Air Pollutant Emission Performance for the 2022 Model Year On-Road Vehicle Fleet

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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 which came into place in July of 2015 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) and beyond. 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 was 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 2022 MY fleet of vehicles. A total of 23 companies submitted end of MY reports comprising a total of 1,570,100 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 2022 MY combined fleet of light-duty vehicles and light-duty trucks 1 is 0.0460748 grams/mile compared to the standards of 0.051 grams/mile. The average NMOG+NO_x value for the Canadian 2022 MY combined fleet of light-duty trucks 2, heavy-light duty trucks and medium-duty passenger vehicles is 0.0574179 grams/mile compared to the standard of 0.056 grams/mile. The average NMOG+NO_x value for the Canadian 2022 MY fleet of Class 2B vehicles is 0.19805 grams/mile compared to the standard of 0.178 grams/mile. The average NMOG+NO_x value for the Canadian 2022 MY fleet of Class 3 vehicles is 0.27132 grams/mile compared to the standard of 0.247 grams/mile.

The overall NMOG+NO_x fleet averages demonstrate continued industry improvements in emission performance since 2004. While the fleet average values for the light-duty trucks 2, heavy-light duty trucks and medium-duty passenger vehicles fleet, the Class 2B fleet and the Class 3 fleet are slightly above the applicable standards for the 2022 MY, companies have 3 years to offset any carryover deficits, and all currently remain in compliance with the fleet averaging provisions of the Regulations.

All companies have complied with the 2022 PM standards, the EVAP phase-in percentages and have met the cold NMHC fleet average standards.

All companies remain in compliance with the Regulations.

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 2022 MY. It's 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 vehicles[1] (LDVs), light light-duty trucks[2] (LLDTs) composed of light-duty trucks 1 (LDT1) and light-duty trucks 2 (LDT2), heavy light-duty trucks[3] (HLDTs) composed of light-duty trucks 3 (LDT3) and light-duty trucks 4 (LDT4), medium-duty passenger vehicles[4] (MDPVs), as well as 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.

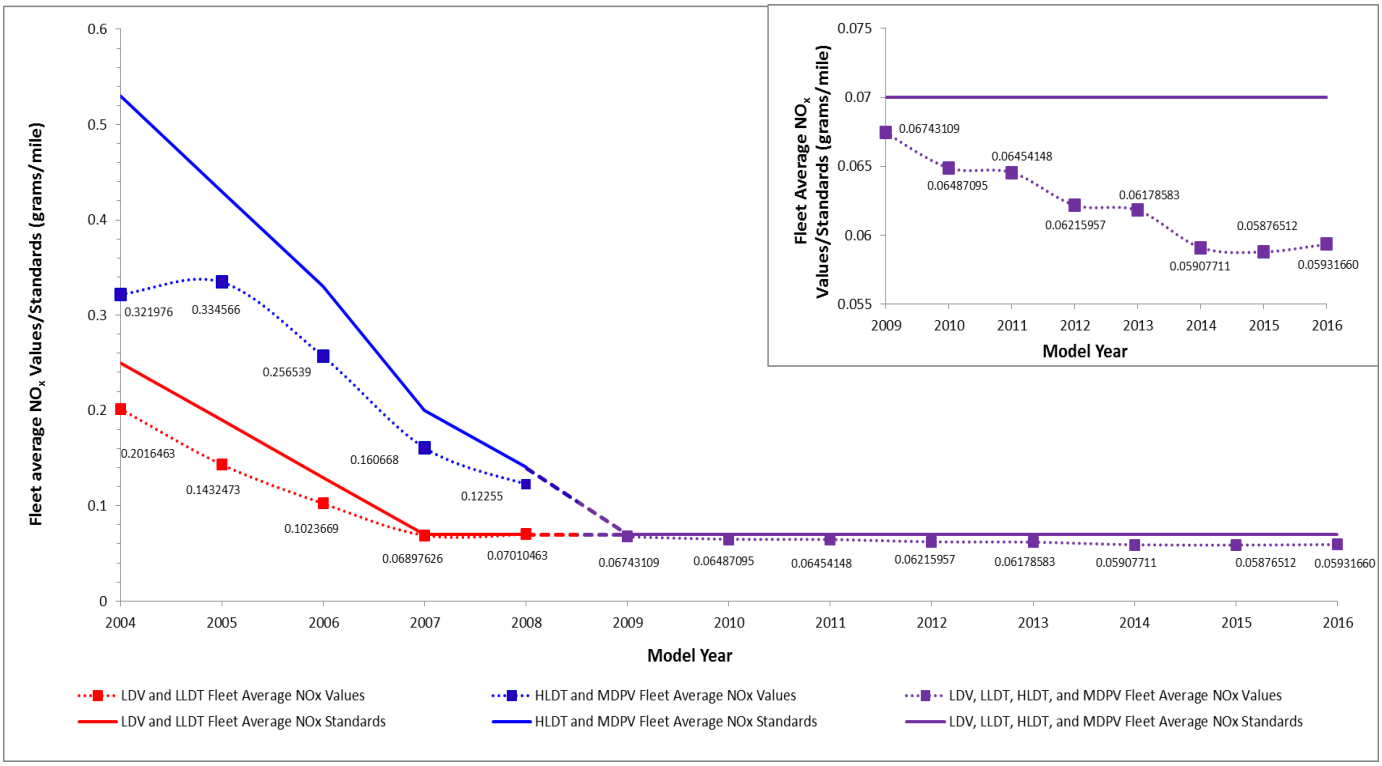
[1] Light-duty vehicles are generally passenger cars.

