



Air Pollutant Emission Performance for the 2018 Model Year On-Road Vehicle Fleet

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

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Executive summary

The On-Road Vehicle and Engine Emission Regulations (hereinafter referred to as the “Regulations”) establish national emission standards to limit smog-forming emissions (non-methane organic gases (NMOG), nitrous oxides (NO_x), particulate matter (PM), cold non-methane hydrocarbons (NMHC), evaporative emissions (EVAP)) from new on-road vehicles and engines. The Tier 3 fleet average standards continue to align with the progressively more stringent standards adopted by the U.S. Environmental Protection Agency (EPA) over the 2017 through 2025 model years (MYs). These Regulations require importers and manufacturers of new vehicles to meet fleet average emission standards for air pollutants and establish annual compliance reporting requirements. The 2017 MY, is the first MY in which companies are required to meet the new Tier 3 standards.

This report summarizes the fleet average air pollutant emission performance of the Canadian 2018 MY fleet of vehicles. A total of 25 companies submitted end of MY reports comprising a total of 2 050 866 vehicles manufactured in Canada or imported into Canada for the purpose of first retail sale. This report includes the fleet average NMOG+NO_x, cold NMHC and EVAP values 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 emission bins and compares the overall NMOG+NO_x performance with that of the pre-Tier 3 MYs.

The average NMOG+NO_x value for the Canadian 2018 MY combined fleet of light-duty vehicles and light-duty trucks 1 is 0.07638061 grams/mile compared to the standards of 0.079 grams/mile. The average NMOG+NO_x value for the Canadian 2018 MY combined fleet of light-duty trucks 2, heavy-light duty trucks and medium-duty passenger vehicles is 0.09138542 grams/mile compared to the standard of 0.092 grams/mile. The average NMOG+NO_x value for the Canadian 2018 MY fleet of Class 2B vehicles is 0.24563 grams/mile compared to the standard of 0.278 grams/mile. The average NMOG+NO_x value for the Canadian 2018 MY fleet of Class 3 vehicles is 0.45054 grams/mile compared to the standard of 0.451 grams/mile.

The overall NMOG+NO_x fleet averages demonstrate continued industry improvements in emission performance since 2004. All companies currently remain in compliance with the fleet averaging provisions of the Regulations. All companies have complied with the 2018 PM and EVAP phase-in percentages and have met the cold NMHC fleet average standards.

1. Purpose

The purpose of this report is to summarize the fleet average air pollutant emission performance of individual companies and the overall Canadian fleet for the 2018 MY. It is based on data submitted by companies in their end of MY 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 air pollutant emission program in achieving the environmental performance objectives outlined in the Regulations.

2. The Regulations

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 vehicles¹ (LDVs), light light-duty trucks² (LLDTs) composed of Light-Duty Trucks 1 (LDT1) and Light-Duty Trucks 2 (LDT2), heavy light-duty trucks³ (HLDTs) composed of Light-Duty Trucks 3 (LDT3) and Light-Duty Trucks 4 (LDT4), medium-duty passenger vehicles⁴ (MDPVs), heavy-duty vehicles, heavy-duty engines and on-road motorcycles with those of the U.S. EPA through incorporation by reference to the U.S. Code of Federal Regulations (CFR).

From MY 2004 through MY 2016, companies were required to meet fleet average NO_x emission standards (Tier 1 and Tier 2 standards). Figure 1 shows the overall Canadian performance during those years.

¹ Light-duty vehicles are generally passenger cars.

² 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.

³ 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).

⁴ 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).

