognormal	0.08826	-3.4855	
		SO <sub>2</sub>	Lognormal	0.86683	-3.6767	
		VOC, exhaust	Gamma	12.065	0.07191	0
		VOC, evaporative	Lognormal	0.42612	-0.97317	
		PM <sub>10</sub> , exhaust	Lognormal	0.42868	-4.1409	
		PM <sub>10</sub> , OC	Lognormal	0.4337	-4.3965	
		PM <sub>10</sub> , BC	Lognormal	0.45719	-5.7045	
		PM <sub>10</sub> , Sulfate	Lognormal	0.86683	-8.8014	
		PM <sub>2.5</sub> , exhaust	Lognormal	0.42867	-4.2234	
		PM <sub>2.5</sub> , OC	Lognormal	0.4337	-4.479	
		PM <sub>2.5</sub> , BC	Lognormal	0.45719	-5.787	
		PM <sub>2.5</sub> , Sulfate	Lognormal	0.86682	-8.8833	
2000	Gasoline passenger cars	CO	Gamma	2.1911	1.7216	2.6786
		NO <sub>x</sub>	Weibull	1.3627	0.54611	0.5518
		CH <sub>4</sub>	Gamma	3.2704	0.00152	0.01153
		N <sub>2</sub> O	Gamma	1.3537	0.00307	0.01454
		SO <sub>2</sub>	Gamma	0.80604	0.02925	0.00297
		VOC, exhaust	Gamma	0.92166	0.25388	0.15854
		VOC, evaporative	Weibull	0.46484	0.0186	0.03582
		PM <sub>10</sub> , exhaust	Gamma	1.5836	0.00438	0.00372
		PM <sub>10</sub> , OC	Weibull	1.2526	0.00594	0.00279
		PM <sub>10</sub> , BC	Gamma	1.4772	0.00101	7.0908E-4
		PM <sub>10</sub> , Sulfate	Gamma	0.83739	1.7098E-4	1.7652E-5
		PM <sub>2.5</sub> , exhaust	Gamma	1.5836	0.00403	0.00342
		PM <sub>2.5</sub> , OC	Weibull	1.2526	0.00547	0.00257
		PM <sub>2.5</sub> , BC	Gamma	1.4772	9.3286E-4	6.5292E-4
		PM <sub>2.5</sub> , Sulfate	Gamma	0.83739	1.5753E-4	1.6264E-5
2005	Gasoline passenger cars	CO	Weibull	1.5482	3.1017	1.788
		NO <sub>x</sub>	Weibull	1.3578	0.12873	0.08507
		CH <sub>4</sub>	Gamma	2.3831	0.00156	0.01111
		N <sub>2</sub> O	Weibull	1.4724	0.00164	0.00529
		SO <sub>2</sub>	Gamma	1.3374	0.00465	0.00289
		VOC, exhaust	Weibull	1.0677	0.09896	0.0718
		VOC, evaporative	Weibull	0.51165	0.01741	0.03209
		PM <sub>10</sub> , exhaust	Weibull	1.2314	0.0057	0.00266
		PM <sub>10</sub> , OC	Weibull	1.2406	0.00449	0.00206
		PM <sub>10</sub> , BC	Weibull	1.189	0.00123	5.2825E-4
		PM <sub>10</sub> , Sulfate	Gamma	1.3374	2.7679E-5	1.7205E-5
		PM <sub>2.5</sub> , exhaust	Weibull	1.2314	0.00525	0.00245

MY	Vehicle	Pollutant	PDF type	PDF parameters		
		PM <sub>2.5</sub> , OC	Weibull	1.2406	0.00413	0.0019
		PM <sub>2.5</sub> , BC	Weibull	1.189	0.00114	4.8642E-4
		PM <sub>2.5</sub> , Sulfate	Gamma	1.3374	2.5503E-5	1.5852E-5
	Diesel passenger cars	CO	Gamma	3.1558	0.01213	0.26992
		NO <sub>x</sub>	Weibull	3.4643	2.9568	0
		CH <sub>4</sub>	Weibull	4.0191	6.6051E-4	0
		N <sub>2</sub> O	Lognormal	0.06779	-7.3193	
		SO <sub>2</sub>	Gamma	0.56007	0.02098	0.00172
		VOC, exhaust	Weibull	4.7022	0.1755	0