[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. The exact definitions for LDT1 and LDT2 can be found in the Regulations.

[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: NOx fleet averages and standards for model years 2004 through 2016



The Regulations were subsequently amended in 2015 to set new progressively more stringent emission standards (Tier 3) 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 established vehicle and fleet average standards over the MYs 2017 to 2025 for combined emissions of NMOG and NO_x and established 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 LDVs, light-duty trucks and MDPVs 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 2B[5] and 3[6] 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 were introduced by using a phase-in approach where an increasing percentage of vehicles in a company's fleet for each successive MY are required to comply with the standards, with full implementation commencing with MY 2021. The Regulations

[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).

provides for an alternative phase-in compliance approach for these standards which 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 EVAP standards were introduced by using a phase-in approach where an increasing percentage of a company's fleet of vehicles for each successive MY are required to comply with the standards, with full implementation commencing with MY 2022. The Regulations provides for an alternative phase-in compliance approach for these standards which 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 2015 amendments also introduced 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 was 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 was 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 3 reporting for the 2022 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 2022 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 LDVs and LDT1 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 LDVs and LDT1 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 LDT2, HLDTs and MDPVs;
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 1, table 2 and table 3 outlines the corresponding exhaust emission standards for the Tier 3 FTP bins.

Table 1**:** 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 2: 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 3: 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 4 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 4: overview 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	21
FCA Canada Inc.	Chrysler, Dodge, Jeep, Fiat, Alfa Romeo, RAM	38
Ferrari North America, Inc.	Ferrari	5
Ford Motor Company of Canada, Ltd.	Ford, Lincoln	60
General Motors of Canada Company	Buick, Cadillac, Chevrolet, GMC	36
Honda Canada Inc.	Acura, Honda	22
Hyundai Auto Canada Corp.	Hyundai	38
Jaguar Land Rover Canada, ULC	Jaguar, Land Rover	11
Kia Canada Inc.	Kia	25
Maserati North America, Inc.	Maserati	3
Mazda Canada Inc.	Mazda	8
McLaren Automotive Ltd.	McLaren	2
Mercedes-Benz Canada Inc.	Mercedes, Smart	28
Mitsubishi Motor Sales of Canada	Mitsubishi	5
Morgan Canada Corp.	Morgan Olson	1
Nissan Canada Inc.	Infiniti, Nissan	18
Porsche Cars Canada, Ltd.	Porsche	14
Subaru Canada, Inc.	Subaru	4
Tesla Motors Canada Inc.	Tesla	7
Toyota Canada Inc.	Lexus, Scion, Toyota	36
Volkswagen Group Canada	Audi, Bentley, Bugatti, Lamborghini, Volkswagen	34
Volvo Cars of Canada Corp.	Volvo	8

Table 5 summarizes the distribution of vehicles by the NMOG+NO_x standard for each bin.