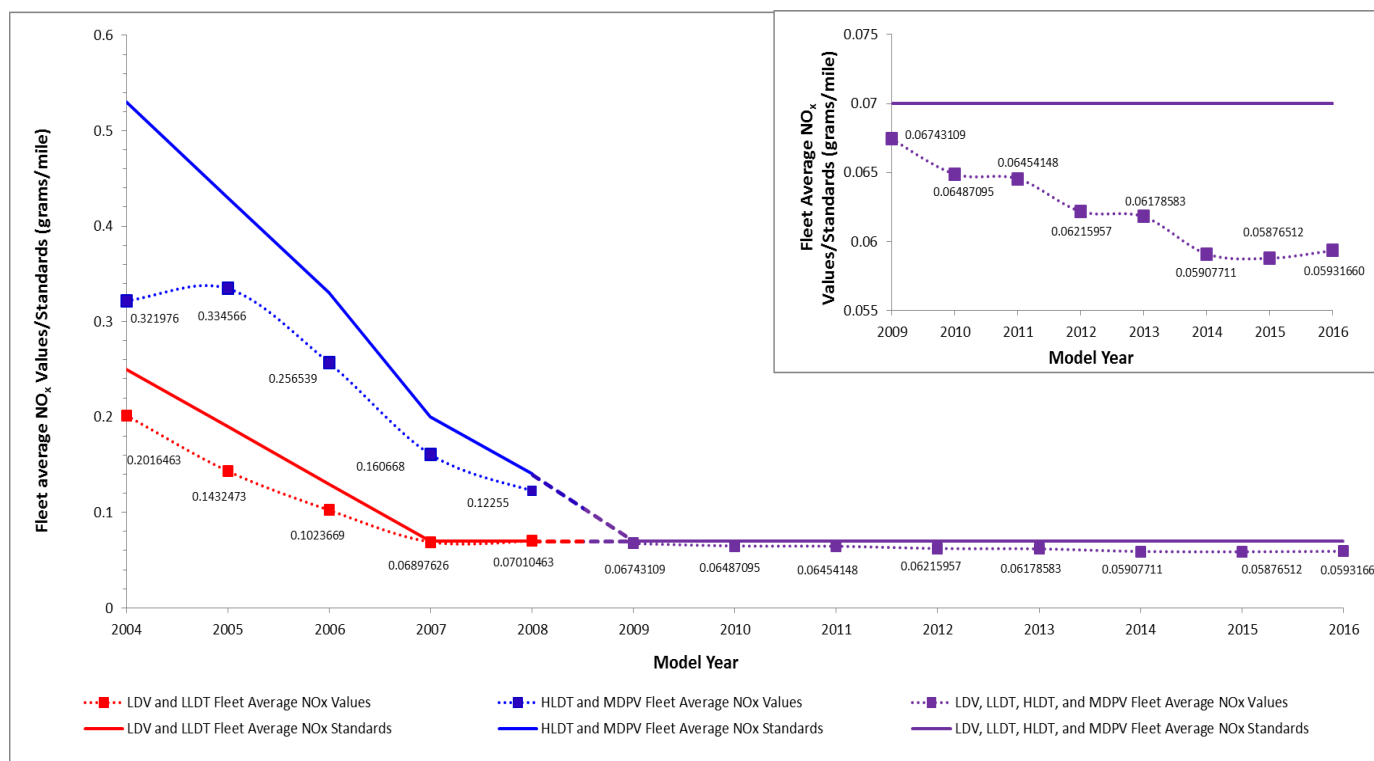


Figure 1: NO_x fleet averages and standards for model years 2004 through 2016

The Regulations were subsequently amended in 2015 to set new emission standards for passenger cars, light-duty trucks and certain heavy-duty vehicles for 2017 and later MYs that are imported or manufactured in Canada. The amendments establish progressively more stringent vehicles and fleet average standards over the MYs 2017 to 2025 for combined emissions of NMOG and NO_x and establish a phase-in schedule for more stringent PM and evaporative emission standards, in alignment with the U.S. EPA standards adopted in 2014.

A company's fleet of light-duty vehicles, light-duty trucks and medium-duty passenger vehicles will have to comply with progressively more stringent exhaust emission standards, reaching a fleet average standard for emission of NMOG+NO_x of 30 milligrams per mile as of MY 2025. Similarly, heavy-duty vehicle weight classes 2B⁵ and 3⁶ will be required to comply with progressively more stringent fleet average standards for emissions of NMOG+NO_x, reaching fleet average standards of 178 milligrams/mile and 247 milligrams/mile, respectively, as of MY 2022.

Also, as of MY 2017, new PM exhaust emission standards are introduced by means of a phase-in approach through which an increasing percentage of vehicles in a company's fleet for each successive MY will be required to comply with the standards, with full implementation starting with MY 2021. An alternative

⁵ Heavy-duty Class 2B vehicles are generally delivery vans and heavy-duty pick-up trucks having a GVWR of more than 3 856 kg (8 500 lb) but less than or equal to 4 536 kg (10 000 lb).

⁶ Heavy-duty Class 3 vehicles are generally delivery vans and heavy-duty pick-up trucks have a GVWR of more than 4 536 kg (10 000 lb) but less than or equal to 6 530 kg (14 000 lb).

phase-in compliance approach for these standards allows companies to conform to the standards by demonstrating that an equivalent number of vehicles conform to the new standards, when averaged over more than 1 MY included in the phase-in period. For vehicles with a gross vehicle weight rating (GVWR) up to 6 000 lb, the PM standard is 3 milligrams/mile. For vehicles with a GVWR above 6 000 lb and up to 14 000 lb, this standard is 3 milligrams/mile for the applicable light-duty trucks and MDPVs, and 8 milligrams/mile and 10 milligrams/mile for heavy-duty vehicle weight classes 2B and 3, respectively.

As of MY 2017, new evaporative emission (EVAP) standards are introduced by means of a phase-in approach through which an increasing percentage of a company's fleet of vehicles for each successive MY will be required to comply with the standards, with full implementation starting with MY 2022. An alternative phase-in compliance approach for these standards allows companies to conform to the standards by demonstrating that an equivalent number of vehicles conform to the new standards, when averaged over more than 1 MY included in the phase-in period. For LDV and LDT1 vehicles, this standard is 0.3 grams per test. For LDT2 vehicles, this standard is 0.4 grams per test. For HLDTs, this standard is 0.5 grams per test and for heavy-duty vehicles (Class 2B and 3), this standard is 0.6 grams per test.

The amendments also introduce new fleet average standards in Canada for cold temperature exhaust emissions of NMHCs. For fleets consisting of vehicles with a GVWR up to 6 000 lb, the cold temperature NMHC fleet average standard is fixed at 0.3 grams/mile, starting with the 2017 MY. For fleets consisting of vehicles with a GVWR above 6 000 lb and up to 10 000 lb, the cold temperate NMHC fleet average standard is fixed at 0.5 grams/mile, starting with the 2017 MY.

Flexibilities for vehicles sold concurrently in Canada and the United States are included for compliance with the fleet average emission standards as well as the phase-in emission standards. These flexibilities recognize that the emission performance of a company's fleet of vehicle models that are sold concurrently in the United States is effectively anchored by the U.S. regulatory program.

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

For more information regarding the Regulations, or more specifically, the calculation of fleet average values and emission credits or deficits, please refer to the Regulations, which can be found on the Environment and Climate Change Canada [CEPA Environmental Registry](#).

3. Tier 2 reporting for the 2018 MY

Small volume manufacturers in the United States have the option to continue to certify their vehicles to Tier 2 standards until MY 2022. Given that Canadian companies may meet the emission standards listed on the EPA Certificate of Conformity instead of the standards of the Regulations, 2 small volume manufacturers have submitted a 2018 end of MY report containing vehicles certified to Tier 2 standards. Companies certify their vehicles to a bin for which there are specific emission standards for NO_x and other pollutants (see Table 1). Table 2 presents the companies that submitted an end of MY report which contained vehicles that were certified to Tier 2 standards, including the vehicle makes and the number of Tier 2 certified test groups.

Table 1: light-duty vehicle, light light-duty truck, heavy light-duty truck and medium-duty passenger vehicle Tier 2 federal test procedure bin exhaust emission standards (grams/mile)

Bin number	NO _x	NMOG	CO	Formaldehyde	PM
8	0.20	0.125/0.156	4.2	0.018	0.02
7	0.15	0.09	4.2	0.018	0.02
6	0.10	0.09	4.2	0.018	0.01
5	0.07	0.09	4.2	0.018	0.01
4	0.04	0.07	2.1	0.011	0.01
3	0.03	0.055	2.1	0.011	0.01
2	0.02	0.01	2.1	0.004	0.01
1	0.00	0.00	0.0	0.000	0.00

Table 2: scope of company reports (Tier 2)

Company	Makes	Number of test groups
Karma Automotive LLC	Karma	1
Lotus Cars Ltd	Lotus	1

3.1. Fleet average NO_x emission performance

Table 3 summarizes the distribution of vehicles by the NO_x standard for each Tier 2 bin. It also provides the calculated fleet average NO_x value of the Canadian Tier 2 fleet for the 2018 MY.

