



# **Fleet Average NO<sub>x</sub> Emission Performance of 2015 Model Year Light-Duty Vehicles, Light-Duty Trucks and Medium-Duty Passenger Vehicles**

In relation to the  
*On-Road Vehicle and Engine Emission Regulations*  
under the  
*Canadian Environmental Protection Act, 1999*

Transportation Division  
Environment and Climate Change Canada

October 17, 2017

## Disclaimer

This document provides a summary of data collected pursuant to the *On-Road Vehicle and Engine Emission Regulations* under the *Canadian Environmental Protection Act, 1999*. Information presented in this report is subject to on-going verifications and update.

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## 1 Executive Summary

Under the *On-Road Vehicle and Engine Emission Regulations* (hereafter referred to as the “Regulations”), each new light-duty vehicle, light-duty truck and medium-duty passenger vehicle is required to be certified by its manufacturer to one of the bins corresponding to those of the United States Environmental Protection Agency for which there are specific emission standards for oxides of nitrogen (NO<sub>x</sub>) and other pollutants. Manufacturers and importers of these vehicles are required to report on their fleet average NO<sub>x</sub> emission performance for each model year.

This twelfth annual performance report summarizes the fleet average NO<sub>x</sub> emission performance of the Canadian 2015 model year fleet of vehicles. A total of 21 companies submitted end of model year reports comprising a total of 1,837,959<sup>1</sup> vehicles manufactured in Canada or imported into Canada for the purpose of first retail sale. This report includes the fleet average NO<sub>x</sub> value for each company as well as their number of emission credits or deficits. It also provides a comparison of the distribution of vehicles certified to the various emissions bins and compares the overall NO<sub>x</sub> performance with that of previous model years.

The average NO<sub>x</sub> value for the Canadian 2015 model year combined fleet of light-duty vehicles, light light-duty trucks, heavy light-duty trucks and medium-duty passenger vehicles is 0.05876512<sup>2</sup> grams/mile compared to the standard of 0.07 grams/mile. Each company had a fleet average NO<sub>x</sub> value that was at or below the standard and complied with the fleet averaging provisions of the Regulations based on their reports.

The average NO<sub>x</sub> value continued to decrease for the 2015 model year. This result is consistent with the environmental performance objectives of the Regulations.

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<sup>1</sup> The total number of vehicles does not include early-certified Tier 3 vehicles

<sup>2</sup> The average NO<sub>x</sub> value does not include early-certified Tier 3 vehicles

## **2 Purpose**

The purpose of this report is to summarize the fleet average NO<sub>x</sub> emission performance of individual companies and the overall Canadian fleet for the 2015 model year (MY) based on data submitted by companies in their end of model year reports and any subsequent revisions received prior to the publication of this report. It also serves to report on the effectiveness of the Canadian fleet average NO<sub>x</sub> emission program in achieving the environmental performance objectives.

## **3 Introduction**

On January 1, 2004, the *On-Road Vehicle and Engine Emission Regulations* came into effect under the *Canadian Environmental Protection Act, 1999* (CEPA). These Regulations introduced more stringent national emission standards for on-road vehicles and engines. The Regulations align Canada's emission standards for light-duty vehicles<sup>3</sup> (LDVs), light light-duty trucks<sup>4</sup> (LLDTs), heavy light-duty trucks<sup>5</sup> (HLDTs), medium-duty passenger vehicles<sup>6</sup> (MDPVs), heavy-duty vehicles, heavy-duty engines and on-road motorcycles with those of the U.S. Environmental Protection Agency (EPA) through incorporation by reference to the U.S. Code of Federal Regulations (CFR).

Each new LDV, LLDT, HLDT and MDPV is required to be certified to a bin for which there are specific emission standards for NO<sub>x</sub> and other pollutants. A company's choice of bin to which individual vehicle models are certified in a given model year is limited by the obligation to comply with the fleet average NO<sub>x</sub> standards associated with that model year. The current NO<sub>x</sub> standard is 0.07 grams/mile, which was introduced in the 2009 model year.