Table 5: 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	0	0.000
Tier 3 Bin 570	0.570	0	0.000
Tier 3 Bin 400	0.400	816	0.052
Tier 3 Bin 395	0.395	0	0.000
Tier 3 Bin 340	0.340	0	0.000
Tier 3 Bin 270	0.270	58,010	3.695
Tier 3 Bin 250	0.250	4,922	0.313
Tier 3 Bin 230	0.230	688	0.044
Tier 3 Bin 200	0.200	40,516	2.580
Tier 3 Bin 170	0.170	615	0.039

Tier 3 Bin 160	0.160	10,280	0.655
Tier 3 Bin 150	0.150	2,760	0.176
Tier 3 Bin 125	0.125	91,449	5.824
Tier 3 Bin 110[1]	0.110	0	0.000
Tier 3 Bin 85[1]	0.085	0	0.000
Tier 3 Bin 70	0.070	486,834	31.007
Tier 3 Bin 50	0.050	352,385	22.443
Tier 3 Bin 30	0.030	433,634	27.618
Tier 3 Bin 20	0.020	0	0.000
Tier 3 Bin 0	0.000	87,191	5.553
Total number of Tier 3 vehicles in 2022 MY fleet			1,570,100

1 Transitional Bins

3.1. Fleet average NMOG+NO_x emission performance

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

Table 6 and table 7 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 LDVs, LDTs, HLDTs and MDPVs from MY 2017 to MY 2025.

Table 6: 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, HLDT[2]
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 and subsequent model years	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 HLDT and MDPV must meet the Tier 3 standards starting with MY 2018.

Table 7: 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 and subsequent model years	0.050

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

Table 8, 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 8: 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.

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

Table 9 presents the summary of the company average NMOG+NO_x FTP values for their LDV/LDT1 150k fleets.

Table 9: 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 2022 MY credits[7]	Credit balance
Aston Martin Lagonda Ltd.	45	0.0798	0	0
BMW Group Canada	12,983	0.047894	40	2,548
FCA Canada Inc.	7,542	0.09081	-300	-2,245
Ferrari North America, Inc.	493	0.0975	0	0
Ford Motor Company of Canada, Ltd.	14,051	0.049629	19	-423

[7] Negative totals represent a deficit.

General Motors of Canada Company	31,014	0.037931	405	-206
Honda Canada Inc.	96,490	0.048601	0	0
Hyundai Auto Canada Corp.	80,506	0.052144	0	0
Jaguar Land Rover Canada, ULC	92	0.100	-5	105
Kia Canada Inc.	43,177	0.065619	0	0
Maserati North America, Inc.	193	0.112	0	0
Mazda Canada Inc.	18,057	0.052724	-31	1,921
McLaren Automotive Ltd.	79	0.113	0	0
Mercedes-Benz Canada Inc.	8,354	0.05881	-65	474
Mitsubishi Motor Sales of Canada	14,673	0.070000	-279	-288
Nissan Canada Inc.	33,662	0.039592	384	3,513
Porsche Cars Canada, Ltd.	3,320	0.06977	0	0
Subaru Canada, Inc.	13,927	0.053056	0	0
Tesla Motors Canada Inc.	50,522	0.00000	2 577	7,734
Toyota Canada Inc.	76,092	0.048090	221	2,949
Volkswagen Group Canada	27,245	0.042296	237	5,678
Volvo Cars of Canada Corp.	4,598	0.03689	65	162

Table 10 presents the summary of the company average NMOG+NO_x SFTP values for their LDV/LDT1 150k fleets.

Table 10: 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 2022 MY credits	Credit balance
Aston Martin Lagonda Ltd.	45	0.0700	0	0
BMW Group Canada	12,983	0.058771	146	3 045
FCA Canada Inc.	7,542	0.09304	-174	234
Ferrari North America, Inc.	493	0.0657	0	0

Ford Motor Company of Canada, Ltd.	14,051	0.055330	206	2,290
General Motors of Canada Company	31,014	0.050257	612	3,344
Honda Canada Inc.	96,490	0.066852	0	0
Hyundai Auto Canada Corp.	80,506	0.053533	0	0
Jaguar Land Rover Canada, ULC	92	0.0934	0	0
Kia Canada Inc.	43,177	0.066246	0	0
Maserati North America, Inc.	193	0.125	0	0
Mazda Canada Inc.	18,057	0.062830	129	5,276
McLaren Automotive Ltd.	79	0.0734	0	0
Mercedes-Benz Canada Inc.	8,354	0.05876	94	2,311
Mitsubishi Motor Sales of Canada	14,673	0.078361	-123	73
Nissan Canada Inc.	33,662	0.050983	640	5,788
Porsche Cars Canada, Ltd.	3,320	0.07023	0	0
Subaru Canada, Inc.	13,927	0.060554	0	0
Tesla Motors Canada Inc.	50,522	0.00000	3,537	10,137
Toyota Canada Inc.	76,092	0.054494	1,180	8,934
Volkswagen Group Canada	27,245	0.051701	499	9,085
Volvo Cars of Canada Corp.	4,598	0.04887	97	182

3.1.2. Light-duty trucks 2, heavy light-duty trucks, and medium-duty passenger vehicles

Table 11 provides a summary of the company average NMOG+NO_x FTP values for their LDT2/HLDT/MDPV fleets.