		PM <sub>10</sub> , exhaust	Weibull	1.1233	0.0033	0.00385
		PM <sub>10</sub> , OC	Weibull	0.9589	0.00219	0.00234
		PM <sub>10</sub> , BC	Lognormal	0.45821	-6.8408	
		PM <sub>10</sub> , Sulfate	Weibull	0.78167	0.00103	0
		PM <sub>2.5</sub> , exhaust	Weibull	1.1227	0.0032	0.00373
		PM <sub>2.5</sub> , OC	Weibull	0.95889	0.00213	0.00227
		PM <sub>2.5</sub> , BC	Lognormal	0.45821	-6.8712	
		PM <sub>2.5</sub> , Sulfate	Weibull	0.78167	9.9996E-4	0
2010	Gasoline passenger cars	CO	Weibull	1.3656	2.3295	0.95416
		NO <sub>x</sub>	Gamma	1.2501	0.06047	0.04781
		CH <sub>4</sub>	Weibull	1.5604	0.00415	0.00747
		N <sub>2</sub> O	Gamma	2.2825	6.5072E-4	0.00526
		SO <sub>2</sub>	Weibull	8.9388	0.00819	-0.00217
		VOC, exhaust	Gamma	0.95227	0.08332	0.03964
		VOC, evaporative	Weibull	0.36852	0.0111	0.03491
		PM <sub>10</sub> , exhaust	Weibull	1.2322	0.00571	0.00263
		PM <sub>10</sub> , OC	Weibull	1.244	0.00449	0.00207
		PM <sub>10</sub> , BC	Weibull	1.1974	0.00123	5.2565E-4
		PM <sub>10</sub> , Sulfate	Weibull	8.9389	4.8692E-5	-1.2916E-5
		PM <sub>2.5</sub> , exhaust	Weibull	1.2322	0.00526	0.00243
		PM <sub>2.5</sub> , OC	Weibull	1.244	0.00413	0.0019
		PM <sub>2.5</sub> , BC	Weibull	1.1974	0.00113	4.8403E-4
		PM <sub>2.5</sub> , Sulfate	Weibull	8.9388	4.4864E-5	-1.1901E-5
	Diesel passenger cars	CO	Normal	1.3943	2.8006	
		NO <sub>x</sub>	Gamma	2.9377	0.06722	0.03637
		CH <sub>4</sub>	Gamma	1.7504	0.04123	0.02124
		N <sub>2</sub> O	Lognormal	0.06713	-7.32	
		SO <sub>2</sub>	Gamma	11.608	2.7016E-4	3.4231E-5
		VOC	Gamma	1.7963	0.0294	0.02237
		PM <sub>10</sub> , exhaust	Weibull	0.93129	0.00228	0.00273
		PM <sub>10</sub> , OC	Weibull	0.95491	0.00185	0.00196
		PM <sub>10</sub> , BC	Weibull	0.84499	5.0197E-4	4.9899E-4
		PM <sub>10</sub> , Sulfate	Gamma	11.608	1.9477E-5	2.4679E-6
		PM <sub>2.5</sub> , exhaust	Weibull	0.93312	0.00221	0.00264
		PM <sub>2.5</sub> , OC	Weibull	0.95491	0.00179	0.0019
		PM <sub>2.5</sub> , BC	Lognormal	0.45973	-7.0453	
		PM <sub>2.5</sub> , Sulfate	Gamma	11.608	1.8897E-5	2.3944E-6
2015	Gasoline passenger cars	CO	Weibull	1.3787	2.3394	0.94694
		NO <sub>x</sub>	Gamma	1.1763	0.06401	0.04778

MY	Vehicle	Pollutant	PDF type	PDF parameters		
		CH <sub>4</sub>	Weibull	1.5883	0.00416	0.0087
		N <sub>2</sub> O	Gamma	2.8899	2.8982E-4	0.00358
		SO <sub>2</sub>	Weibull	7.2588E+8	2.1476E+5	-2.1476E+5
		VOC, exhaust	Gamma	0.98182	0.08077	0.03982
		VOC, evaporative	Weibull	0.37091	0.01088	0.0354
		PM <sub>10</sub> , exhaust	Weibull	1.2394	0.00567	0.00262
		PM <sub>10</sub> , OC	Weibull	1.2495	0.00447	0.00206
		PM <sub>10</sub> , BC	Weibull	1.2081	0.00121	5.2034E-4