Table 3: distribution of vehicles by NO_x standard of each bin

Tier and bin number	NO _x standard (grams/mi)	Total number of vehicles in "bin"	Percentage of vehicles in "bin"
Tier 2 Bin 8	0.20	0	0
Tier 2 Bin 7	0.15	0	0
Tier 2 Bin 6	0.10	0	0
Tier 2 Bin 5	0.07	68	100
Tier 2 Bin 4	0.04	0	0
Tier 2 Bin 3	0.03	0	0
Tier 2 Bin 2	0.02	0	0
Tier 2 Bin 1	0.00	0	0

For the 2018 MY, all 68 Tier 2 vehicles were certified to a bin at or below the fleet average NO_x standard of 0.07 grams/mile. The average NO_x value for the Canadian fleet was 0.070 grams/mile.

A total of 2 companies submitted a report containing Tier 2 vehicles for the 2018 MY.

The company average NO_x values were 0.070 grams/miles and no companies reported a fleet average NO_x value that was above the standard of 0.07 grams/mile (see Table 4).

No Tier 2 credits were generated for the 2018 MY. No company incurred a deficit with respect to their fleet, and no company reported a deficit at the end of this MY. In addition, there were no Tier 2 credit transfers to or from companies for the 2018 MY.

Table 4: summary of company average NO_x values for the heavy light-duty and medium-duty passenger vehicle fleet

Company	Total number of vehicles in fleet	Fleet average NO _x value (grams/mile)	Total 2018 MY credits
Karma Automotive LLC	56	0.07	0
Lotus Cars Ltd	12	0.07	0

3.2 Pre-Tier 3 Class 2B and Class 3 vehicles

Small volume manufacturers in the United States have the option to continue to certify their vehicles to Tier 2 standards until MY 2022. Given that Canadian companies may meet the emission standards listed on the EPA Certificate of Conformity instead of the standards of the Regulations, Isuzu Commercial Truck of Canada, Inc. submitted a 2018 end of MY report containing 37 Class 3 vehicles certified to pre-Tier 3 standards. Their 1 test group was certified to the HDV2 standard which has a NO_x value of 0.4 grams/mile. Since pre-Tier 3 Class 2B and Class 3 vehicles were not subject to fleet averaging standards in Canada, Isuzu does not need to provide a fleet average value and no credits or deficits are incurred.

4. Tier 3 reporting for the 2018 MY

Under the Tier 3 standards, companies certify a vehicle to a combined “NMOG+NO_x” bin. These bins represent the Federal Test Procedure (FTP) standards that vehicles are certified against. For the 2018 MY, a company’s fleet average NMOG+NO_x FTP values are calculated over the following fleets:

- 1) A company’s fleet that is composed of all of its light-duty vehicles and light-duty trucks 1 to which the applicable NMOG+NO_x standard applies for a useful life of 120 000 miles;
- 2) A company’s fleet that is composed of all of its light-duty vehicles and light-duty trucks 1 to which the applicable NMOG+NO_x standard applies for a useful life of 150 000 miles;
- 3) A company’s fleet that is composed of all of its light-duty trucks 2, heavy light-duty trucks and medium-duty passenger vehicles;
- 4) A company’s fleet that is composed of all of its Class 2B vehicles; and
- 5) A company’s fleet that is composed of all of its Class 3 vehicles.

Table 5, Table 6 and Table 7 presents the corresponding exhaust emission standards for the Tier 3 FTP bins.

Table 5: light-duty vehicle, light light-duty truck, heavy light-duty truck and medium-duty passenger vehicle Tier 3 federal test procedure bin exhaust emission standards (grams/mile)

Bin Number	NMOG+NO _x	CO	Formaldehyde	PM
160	0.160	4.2	0.004	0.003
125	0.125	2.1	0.004	0.003
110 ¹	0.110	2.1	0.004	0.003
85 ¹	0.085	2.1	0.004	0.003
70	0.070	1.7	0.004	0.003
50	0.050	1.7	0.004	0.003
30	0.030	1.0	0.004	0.003
20	0.020	1.0	0.004	0.003
0	0.000	0.0	0.000	0.000

¹ Transitional Bins to which vehicles may be certified to through MY 2019.

Table 6: Class 2B vehicle Tier 3 federal test procedure bin exhaust emission standards (grams/mile)

Bin Number	NMOG+NO _x	CO
395 ¹	0.395	6.4
340 ¹	0.340	6.4
250	0.250	6.4
200	0.200	4.2
170	0.170	4.2
150	0.150	3.2
0	0.000	0.0

1 Transitional Bins to which vehicles may be certified to through MY 2021.

Table 7: Class 3 vehicle Tier 3 federal test procedure bin exhaust emission standards (grams/mile)

Bin Number	NMOG+NO _x	CO
630 ¹	0.630	7.3
570 ¹	0.570	7.3
400	0.400	7.3
270	0.270	4.2
230	0.230	4.2
200	0.200	3.7
0	0.000	0.0

1 Transitional Bins to which vehicles may be certified to through MY 2021.

Table 8 presents the companies that submitted an end of MY report which contained vehicles that were certified to Tier 3 standards, including the vehicle makes and the number of Tier 3 certified test groups.

Table 8: scope of company reports (Tier 3)

Company	Makes	Number of test groups
Aston Martin Lagonda Ltd.	Aston Martin	3
BMW Group Canada	BMW, Mini, Rolls-Royce	28
FCA Canada Inc.	Chrysler, Dodge, Jeep, Fiat, Alfa Romeo, RAM	34
Ferrari North America, Inc.	Ferrari	2
Ford Motor Company of Canada, Ltd.	Ford, Lincoln	65
General Motors of Canada Company	Buick, Cadillac, Chevrolet, GMC	45
Honda Canada Inc.	Acura, Honda	24
Hyundai Auto Canada Corp.	Hyundai	24
Jaguar Land Rover Canada, ULC	Jaguar, Land Rover	8
Kia Canada Inc.	Kia	23
Maserati North America, Inc.	Maserati	4
Mazda Canada Inc.	Mazda	11
McLaren Automotive Ltd.	McLaren	2
Mercedes-Benz Canada Inc.	Mercedes, Smart	23
Mitsubishi Motor Sales of Canada	Mitsubishi	7
Nissan Canada Inc.	Infiniti, Nissan	36

Porsche Cars Canada, Ltd.	Porsche	13
Subaru Canada, Inc.	Subaru	7
Tesla Motors Canada Inc.	Tesla	4
Toyota Canada Inc.	Lexus, Scion, Toyota	37
Volkswagen Group Canada	Audi, Bentley, Bugatti, Lamborghini, Volkswagen	22
Volvo Cars of Canada Corp.	Volvo	6

Table 9 summarizes the distribution of vehicles by the NMOG+NO_x standard for each bin.