A company's fleet average NO<sub>x</sub> value is the weighted average based on the number of vehicles certified to each bin. Though the emission bins, fleet average NO<sub>x</sub> standards, and methods of calculating fleet average NO<sub>x</sub> values are aligned with those of the U.S. EPA, there are differences in the structure of the NO<sub>x</sub> averaging program in Canada, which is designed to recognize vehicles that are sold concurrently in Canada and the U.S. The regulatory requirements are structured to deliver fleet average emissions comparable to those of the U.S. while minimizing the regulatory burden on companies and enabling the marketing of vehicles in Canada independently from the U.S.

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<sup>3</sup> Light-duty vehicles are generally passenger cars.

<sup>4</sup> Light light-duty trucks are generally vans, sport utility vehicles and pick-up trucks having GVWR of 2,722 kg (6,000 pounds) or less.

<sup>5</sup> Heavy light-duty trucks are generally vans, sport utility vehicles and pick-up trucks having a GVWR of more than 2,722 (6,000 pounds) and up to 3,856 kg (8,500 pounds).

<sup>6</sup> Medium-duty passenger vehicles are generally heavier passenger-type vehicles, such as vans and sport utility vehicles having a gross vehicle weight rating (GVWR) greater than 3,856 kg (8,500 pounds) and less than 4,536 kg (10,000 pounds).

Amendments to the Regulations in 2015 introduced more stringent “Tier 3” standards beginning with the 2017 model year that include a standard comprised of the sum of non-methane organic gases (NMOG) and nitrogen oxides (NO<sub>x</sub>) presented as “NMOG + NO<sub>x</sub>”. Under the Tier 3 standards, companies certify a vehicle to a combined “NMOG + NO<sub>x</sub>” bin. Beginning with the 2015 model year, companies were able to optionally certify vehicles to the new Tier 3 bins. The Tier 3 standard is a change from the Tier 2 standard which utilized a NO<sub>x</sub> standard. Consequently, performance of Tier 3 certified vehicles, including early certified 2015 and 16 model year vehicles, will be reported beginning with the 2017 model year results once Tier 3 credits and early action credits become available.

The Regulations require that all companies submit a report to the Minister of the Environment and Climate Change no later than May 1 after the end of each model year. The end of model year report must contain detailed information concerning the company’s fleet(s) and/or groups of vehicles.

For more information regarding the calculation of fleet average NO<sub>x</sub> values and NO<sub>x</sub> emission credits or deficits, please refer to the Regulations, which can be found on the Environment and Climate Change Canada CEPA Environmental Registry at <http://ec.gc.ca/lcpe-cepa/eng/regulations/detailReg.cfm?intReg=65>.

### 3.1 Scope of Company Reports

Table 1 presents a list of the companies that submitted an end of model year report for the 2015 model year in accordance with the requirements of the Regulations, including the vehicle makes and a summary of the data received.

The results exclude early-certified Tier 3 vehicles and as a result, they are not accounted for in the calculation of the average NO<sub>x</sub> value. For the 2015 model year, one company reported Tier 3 vehicles. These comprised less than 0.04% of the total vehicles reported by all companies.

**Table 1: Summary of Company Reports**

Company	Makes	Number of Test Groups <sup>7</sup>	Total Number of Vehicles	Average NO <sub>x</sub> Value (grams/mile) <sup>8</sup>	Initial Credit Balance <sup>9</sup>	2015 MY Balance <sup>7</sup>
Aston Martin Lagonda Limited	Aston Martin	3	117	0.0700	0	0
BMW Group Canada	BMW, Mini, Rolls-Royce	25	41,030	0.069823	922	929
FCA Canada Inc.	Chrysler, Dodge, Jeep, Fiat, Alfa Romeo, RAM	21	276,642	0.0426958	66,466	74,019
Ferrari North America, Inc.	Ferrari	4	265	0.0700	0	0
Ford Motor Company of Canada, Limited	Ford, Lincoln	40	220,483	0.0568828	53,714	56,606
General Motors of Canada Company	Buick, Cadillac, Chevrolet, GMC	25	247,866	0.0405872	96,111	103,401
Honda Canada Inc.	Acura, Honda	15	178,785	0.0672313	20,241	20,736
Hyundai Auto Canada Corp.	Hyundai	18	108,537	0.0695587	3,370	3,418
Jaguar Land Rover Canada, ULC	Jaguar, Land Rover	12	7,695	0.04582	1,079	1,265
Kia Canada Inc.	Kia	18	67,871	0.069712	4,927	4,947
Lotus Cars Limited	Lotus	1	8	0.070	0	0
Maserati North America, Inc.	Maserati	3	432	0.0700	0	0
Mazda Canada Inc.	Mazda	8	64,927	0.070000	15,090	15,090
Mercedes-Benz Canada Inc.	Mercedes, Smart	20	43,080	0.069758	233	243
Mitsubishi Motor Sales of Canada, Inc.	Mitsubishi	7	25,680	0.070000	116	116
Nissan Canada Inc.	Infiniti, Nissan	25	154,102	0.0692264	18,946	19,065
Porsche Cars Canada, Ltd.	Porsche	12	4,889	See note <sup>10</sup>	See note <sup>10</sup>	See note <sup>10</sup>
Subaru Canada, Inc.	Subaru	9	53,328	0.060241	2,828	3,348
Toyota Canada Inc.	Lexus, Scion, Toyota	35	226,272	0.0675894	28,875	29,420
Volkswagen Group Canada	Audi, Bentley, Bugatti, Lamborghini, Volkswagen	29	109,539	See note <sup>10</sup>	See note <sup>10</sup>	See note <sup>10</sup>
Volvo Cars of Canada Corp.	Volvo	4	6,411	0.07000	3,538	3,538

