

C2 Clean Diesel



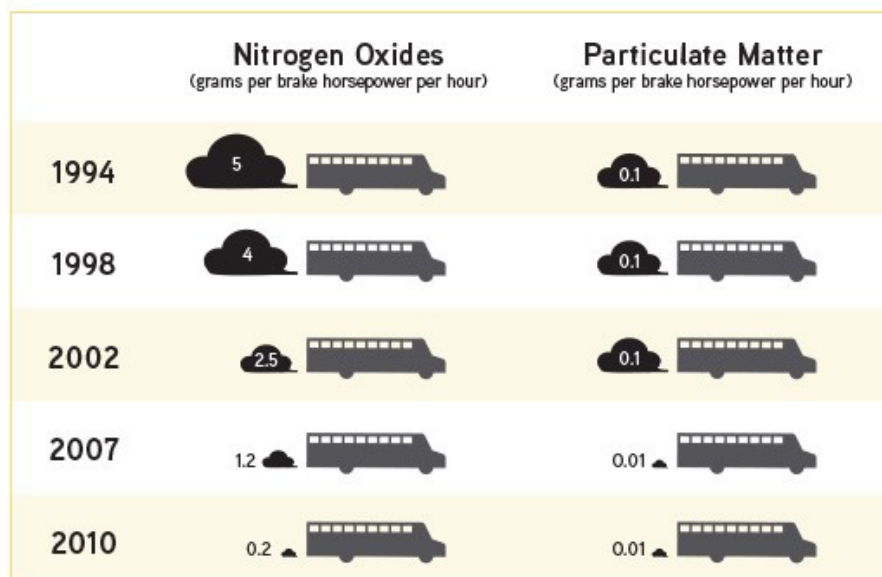
Clean Diesel = Clean Technology

When you think of diesel fuel, you may think of a black sooty cloud coming out of the tailpipe. Ultra-low sulfur diesel, SCR and EGR technologies have cleaned up diesel considerably, but the truth is that most people don't realize how clean diesel now is.

Today, clean-diesel emissions are 90 percent cleaner at the tailpipe than they were 10 years ago and just as clean, if not cleaner, than other fuel types. And, when considering CO₂, a greenhouse gas, diesel offers the lowest carbon footprint over the operational lifetime of the bus. That's less than CNG and propane.

To put that in perspective, it would take more than 65 Saf-T-Liner® C2 buses (manufactured in 2010 or later) to produce the same amount of emissions as one school bus from the 1980s.

EPA Emissions Standards: 1994 - 2010



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Today's clean-diesel engines, like the Cummins ISB 6.7L and the anticipated Detroit™ DD5™, provide low emissions and best-in-class fuel efficiency, power, proven performance and reliability, as well as the lowest total cost of ownership.

Consider the popular Saf-T-Liner C2, for example. As you can see in the chart below, across the board Thomas Built's diesel engine (the Cummins ISB 6.7L) is certified well below the EPA rating requirements for particulates, NOx and CO grams per brake horsepower.

	Particulate Matter (grams per brake horsepower per hour)	Nitrogen Oxides (grams per brake horsepower per hour)	Carbon Monoxide (grams per brake horsepower per hour)	Nonmethane Hydrocarbon (grams per brake horsepower per hour)
Federal Emissions Standards	0.01	0.20	15.5	0.14
Model Year 2017 Engines	Certified Levels			
Cummins ISB Diesel	0.002	0.14	0.02	0.03
Cummins L9 Diesel	0.001	0.16	0.2	0.02
Detroit™ DD5™ (Available 2018)	0.001	0.09	0.1	0.014
ISB- Nat Gas	0.000	0.08	3	0.01
ISL-Nat Gas	0.002	0.13	9.4	0.06
ISL-Nat Gas Near Zero	0.002	0.01	1.5	0.01
Roush V10 Propane	0.000	0.01	1.2	0.02
Pilthon™ 8.0L V8 Propane	0.003	0.16	5.6	0.090
Ford V10 Gasoline	0.002	0.08	12.9	0.080

*Results are based on Federal Test Procedure (FTP) cycle.

Why We Care

Why does all of this matter? We at Thomas Built Buses are dedicated to investing in technologies and innovations that make school buses safer, more reliable, durable, more efficient and easier to maintain. To that end, we strive to make our buses safe for the children and drivers who ride in them every day, and for the environment. With more than 480,000 buses on the road every day, the impact of emissions can be great, and it is our duty to make our school buses the cleanest and safest they can be. That's why we not only meet EPA and GHG standards, but exceed them. Here's why emissions matter to us:

- Particulate Matter (PM)** – Particulate matter includes tiny solid and liquid particles that are suspended in the air that we breathe. Many of these particles can be hazardous to your health and can cause serious health issues including breathing problems, lung tissue damage and even cancer. Across the board, all of our buses have a near-zero PM rating.
 - Nitrogen Oxide (NOx)** – Nitrogen oxide is most commonly known for causing acid rain. But what you may not realize is that when it reacts with ammonia, moisture and other compounds in the air, nitrogen oxide creates microscopic particles that can cause emphysema, bronchitis and aggravate heart disease. While the Cummins ISB 6.7L engine has a PM level well below the EPA standard, the new Detroit DD5 engine will cut NOx emissions in half.
 - Carbon Monoxide (CO)** – Carbon monoxide is a greenhouse gas. While not dangerous in small amounts, high levels can be absorbed into your red blood cells in the place of oxygen, which can be lethal. While the standard is 15.5 grams per brake horsepower per hour, our Cummins ISB 6.7L engine has a 0.02 rating and the Detroit DD5 engine's CO rating is 0.1 (less than 1% of the limit).
 - Nonmethane Hydrocarbons (NMHC)** – Nonmethane hydrocarbons cause ground level O₃ (OZONE) and smog. With a new and improved after treatment system, the Detroit DD5 engine will run at about 10% of the actual limit.