Table 9: distribution of Tier 3 vehicles by NMOG+NO_x standard of each bin

Tier and Bin Number	NMOG+NO_x standard (grams/mile)	Total number of vehicles in “bin”	Percentage of vehicles in “bin”
Tier 3 Bin 630	0.630	682	0.03
Tier 3 Bin 570	0.570	11 635	0.57
Tier 3 Bin 400	0.400	17 911	0.87
Tier 3 Bin 395	0.395	2 431	0.12
Tier 3 Bin 340	0.340	11 259	0.55
Tier 3 Bin 270	0.270	2 730	0.13
Tier 3 Bin 250	0.250	31 093	1.51
Tier 3 Bin 230	0.230	0	0.00
Tier 3 Bin 200	0.200	17 722	0.86
Tier 3 Bin 170	0.170	0	0.00
Tier 3 Bin 160	0.160	34 549	1.68
Tier 3 Bin 150	0.150	10 427	0.51
Tier 3 Bin 125	0.125	679 010	33.12
Tier 3 Bin 110 ¹	0.110	144 477	7.04
Tier 3 Bin 85 ¹	0.085	1 172	0.06
Tier 3 Bin 70	0.070	695 937	33.95
Tier 3 Bin 50	0.050	60 587	2.95
Tier 3 Bin 30	0.030	310 024	15.12
Tier 3 Bin 20	0.020	850	0.04
Tier 3 Bin 0	0.000	18 285	0.89
Total number of Tier 3 vehicles in 2018 MY fleet			2 050 781

¹ Transitional Bins

4.1. Fleet average NMOG+NO_x emission performance

This section describes the manufacturers NMOG+NO_x fleet average performance.

Table 10 and Table 11, both taken from section 86.1811-17 of the CFR, present the declining fleet average Tier 3 FTP and Supplemental Federal Test Procedure (SFTP) emission standards for NMOG+NO_x for light-duty vehicles, light-duty trucks, heavy-light duty trucks and medium-duty passenger vehicles from MY 2017 to MY 2025.

Table 10: declining fleet average Tier 3 federal test procedure emission standards for NMOG+NO_x (grams/mile)

MY	LDV, LDT1 – 150 000 mile useful life ¹	LDV, LDT1 – 120 000 mile useful life ¹	LDT2, HLD²
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2017 ³	0.086	0.073	0.101
2018	0.079	0.067	0.092
2019	0.072	0.061	0.083
2020	0.065	0.055	0.074
2021	0.058	0.049	0.065
2022	0.051	0.043	0.056
2023	0.044	0.037	0.047
2024	0.037	0.031	0.038
2025	0.030	0.026	0.030

1 Vehicles certified to standards based on a useful life of 120 000 miles may comply based on the fleet-average standard specified for 150 000 mile useful life in certain circumstances as specified in [paragraph \(b\)\(8\)\(iii\)\(A\)](#) of this section.

2 MDPVs are subject to all the same emission standards and certification provisions that apply to LDT4.

3 HLDLT and MDPV must meet the Tier 3 standards starting with MY 2018.

Table 11: declining fleet average Tier 3 supplemental federal test procedure emission standards for NMOG+NO_x (grams/mile)

MY	NMOG+NO _x (grams/mile)
2017 ¹	0.103
2018	0.097
2019	0.090
2020	0.083
2021	0.077
2022	0.070
2023	0.063
2024	0.057
2025	0.050

1 HLDLT and MDPV must meet the Tier 3 standards starting with MY 2018.

Table 12, taken from section 86.1818-18 of the CFR, presents the declining fleet average Tier 3 FTP emission standards for NMOG+NO_x for Class 2B and Class 3 vehicles from MY 2018 to MY 2022.

Table 12: declining fleet average federal test procedure emission standards for NMOG+NO_x (grams/mile)

MY	Class 2B	Class 3
2016 ¹	0.333	0.548
2017 ¹	0.310	0.508
2018	0.278	0.451
2019	0.253	0.400
2020	0.228	0.349
2021	0.203	0.298
2022	0.178	0.247

1 Fleet-average standards are shown for 2016 and 2017 for purposes of voluntary early compliance.

4.1.1. Light-duty vehicles and light-duty trucks 1, 120k

Table 13 presents the summary of the company average NMOG+NO_x FTP values for their LDV/LDT1 120k fleets.

Table 13: summary of company average NMOG+NO_x federal test procedure values for the light-duty vehicle and light-duty truck 1, 120K fleet

Company	Total number of vehicles in fleet	Fleet average NMOG+NO_x value (grams/mile)	Total 2018 MY credits⁷	Credit balance
Aston Martin Lagonda Ltd.	9	0.125	0	0
BMW Group Canada	1 844	0.1258	-108	-365
Jaguar Land Rover Canada, ULC	161	0.125	0	0
Maserati North America, Inc.	1 000	0.160	0	0
McLaren Automotive Ltd.	220	0.125	0	0
Mercedes-Benz Canada Inc.	94	0.160	-9	-209
Porsche Cars Canada, Ltd.	686	0.160	0	0

Table 14 presents the summary of the company average NMOG+NO_x SFTP values for their LDV/LDT1 120k fleets.

Table 14: summary of company average NMOG+NO_x supplemental federal test procedure values for the light-duty vehicle and light-duty truck 1, 120K fleet

Company	Total number of vehicles in fleet	Fleet average NMOG+NO_x value (grams/mile)	Total 2018 MY credits	Credit balance
Aston Martin Lagonda Ltd.	9	0.097	0	0
BMW Group Canada	1 844	0.1693	-133	425
Jaguar Land Rover Canada, ULC	161	0.0900	0	0
Maserati North America, Inc.	1 000	0.160	0	0
McLaren Automotive Ltd.	220	0.097	0	0

⁷ Negative totals represent a deficit.