Table 11: 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 2022 MY credits	Credit balance
Aston Martin Lagonda Ltd.	38	0.0700	0	0

BMW Group Canada	18,202	0.071209	-277	-828
FCA Canada Inc.	161,696	0.0667766	-1,743	-3,773
Ford Motor Company of Canada, Ltd.	198,292	0.0523472	724	722
General Motors of Canada Company	157,284	0.0535659	383	-4,752
Honda Canada Inc.	22,724	0.080501	0	0
Hyundai Auto Canada Corp.	51,671	0.054958	0	0
Jaguar Land Rover Canada, ULC	5,111	0.05044	28	1,023
Kia Canada Inc.	16,366	0.070000	0	0
Maserati North America, Inc.	484	0.130	0	0
Mazda Canada Inc.	19,521	0.057254	-24	2,577
Mercedes-Benz Canada Inc.	23,756	0.059838	-91	199
Mitsubishi Motor Sales of Canada	14,265	0.047049	128	764
Morgan Canada Corp.	40	0.125	-3	-3
Nissan Canada Inc.	27,341	0.059817	-104	6,285
Porsche Cars Canada, Ltd.	4,453	0.07613	0	0
Subaru Canada, Inc.	24,800	0.070948	0	0
Toyota Canada Inc.	124,747	0.0526581	417	3,264
Volkswagen Group Canada	46,739	0.048727	340	2,406
Volvo Cars of Canada Corp.	6,234	0.03338	141	569

Table 12 provides a summary of the company average NMOG+NO_x SFTP values for their LDT2/HLDT/MDPV fleets.

Table 12: 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 2022 MY credits	Credit balance
Aston Martin Lagonda Ltd.	38	0.0700	0	0
BMW Group Canada	18,202	0.078288	-151	322
FCA Canada Inc.	161,696	0.0513133	3,022	4,034

Ford Motor Company of Canada, Ltd.	198,292	0.0654068	911	5,231
General Motors of Canada Company	157,284	0.0769324	-1,090	-4,373
Honda Canada Inc.	22,724	0.085512	0	0
Hyundai Auto Canada Corp.	51,671	0.056880	0	0
Jaguar Land Rover Canada, ULC	5,111	0.09954	0	0
Kia Canada Inc.	16,366	0.074027	0	0
Maserati North America, Inc.	484	0.145	0	0
Mazda Canada Inc.	19,521	0.075388	-105	3,878
Mercedes-Benz Canada Inc.	23,756	0.065683	103	3,016
Mitsubishi Motor Sales of Canada	14,265	0.075573	-79	165
Morgan Canada Corp.	40	0.160	-4	-4
Nissan Canada Inc.	27,341	0.077795	-213	3,251
Porsche Cars Canada, Ltd.	4,453	0.08223	0	0
Subaru Canada, Inc.	24,800	0.067213	0	0
Toyota Canada Inc.	124,747	0.0632704	840	8,545
Volkswagen Group Canada	46,739	0.060171	459	4,491
Volvo Cars of Canada Corp.	6,234	0.06698	19	91

3.1.3. Class 2B vehicles

Table 13 presents the summary of the company average NMOG+NO_x FTP values for their Class 2B vehicle fleets.

Table 13: 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 2022 MY credits	Credit balance
FCA Canada Inc.	12,586	0.18972	-148	1,374
Ford Motor Company of Canada, Ltd.	23,022	0.19189	-320	1,477
General Motors of Canada Company	10,372	0.22289	-466	-1,195

Mercedes-Benz Canada Inc.	3,767	0.1951	-64	451

3.1.4. Class 3 vehicles

Table 14 presents the summary of the company average NMOG+NO_x FTP values for their Class 3 fleets.

Table 14: 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 2022 MY credits	Credit balance
FCA Canada Inc.	7,274	0.2840	-269	709
Ford Motor Company of Canada, Ltd.	23,702	0.27018	-549	-1,666
General Motors of Canada Company	27,850	0.27000	-641	2,264
Mercedes-Benz Canada Inc.	688	0.230	12	400

Fleet average NMOG+NO_x values above the applicable NMOG+NO_x standards (that is, negative total MY credits) 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.

3.1.5. 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, LDT and MDPV certified to standards based on a useful life of 150,000 miles and 15 years
3) HDV (Class 2B and 3)

However, FTP and SFTP credits are not interchangeable.