		PM <sub>10</sub> , Sulfate	Weibull	13.203	2.7926E-5	0
		PM <sub>2.5</sub> , exhaust	Weibull	1.2394	0.00522	0.00241
		PM <sub>2.5</sub> , OC	Weibull	1.2495	0.00411	0.0019
		PM <sub>2.5</sub> , BC	Weibull	1.2081	0.00112	4.7913E-4
		PM <sub>2.5</sub> , Sulfate	Weibull	13.203	2.5730E-5	0
	Diesel passenger cars	CO	Normal	1.3794	2.8092	
		NO <sub>x</sub>	Gamma	3.09	0.06441	0.03452
		CH <sub>4</sub>	Gamma	1.8284	0.03934	0.02115
		N <sub>2</sub> O	Normal	4.2960E-5	6.6286E-4	
		SO <sub>2</sub>	Weibull	11.89	0.00226	0
		VOC	Gamma	1.8225	0.02838	0.02148
		PM <sub>10</sub> , exhaust	Lognormal	0.42701	-5.3916	0
		PM <sub>10</sub> , OC	Weibull	0.96159	0.00187	0.00196
		PM <sub>10</sub> , BC	Lognormal	0.45776	-7.0099	
		PM <sub>10</sub> , Sulfate	Weibull	11.89	1.6273E-4	0
		PM <sub>2.5</sub> , exhaust	Lognormal	0.42701	-5.4221	
		PM <sub>2.5</sub> , OC	Weibull	0.96099	0.00182	0.0019
		PM <sub>2.5</sub> , BC	Lognormal	0.45776	-7.0404	
		PM <sub>2.5</sub> , Sulfate	Weibull	11.89	1.5789E-4	0
2020	Gasoline passenger cars	CO	Weibull	1.404	2.3408	0.94042
		NO <sub>x</sub>	Gamma	1.2009	0.06234	0.04772
		CH <sub>4</sub>	Weibull	1.5805	0.00397	0.00871
		N <sub>2</sub> O	Gamma	3.1159	2.4583E-4	0.00358
		SO <sub>2</sub>	Weibull	13.215	0.00442	0
		VOC, exhaust	Weibull	1.0347	0.07566	0.03946
		VOC, evaporative	Weibull	0.41316	0.01239	0.03477
		PM <sub>10</sub> , exhaust	Weibull	1.2447	0.00568	0.00262
		PM <sub>10</sub> , OC	Weibull	1.2543	0.00449	0.00206
		PM <sub>10</sub> , BC	Weibull	1.2156	0.00121	5.2068E-4
		PM <sub>10</sub> , Sulfate	Weibull	13.215	2.6289E-5	0
		PM <sub>2.5</sub> , exhaust	Weibull	1.2447	0.00523	0.00241
		PM <sub>2.5</sub> , OC	Weibull	1.2543	0.00413	0.0019
		PM <sub>2.5</sub> , BC	Weibull	1.2156	0.00111	4.7945E-4
		PM <sub>2.5</sub> , Sulfate	Weibull	13.215	2.4222E-5	0
	Diesel passenger cars	CO	Normal	1.3581	2.8051	
		NO <sub>x</sub>	Gamma	3.2385	0.06132	0.03243
		CH <sub>4</sub>	Gamma	1.9033	0.03716	0.02086
		N <sub>2</sub> O	Logistic	2.2665E-5	6.5985E-4	
		SO <sub>2</sub>	Weibull	11.89	0.00213	0
		VOC	Gamma	1.889	0.02683	0.02114

MY	Vehicle	Pollutant	PDF type	PDF parameters		
		PM <sub>10</sub> , exhaust	Gamma	0.89011	0.00253	0.00266
		PM <sub>10</sub> , OC	Weibull	0.88507	0.00161	0.00196
		PM <sub>10</sub> , BC	Lognormal	0.45515	-7.0091	
		PM <sub>10</sub> , Sulfate	Weibull	11.89	1.5321E-4	0
		PM <sub>2.5</sub> , exhaust	Gamma	0.89011	0.00245	0.00258
		PM <sub>2.5</sub> , OC	Weibull	0.88507	0.00156	0.0019
		PM <sub>2.5</sub> , BC	Lognormal	0.45515	-7.0395	
		PM <sub>2.5</sub> , Sulfate	Weibull	11.89	1.4865E-4	0