Mercedes-Benz Canada Inc.	94	0.100	0	43
Porsche Cars Canada, Ltd.	686	0.100	0	0

4.1.2. Light-duty vehicles and light-duty trucks 1, 150k

Table 15 presents the summary of the company average NMOG+NO_x FTP values for their LDV/LDT1 150k fleets.

Table 15: summary of company average NMOG+NO_x federal test procedure values for the light-duty vehicle and light-duty truck 1, 150K fleet

Company	Total number of vehicles in fleet	Fleet average NMOG+NO_x value (grams/mile)	Total 2018 MY credits	Credit balance
Aston Martin Lagonda Ltd.	35	0.125	0	0
BMW Group Canada	32 987	0.054412	811	1 687
FCA Canada Inc.	13 557	0.101920	-311	-1 000
Ferrari North America, Inc.	247	0.125	0	0
Ford Motor Company of Canada, Ltd.	39 095	0.071884	278	-350
General Motors of Canada Company	78 987	0.075697	261	-1 683
Honda Canada Inc.	170 470	0.0964455	0	0
Hyundai Auto Canada Corp.	123 523	0.0904191	0	0
Jaguar Land Rover Canada, ULC	1 493	0.05647	34	87
Kia Canada Inc.	72 808	0.090380	-328	-328
Mazda Canada Inc.	53 267	0.054749	1 292	2 112
Mercedes-Benz Canada Inc.	25 468	0.070292	222	515
Mitsubishi Motor Sales of Canada	12 633	0.070000	114	114
Nissan Canada Inc.	76 990	0.063481	1 195	1 195
Porsche Cars Canada, Ltd.	2 903	0.1175	0	0
Subaru Canada, Inc.	35 981	0.072277	0	0
Tesla Motors Canada Inc.	8 961	0.0000	708	1 008
Toyota Canada Inc.	93 251	0.092348	-1 245	-1 245

Volkswagen Group Canada	61 658	0.062082	1 043	2 479
Volvo Cars of Canada Corp.	1 256	0.1160	0	0

Table 16 presents the summary of the company average NMOG+NO_x SFTP values for their LDV/LDT1 150k fleets.

Table 16: summary of company average NMOG+NO_x supplemental federal test procedure values for the light-duty vehicle and light-duty truck 1, 150K fleet

Company	Total number of vehicles in fleet	Fleet average NMOG+NO_x value (grams/mile)	Total 2018 MY credits	Credit balance
Aston Martin Lagonda Ltd.	35	0.097	0	0
BMW Group Canada	32 987	0.067912	960	1 863
FCA Canada Inc.	13 557	0.101301	-58	845
Ferrari North America, Inc.	247	0.125	0	0
Ford Motor Company of Canada, Ltd.	39 095	0.079458	686	1 595
General Motors of Canada Company	78 987	0.085142	937	585
Honda Canada Inc.	170 470	0.0880128	0	0
Hyundai Auto Canada Corp.	123 523	0.0924218	0	0
Jaguar Land Rover Canada, ULC	1 493	0.103	0	0
Kia Canada Inc.	72 808	0.092461	0	0
Mazda Canada Inc.	53 267	0.052179	2 387	3 966
Mercedes-Benz Canada Inc.	25 468	0.071221	657	1 693
Mitsubishi Motor Sales of Canada	12 633	0.090000	88	88
Nissan Canada Inc.	76 990	0.075769	1 635	1 635
Porsche Cars Canada, Ltd.	2 903	0.08129	0	0
Subaru Canada, Inc.	35 981	0.057681	0	0
Tesla Motors Canada Inc.	8 961	0.0000	869	1 228
Toyota Canada Inc.	93 251	0.079219	1 658	1 658
Volkswagen Group Canada	61 658	0.065891	1 918	4 352

Volvo Cars of Canada Corp.	1 256	0.09837	0	0
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4.1.3. Light-duty trucks 2, heavy light-duty trucks, and medium-duty passenger vehicles

Table 17 presents the summary of the company average NMOG+NO_x FTP values for their LDT2/HLDT/MDPV fleets.

Table 17: summary of company average NMOG+NO_x federal test procedure values for the light duty truck 2, heavy light-duty truck, and medium-duty passenger vehicle, 150K fleet

Company	Total number of vehicles in fleet	Fleet average NMOG+NO_x value (grams/mile)	Total 2018 MY credits	Credit balance
BMW Group Canada	17 207	0.085898	-119	-337
FCA Canada Inc.	171 829	0.0998909	-3 590	-4 066
Ford Motor Company of Canada, Ltd.	238 566	0.0877282	-2 082	-1 867
General Motors of Canada Company	190 441	0.102730	-4 519	-4 626
Honda Canada Inc.	21 780	0.12500	0	0
Jaguar Land Rover Canada, ULC	11 646	0.065492	157	501
Kia Canada Inc.	5 113	0.1250	0	0
Mazda Canada Inc.	29 448	0.043817	1 036	474
Mercedes-Benz Canada Inc.	29 596	0.093022	-415	-92
Mitsubishi Motor Sales of Canada	11 805	0.051770	321	321
Nissan Canada Inc.	62 363	0.082295	-205	-205
Porsche Cars Canada, Ltd.	7 837	0.1258	0	0
Subaru Canada, Inc.	22 612	0.088897	0	0
Toyota Canada Inc.	140 313	0.0938347	-2 082	-2 082
Volkswagen Group Canada	68 060	0.072454	446	8
Volvo Cars of Canada Corp.	6 691	0.07071	0	0

Table 18 presents the summary of the company average NMOG+NO_x SFTP values for their LDT2/HLDT/MDPV fleets.