3.1.6. Early action credits

Early action credits were 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 were 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 8.

3.1.7. Overall performance of Canadian fleets

Figure 2 shows the overall Canadian NMOG+NO_x fleet averages from the 2015 to 2022 MY for the LDV/LDT1 and LDT2/HLDT/MDPV fleets.

Figure 2: NMOG+NO_x fleet averages and standards for the light-duty vehicle and light-duty truck 1 fleet and the light-duty truck 2, heavy light-duty trucks and medium-duty passenger vehicles fleet

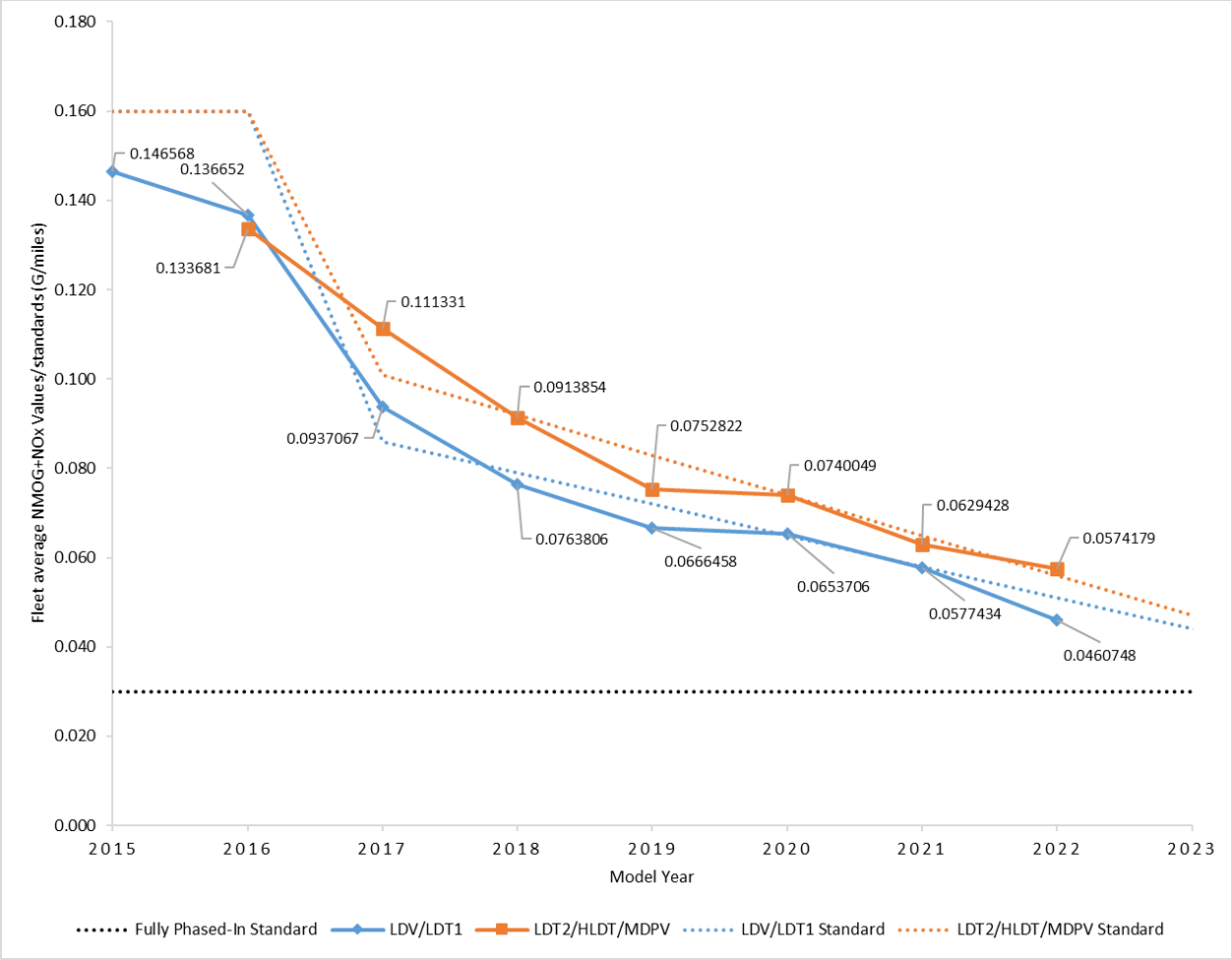
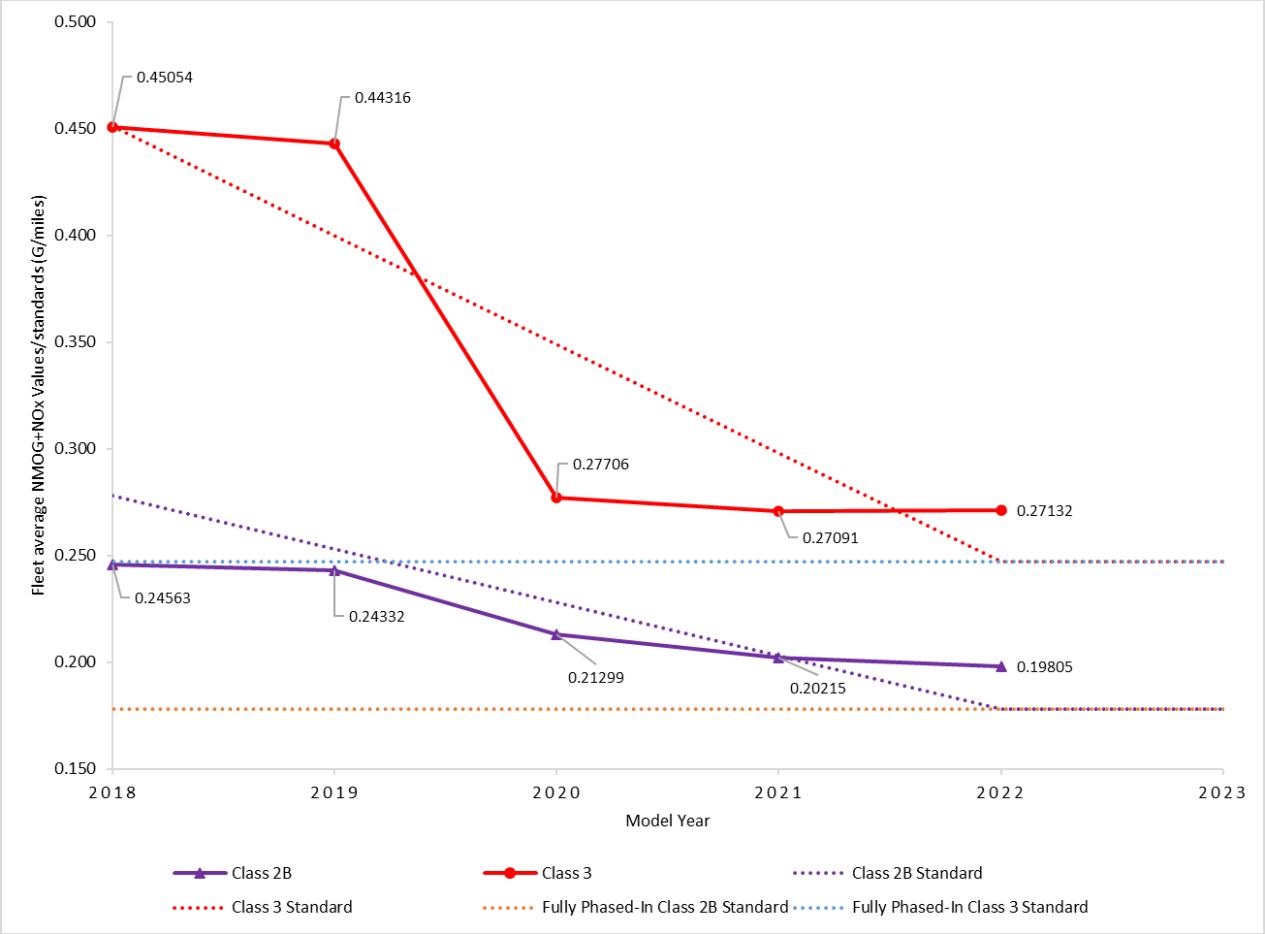