<sup>7</sup> A test group is the basic classification unit that comprises LDV, LLDT, HLDT or MDPV having similar exhaust emission performances and that share all of the features described in section 1827, subchapter C, part 86 of the CFR.

<sup>8</sup> Fleet average NO<sub>x</sub> values are rounded to the same number of significant figures that are contained in the total number of vehicles in a company's fleet.

<sup>9</sup> NO<sub>x</sub> emission credits/deficits are rounded to the nearest whole number. A negative sign (-) indicates a deficit.

<sup>10</sup> The average NO<sub>x</sub> value and credit balance for Porsche Cars Canada, Ltd. and Volkswagen Group are not included in this table due to an ongoing investigation regarding certain of their diesel vehicles. However, no adjustments were made to the total number of vehicles, the number of test groups, the distribution of vehicles by the NO<sub>x</sub> standard of each bin and the average NO<sub>x</sub> value for the Canadian fleet (Table 2).



A total of 21 companies submitted a report for the 2015 model year covering a total of 334 distinct test groups. It should be noted that certain test groups were common between companies that shared vehicle platforms or powertrains.

The company average NO<sub>x</sub> values ranged from 0.0405872 grams/mile to 0.070000 grams/mile for the fleet of LDVs, LLDTs, HLDTs, and MDPVs, and no companies reported a fleet average NO<sub>x</sub> value that was above the standard of 0.07 grams/mile.

A total of 19,685 credits were generated by companies for the 2015 model year. No company incurred a deficit with respect to their fleet, and no company reported a deficit at the end of this model year. In addition, there were no credit transfers to or from companies for the 2015 model year.

### 3.2 Distribution of Bins and Total Canada NO<sub>x</sub> Fleet Average Value

Table 2 summarizes the distribution of vehicles by the NO<sub>x</sub> standard of each bin. It also provides the calculated fleet average NO<sub>x</sub> value of the entire Canadian fleet for the 2015 model year.

**Table 2: Distribution of Vehicles by the NO<sub>x</sub> Standard of Each Bin**

<b>Tier and Bin Number</b>	<b>NO<sub>x</sub> Standard (grams/mile)</b>	<b>Total Number of Vehicles in "Bin"</b>	<b>Percentage of Vehicles in "Bin"</b>
Tier 2 Bin 8	0.20	605	0.03
Tier 2 Bin 7	0.15	0	0.00
Tier 2 Bin 6	0.10	0	0.00
Tier 2 Bin 5	0.07	1,169,322	63.62
Tier 2 Bin 4	0.04	607,795	33.07
Tier 2 Bin 3	0.03	56,874	3.09
Tier 2 Bin 2	0.02	1,241	0.07
Tier 2 Bin 1	0.00	2,122	0.12
<b>Total Number of Vehicles in 2015 MY Fleet</b>			<b>1,837,959</b>
<b>Total Canada NO<sub>x</sub> Fleet Average (grams/mile)</b>			<b>0.05876512</b>
<b>Fleet Average NO<sub>x</sub> Standard (grams/mile)</b>			<b>0.07</b>