Table 18: summary of company average NMOG+NO_x supplemental federal test procedure values for the light duty truck 2, heavy light-duty truck, and medium-duty passenger vehicle, 150K fleet

Company	Total number of vehicles in fleet	Fleet average NMOG+NO _x value (grams/mile)	Total 2018 MY credits	Credit Balance
BMW Group Canada	17 207	0.099175	-37	556
FCA Canada Inc.	171 829	0.1033409	-1 090	-1 008
Ford Motor Company of Canada, Ltd.	238 566	0.0944145	617	1 597
General Motors of Canada Company	190 441	0.103961	-1 326	-1 416
Honda Canada Inc.	21 780	0.10000	0	0
Jaguar Land Rover Canada, ULC	11 646	0.101447	0	0
Kia Canada Inc.	5 113	0.1300	0	0
Mazda Canada Inc.	29 448	0.051635	1 336	1 540
Mercedes-Benz Canada Inc.	29 596	0.067188	882	1 428
Mitsubishi Motor Sales of Canada	11 805	0.090000	83	83
Nissan Canada Inc.	62 363	0.097974	-61	-61
Porsche Cars Canada, Ltd.	7 837	0.1055	0	0
Subaru Canada, Inc.	22 612	0.050402	0	0
Toyota Canada Inc.	140 313	0.0857286	1 582	1 582
Volkswagen Group Canada	68 060	0.071466	1 738	1 674
Volvo Cars of Canada Corp.	6 691	0.08844	0	0

Average NMOG+NO_x values above the applicable NMOG+NO_x standards for a given fleet can be attributed to the following factors:

1. The company elects to exclude from mandatory compliance with the fleet average NMOG+NO_x standard its group of U.S. certified vehicles that are sold in Canada and the U.S. This exclusion is allowed because the objective of the fleet averaging provisions is to achieve an overall Canadian vehicle fleet emission performance comparable to that of the U.S., while minimizing the regulatory burden on companies. An analysis conducted by Environment and Climate Change Canada indicated that, even under extreme scenarios, the variations between the Canadian and U.S. fleet averages are expected to be small.
2. The company made use of an interim provision allowing them to include their LDV/LDT1 120k mile useful life vehicles certified to bins greater than bin 70 in their LDV/LDT1 150k mile useful

life fleet. This interim provision may be used through MY 2019. This allows their LDV/LDT1 120k vehicles to meet the less stringent standard of the LDV/LDT1 150k fleet.

3. The average NMOG+NO_x value is above the NMOG+NO_x standard for 1 of its fleets. A company can offset a deficit from 1 fleet with credits from another fleet within the same averaging set.
4. The average NMOG+NO_x value is above the applicable standard. A company can offset a deficit in a subsequent MY.

4.1.4 Class 2B vehicles

Table 19 presents the summary of the company average NMOG+NO_x FTP values for their Class 2B vehicle fleets.

Table 19: summary of company average NMOG+NO_x federal test procedure values for the Class 2B vehicle fleet

Company	Total number of vehicles in fleet	Fleet average NMOG+NO_x value (grams/mile)	Total 2018 MY credits	Credit balance
FCA Canada Inc.	19 495	0.21432	1 241	1 241
Ford Motor Company of Canada, Ltd.	23 440	0.24178	849	849
General Motors of Canada Company	25 875	0.25000	725	725
Mercedes-Benz Canada Inc.	3 054	0.4439	-507	-507
Nissan Canada Inc.	1 704	0.2351	73	73

4.1.5 Class 3 vehicles

Table 20 presents the summary of the company average NMOG+NO_x FTP values for their Class 3 fleets.

Table 20: summary of company average NMOG+NO_x federal test procedure values for the Class 3 vehicle fleet

Company	Total number of vehicles in fleet	Fleet average NMOG+NO_x value (grams/mile)	Total 2018 MY credits	Credit balance
FCA Canada Inc.	6 318	0.4120	246	246
Ford Motor Company of Canada, Ltd.	13 919	0.51116	-837	-837
General Motors of Canada Company	12 039	0.40000	614	614
Mercedes-Benz Canada Inc.	46	0.630	-8	-8

4.1.6 NMOG+NO_x Averaging Sets

NMOG+NO_x credits may be exchanged only within an averaging set, as follows:

- 1) LDV and LDT1 certified to standards based on a useful life of 120,000 miles and 10 years
- 2) LDV and LDT
- 3) HDV

However, FTP and SFTP credits are not interchangeable.

4.1.7. Early action credits

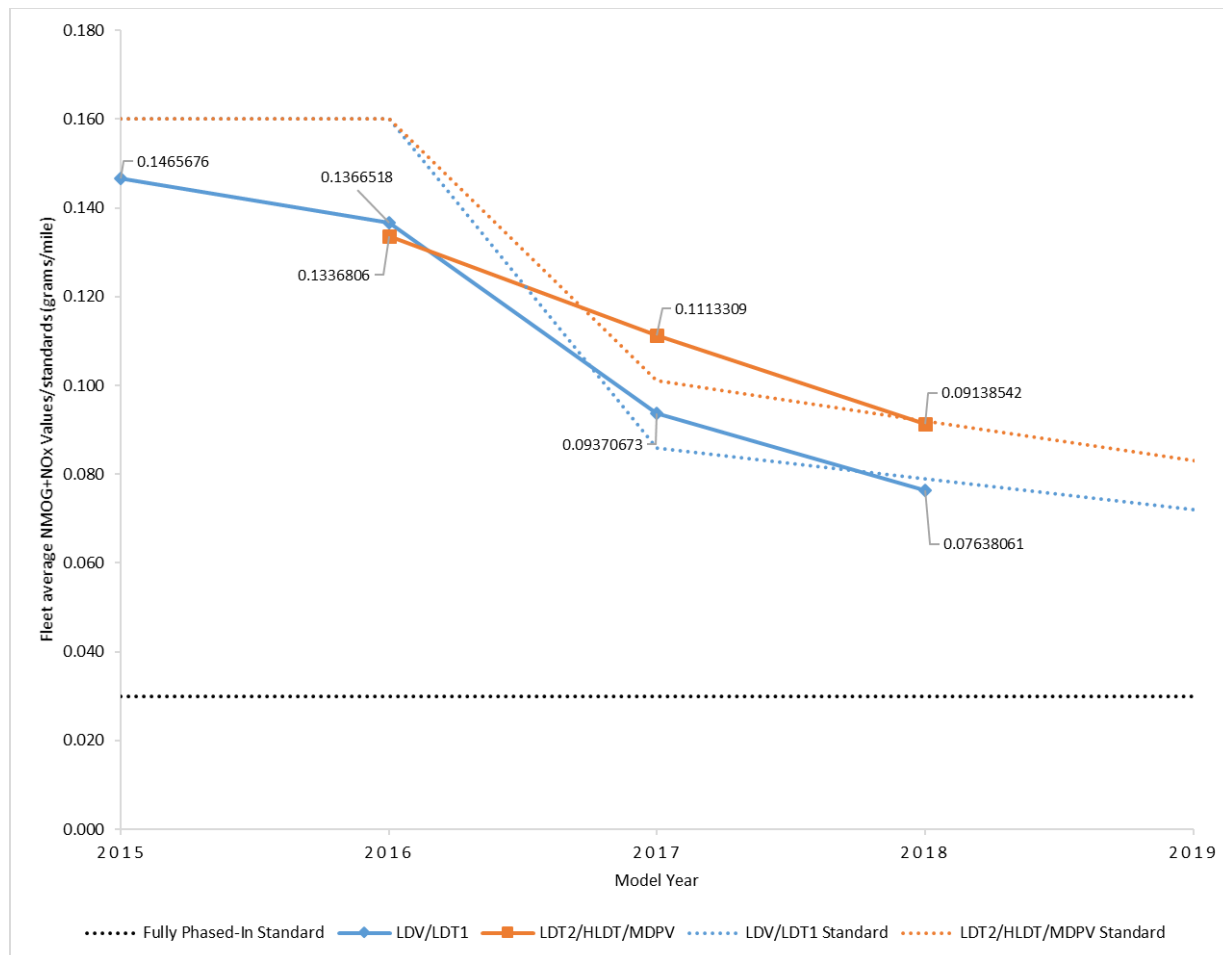
Early Action credits are earned over the 2015-2016 MYs for a company's fleet of LDV/LDT1 vehicles and over the 2016-2017 MYs for a company's fleet of LDT2/HLDT/MDPV vehicles if the respective NMOG+NO_x fleet averages are below the 0.160 standard.