Figure 3 shows the overall Canadian NMOG+NO_x fleet averages from the 2018 to 2022 MY for the Class 2B and Class 3 fleets.

Figure 3: NMOG+NO_x fleet averages and standards for the Class 2B fleet and the Class 3 fleet



3.2. Fleet average cold NMHC emission performance

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

Table 15 presents the fleet average cold temperature NMHC exhaust emission standards.

Table 15: 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	0.5

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

Table 16 presents the summary of company average cold NMHC values for their LDV/LLDT fleets.

Table 16: 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 2022 MY Credits	Credit balance
Aston Martin Lagonda Ltd.	45	0.3	0	0
BMW Group Canada	21,655	0.3	0	0
FCA Canada Inc.	36,464	0.3	0	0
Ferrari North America, Inc.	493	0.3	0	0
Ford Motor Company of Canada, Ltd.	93,598	0.3	0	0
General Motors of Canada Company	73,974	0.3	0	0
Honda Canada Inc.	113,949	0.3	0	0
Hyundai Auto Canada Corp.	122,294	0.3	0	0
Jaguar Land Rover Canada, ULC	1,476	0.3	0	0
Kia Canada Inc.	56,665	0.3	0	0
Maserati North America, Inc.	193	0.3	0	0
Mazda Canada Inc.	36,510	0.2	3,651	30,614
McLaren Automotive Ltd.	79	0.3	0	0
Mercedes-Benz Canada Inc.	20,690	0.2	2,069	6,888
Mitsubishi Motor Sales of Canada	28,938	0.3	0	0
Nissan Canada Inc.	47,978	0.3	0	0
Porsche Cars Canada, Ltd.	4,907	0.3	0	0
Subaru Canada, Inc.	38,727	0.3	0	0
Toyota Canada Inc.	174,357	0.3	0	0
Volkswagen Group Canada	66,791	0.3	0	0
Volvo Cars of Canada Corp.	6,633	0.3	0	0

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

Table 17 presents the summary of company average cold NMHC values for their HLDT/MDPV fleets.

Table 17: 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 2022 MY credits	Credit balance
Aston Martin Lagonda Ltd.	38	0.3	0	0
BMW Group Canada	8,111	0.5	0	4,486
FCA Canada Inc.	128,853	0.4	12,885	78,905
Ford Motor Company of Canada, Ltd.	110,610	0.4	11,061	74,658
General Motors of Canada Company	92,194	0.4	9,219	66,852
Honda Canada Inc.	5,265	0.3	0	0
Hyundai Auto Canada Corp.	402	0.3	80	80
Jaguar Land Rover Canada, ULC	3,675	0.3	735	3,398
Maserati North America, Inc.	484	0.3	0	0
Mercedes-Benz Canada Inc.	11,020	0.2	3,306	10,938
Morgan Canada Corp.	40	0.5	0	0
Nissan Canada Inc.	12,109	0.4	1,211	1,211
Porsche Cars Canada, Ltd.	2,252	0.3	0	0
Toyota Canada Inc.	26,460	0.4	2,646	5,830
Volkswagen Group Canada	3,946	0.5	0	7,039
Volvo Cars of Canada Corp.	2,245	0.3	449	1,455

3.3. Fleet average EVAP emission performance

This section describes the manufacturers EVAP fleet average performance.

Table 18 presents the fleet average EVAP emission standards.

Table 18: 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	0.5
HDV	0.6

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

Table 19 shows the summary of company average EVAP values for their LDV/LDT1 fleets.

Table 19: 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 2022 MY credits	Credit balance
Aston Martin Lagonda Ltd.	45	0.3	0	0
BMW Group Canada	11,970	0.3	0	0
FCA Canada Inc.	7,542	0.3	0	0
Ferrari North America, Inc.	493	0.3	0	0
Ford Motor Company of Canada, Ltd.	8,025	0.3	0	0
General Motors of Canada Company	19,024	0.3	0	0
Honda Canada Inc.	88,885	0.3	0	0
Hyundai Auto Canada Corp.	71,025	0.3	0	0
Jaguar Land Rover Canada, ULC	24	0.3	0	0
Kia Canada Inc.	40,299	0.3	0	0
Mazda Canada Inc.	193	0.3	0	0
McLaren Automotive Ltd.	79	0.3	0	0
Mercedes-Benz Canada Inc.	14,673	0.3	0	0
Mitsubishi Motor Sales of Canada	32,746	0.3	0	0
Nissan Canada Inc.	2,706	0.3	0	0
Porsche Cars Canada, Ltd.	13,927	0.3	0	0
Subaru Canada, Inc.	76,070	0.3	0	0
Toyota Canada Inc.	26,836	0.3	0	0
Volkswagen Group Canada	2,644	0.3	0	0
Volvo Cars of Canada Corp.	14,673	0.4	0	0

3.3.2. Light-duty trucks 2

Table 20 presents the summary of company average EVAP values for their LDT2 fleets.