Notes:

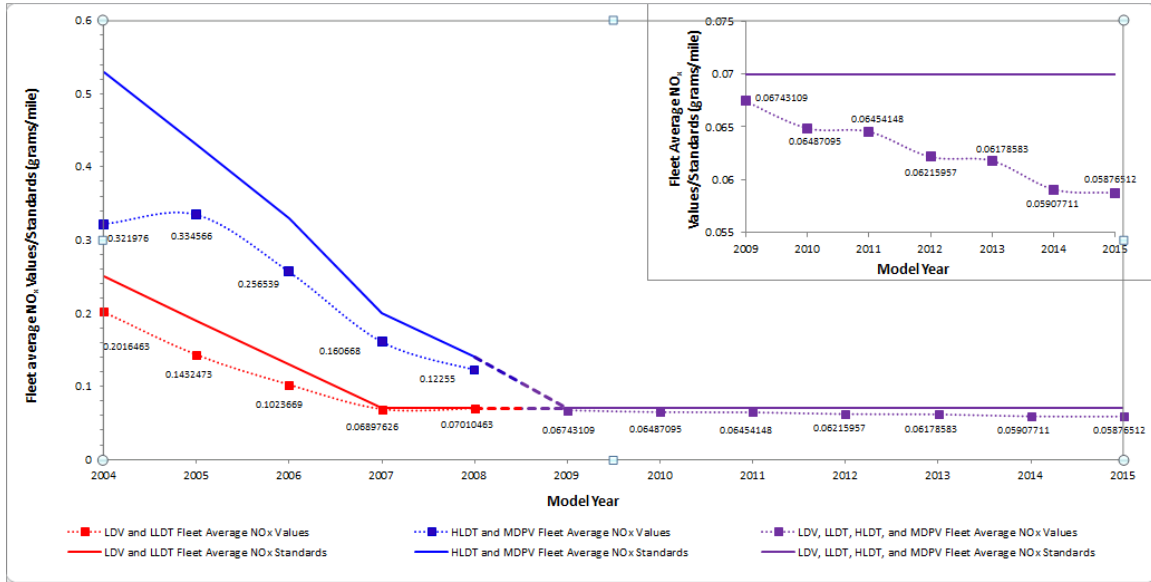
- Beginning in the 2009 model year, applicable standards are limited to bins 1 to 8 for all categories.

For the 2015 model year, almost all vehicles (99.97% of the fleet) were certified to a bin at or below the fleet average NO<sub>x</sub> standard of 0.07 grams/mile. The average NO<sub>x</sub> value for the Canadian fleet was 0.05876512 grams/mile.

### 3.3 Fleet Average NO<sub>x</sub> Values Trend

Figure 1 presents the average NO<sub>x</sub> values trend relative to the applicable standards since 2004 for both the LDV/LLDT and HLDT/MDPV fleets. Beginning in 2009, LDVs, LLDTs, HLDTs, and MDPVs all conform to one NO<sub>x</sub> fleet average standard.

**Figure 1: Fleet Average NO<sub>x</sub> Values and Standards**



Overall, the fleet average NO<sub>x</sub> value for the combined fleet of LDVs, LLDTs, HLDTs, and MDPVs decreased from 2004 to 2015. More specifically, the fleet average NO<sub>x</sub> value for the 2015 model year continues to decrease and is 16.05% below the standard of 0.07 grams/mile.

## **4 Conclusions**

This is the twelfth year that companies were subject to the fleet average NO<sub>x</sub> requirements under the Regulations. A total of 21 companies submitted reports for a total of 334 distinct test groups comprising 1,837,959 vehicles that were either manufactured in Canada or imported into Canada for the purpose of first retail sale.

The average NO<sub>x</sub> value for the Canadian 2015 model year combined fleet of LDVs, LLDTs, HLDTs and MDPVs is 0.05876512 grams/mile compared to the standard of 0.07 grams/mile. Each individual company had a fleet average NO<sub>x</sub> value that was at or below the standard, and all companies complied with the fleet averaging provisions of the Regulations based on their reports.

The average NO<sub>x</sub> value continued to decrease for the 2015 model year. This result is consistent with the environmental performance objectives of the Regulations.

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