Early Action credits are also earned over the 2016-2017 MYs for a company's fleet of Class 2B vehicles or fleet of Class 3 vehicles if the respective NMOG+NO_x fleet averages are below the applicable standards for the MY in question set out in Table 12.

4.1.8. Overall performance of Canadian fleets

Figure 2 shows the overall Canadian NMOG+NO_x fleet averages from the 2015 to 2018 MY for the LDV/LDT1 and LDT2/HLDT/MDPV fleets.

Figure 2: NMOG+NO_x Fleet averages and standards



4.2. Fleet average cold NMHC emission performance

This section describes the manufacturer's cold NMHC fleet average performance.

Table 21 presents the fleet average cold temperature NMHC exhaust emission standards.

Table 21: fleet average cold temperature NMHC exhaust emission standards

Vehicle weight category	Cold temperature NMHC sales- weighted fleet average standard (grams/mile)
LDV and LLDT	0.3
HLDT and MDPV	0.5

4.2.1. Light-duty vehicles and light light-duty trucks

Table 22 presents the summary of company average cold NMHC values for their LDV/LLDT fleets.

Table 22: summary of company average cold NMHC values for the light-duty vehicle and light light-duty truck fleet

Company	Total Number of Vehicles in Fleet	Fleet Average cold NMHC Value (grams/mile)	Total 2018 MY Credits	Credit balance
Aston Martin Lagonda Ltd.	44	0.3	0	0
BMW Group Canada	42 641	0.3	0	0
FCA Canada Inc.	74 789	0.3	0	0
Ferrari North America, Inc.	247	0.3	0	0
Ford Motor Company of Canada, Ltd.	115 257	0.3	0	0
General Motors of Canada Company	131 571	0.3	0	0
Honda Canada Inc.	180 340	0.3	0	0
Hyundai Auto Canada Corp.	123 129	0.3	0	0
Jaguar Land Rover Canada, ULC	8 573	0.3	0	0
Kia Canada Inc.	76 957	0.3	0	0
Maserati North America, Inc.	1 000	0.4	0	0
Mazda Canada Inc.	82 715	0.2	8 272	8 272
McLaren Automotive Ltd.	220	0.3	0	0
Mercedes-Benz Canada Inc.	41 115	0.3	0	0
Mitsubishi Motor Sales of Canada	24 438	0.3	0	0
Nissan Canada Inc.	127 250	0.3	0	0
Porsche Cars Canada, Ltd.	10 115	0.3	0	0
Subaru Canada, Inc.	58 593	0.3	0	0
Toyota Canada Inc.	208 478	0.3	0	0
Volkswagen Group Canada	122 316	0.3	0	0
Volvo Cars of Canada Corp.	4 755	0.3	0	0

4.2.2. Heavy light-duty trucks and medium-duty passenger vehicles

Table 23 presents the summary of company average cold NMHC values for their HLDT/MDPV fleets.

Table 23: summary of company average cold NMHC values for the heavy light-duty truck and medium duty passenger vehicle fleet

Company	Total number of vehicles in fleet	Fleet average cold NMHC value (grams/mile)	Total 2018 MY credits	Credit Balance
BMW Group Canada	6 890	0.3	1 378	1 378
FCA Canada Inc.	100 717	0.4	10 072	28 494
Ford Motor Company of Canada, Ltd.	158 692	0.4	15 869	27 558
General Motors of Canada Company	130 816	0.4	13 082	26 465
Honda Canada Inc.	11 910	0.3	0	0
Jaguar Land Rover Canada, ULC	2 260	0.4	226	530
Mercedes-Benz Canada Inc.	13 601	0.5	0	0
Nissan Canada Inc.	7 663	0.5	0	0
Porsche Cars Canada, Ltd.	1 311	0.5	0	0
Toyota Canada Inc.	25 036	0.5	0	0
Volkswagen Group Canada	6 594	0.4	659	1 563
Volvo Cars of Canada Corp.	3 192	0.3	0	0

4.3. Fleet average EVAP emission performance

This section describes the manufacturers EVAP fleet average performance.

Table 24 presents the fleet average EVAP emission standards.

Table 24: Tier 3 diurnal plus hot soak emission standards in grams per test

Vehicle category	Low-altitude conditions – fleet average
LDV, LDT1	0.3
LDT2	0.4
HLDT, MDPV	0.5
HDV	0.6

4.3.1. Light-duty vehicles and light-duty trucks 1

Table 25 presents the summary of company average EVAP values for their LDV/LDT1 fleets.

Table 25: summary of company average EVAP values for the light-duty vehicle and light duty truck 1 fleet

Company	Total number of vehicles in fleet	Fleet average EVAP value (grams/mile)	Total 2018 MY credits	Credit Balance
BMW Group Canada	31 308	0.3	0	0
FCA Canada Inc.	2 927	0.3	0	0
Ford Motor Company of Canada, Ltd.	29 400	0.3	0	0
General Motors of Canada Company	2 395	0.3	0	0
Honda Canada Inc.	140 410	0.3	0	0
Hyundai Auto Canada Corp.	80 000	0.3	0	0
Jaguar Land Rover Canada, ULC	1 189	0.3	0	0
Kia Canada Inc.	35 975	0.3	0	0
Mazda Canada Inc.	39 390	0.3	0	0
Mercedes-Benz Canada Inc.	7 659	0.3	0	0
Mitsubishi Motor Sales of Canada	9 009	0.3	0	0
Nissan Canada Inc.	38 676	0.3	0	0
Porsche Cars Canada, Ltd.	1 139	0.3	0	0
Subaru Canada, Inc.	24 756	0.3	0	0
Toyota Canada Inc.	33 676	0.3	0	0
Volkswagen Group Canada	41 340	0.3	0	0
Volvo Cars of Canada Corp.	494	0.3	0	0

4.3.2. Light-duty trucks 2

Table 26 presents the summary of company average EVAP values for their LDT2 fleets.

Table 26: summary of company average EVAP values for the light-duty truck 2 fleet

Company	Total number of vehicles in fleet	Fleet average EVAP value (grams/mile)	Total 2018 MY credits	Credit Balance
BMW Group Canada	8 118	0.3	812	812
FCA Canada Inc.	36 003	0.4	0	0

Ford Motor Company of Canada, Ltd.	54 622	0.4	0	0
General Motors of Canada Company	49 042	0.4	0	0
Jaguar Land Rover Canada, ULC	7 223	0.4	0	0
Mazda Canada Inc.	25 165	0.3	2 517	4 525
Mercedes-Benz Canada Inc.	2 488	0.4	0	136
Mitsubishi Motor Sales of Canada	11 805	0.3	1 181	1 181
Nissan Canada Inc.	38 594	0.4	0	0
Subaru Canada, Inc.	8 403	0.3	0	0
Toyota Canada Inc.	44 607	0.4	0	0
Volkswagen Group Canada	61 466	0.4	0	0
Volvo Cars of Canada Corp.	3 051	0.3	0	0

4.3.3. Heavy light-duty trucks and medium-duty passenger vehicles

Table 27 Table 27 presents the summary of company average EVAP values for their HLTD/MDPV fleets.

Table 27: summary of company average EVAP values for the heavy light-duty truck and medium-duty passenger vehicle fleet

Company	Total number of vehicles in fleet	Fleet average EVAP value (grams/mile)	Total 2018 MY credits	Credit Balance
FCA Canada Inc.	53 964	0.5	0	0
Ford Motor Company of Canada, Ltd.	142 535	0.5	0	0
General Motors of Canada Company	129 484	0.5	0	0
Honda Canada Inc.	11 910	0.5	0	0
Jaguar Land Rover Canada, ULC	869	0.5	0	0
Mercedes-Benz Canada Inc.	13 304	0.5	0	0
Nissan Canada Inc.	5 812	0.5	0	0
Toyota Canada Inc.	1 652	0.5	0	0
Volvo Cars of Canada Corp.	3 192	0.5	0	0

4.3.4. Class 2B and Class 3 vehicles

Table 28 presents the summary of company average EVAP values for their Class 2B and Class 3 fleets.

Table 28: summary of company average EVAP values for the Class 2B and Class 3 vehicle fleet

Company	Total number of vehicles in fleet	Fleet average EVAP value (grams/mile)	Total 2018 MY credits	Credit Balance
General Motors of Canada Company	10 221	0.6	0	0

4.3.5 Evaporative emission averaging sets

The following separate averaging sets apply for EVAP standards:

- 1) LDV and LDT1 together represent a single averaging set.
- 2) LDT2 represents a single averaging set.
- 3) HLDT represents a single averaging set.
- 4) HDV represents a single averaging set.

Credits can be exchanged across averaging sets as follows if additional credits are needed to offset a deficit after the final year of maintaining deficit credits:

- 1) You may exchange LDV/LDT1 and LDT2 emission credits.
- 2) You may exchange HLDT and HDV emission credits.

4.4. PM and EVAP phase-in performance

For the 2018 MY, 20% of a company's fleet of light-duty vehicles, light-duty trucks and medium-duty passenger vehicles and 20% of a company's fleet of Class 2b and Class 3 vehicles must meet the Tier 3 PM standards and 60% of a company's overall fleet must meet the Tier 3 EVAP standards. All companies met these requirements.

5. Conclusions

The 2018 MY results represents the second reporting cycle under the new more stringent Tier 3 emission standards. All companies subject to reporting requirements submitted end of MY reports comprising a total of 2 050 886 vehicles manufactured in Canada or imported into Canada for the purpose of first retail sale.

The average NMOG+NO_x value for the Canadian 2018 MY combined fleet of light-duty vehicles and light-duty trucks 1 is 0.07638061 grams/mile compared to the standards of 0.079 grams/mile. The average NMOG+NO_x value for the Canadian 2018 MY combined fleet of light-duty trucks 2, heavy-light duty trucks and medium-duty passenger vehicles is 0.09138542 grams/mile compared to the standard of 0.092 grams/mile. The average NMOG+NO_x value for the Canadian 2018 MY fleet of Class 2B vehicles is 0.24563 grams/mile compared to the standard of 0.278 grams/mile. The average NMOG+NO_x value for the

Canadian 2018 MY fleet of Class 3 vehicles is 0.45054 grams/mile compared to the standard of 0.451 grams/mile.

The overall NMOG+NO_x fleet averages demonstrate industry improvements in emission performance. All companies have complied with the fleet averaging provisions of the Regulations.

All companies have complied with the 2018 PM and EVAP phase-in percentages and have met the cold NMHC fleet average standards.