Table 20: 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 2022 MY credits	Credit balance
BMW Group Canada	9,685	0.3	969	2,445
FCA Canada Inc.	28,922	0.4	0	0
Ford Motor Company of Canada, Ltd.	85,560	0.4	0	0
General Motors of Canada Company	48,509	0.4	0	0
Honda Canada Inc.	17,459	0.4	0	0
Hyundai Auto Canada Corp.	51,269	0.4	0	0
Jaguar Land Rover Canada, ULC	1,384	0.3	0	0
Kia Canada Inc.	16,366	0.4	0	0
Mazda Canada Inc.	19,521	0.3	1,952	12,720
Mercedes-Benz Canada Inc.	12,736	0.3	1,274	4,047
Mitsubishi Motor Sales of Canada	14,265	0.4	0	2,706
Nissan Canada Inc.	15,232	0.4	0	0
Porsche Cars Canada, Ltd.	2,201	0.4	0	0
Subaru Canada, Inc.	24,800	0.3	0	0
Toyota Canada Inc.	98,287	0.4	0	0
Volkswagen Group Canada	39,955	0.4	0	0
Volvo Cars of Canada Corp.	3,989	0.4	0	0

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

Table 21 presents the summary of company average EVAP values for their HLDT/MDPV fleets.

Table 21: 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 2022 MY credits	Credit balance
Aston Martin Lagonda Ltd.	38	0.5	0	0

BMW Group Canada	8,111	0.5	0	0
FCA Canada Inc.	128,853	0.5	0	0
Ford Motor Company of Canada, Ltd.	110,610	0.5	0	0
General Motors of Canada Company	92,194	0.5	0	0
Honda Canada Inc.	5,265	0.5	0	0
Hyundai Auto Canada Corp.	402	0.5	0	0
Jaguar Land Rover Canada, ULC	2,820	0.5	0	0
Maserati North America, Inc.	484	0.3	0	0
Mercedes-Benz Canada Inc.	11,020	0.5	0	0
Morgan Canada Corp.	40	0.5	0	0
Nissan Canada Inc.	12,109	0.5	0	0
Porsche Cars Canada, Ltd.	2,252	0.5	0	0
Toyota Canada Inc.	18,776	0.5	0	140
Volkswagen Group Canada	3,946	0.5	0	2792
Volvo Cars of Canada Corp.	2,245	0.4	0	0

3.3.4. Class 2B and Class 3 vehicles

Table 22 presents the summary of company average EVAP values for their Class 2B and Class 3 fleets.

Table 22: 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 2022 MY credits	Credit balance
FCA Canada Inc.	6,657	0.6	0	0
Ford Motor Company of Canada, Ltd.	21,865	0.6	0	0
General Motors of Canada Company	15,150	0.6	0	0
Mercedes-Benz Canada Inc.	344	0.5	34	40

3.3.5. Evaporative emission averaging sets

The following separate averaging sets apply for evaporative emission standards:

1) LDV and LDT1 together represent a single averaging set

2) LDT2 represents a single averaging set

3) HLDT and MDPV represents a single averaging set

4) HDV (Class 2B and 3) 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

3.4. PM and EVAP phase-in performance

For the 2022 MY, 100% of a company's fleet of LDVs, light-duty trucks and MDPVs and 100% of a company's fleet of Class 2B and Class 3 vehicles must meet the Tier 3 PM standards and 80% of a company's overall fleet must meet the Tier 3 EVAP standards. All companies met these requirements.

4. Conclusions

The 2022 MY results represent the sixth 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 1,570,100 vehicles manufactured in Canada or imported into Canada for the purpose of first retail sale.

The average NMOG+NO_x value for the Canadian 2022 MY combined fleet of light-duty vehicles and light-duty trucks 1 is 0.0460748 grams/mile compared to the standards of 0.051 grams/mile. The average NMOG+NO_x value for the Canadian 2022 MY combined fleet of LDT2, HLDT and MDPVs is 0.0574179 grams/mile compared to the standard of 0.056 grams/mile. The average NMOG+NO_x value for the Canadian 2022 MY fleet of Class 2B vehicles is 0.19805 grams/mile compared to the standard of 0.178 grams/mile. The average NMOG+NO_x value for the Canadian 2022 MY fleet of Class 3 vehicles is 0.27132 grams/mile compared to the standard of 0.247 grams/mile.

The overall NMOG+NO_x fleet averages demonstrate continued industry improvements in emission performance since 2004. While the fleet average values for the LDT2, HLDT and MDPV fleet, the Class 2B fleet and the Class 3 fleet are slightly above the applicable standards for the 2022 MY, companies have 3 years to offset any carryover deficits, and all currently remain in compliance with the fleet averaging provisions of the Regulations.

All companies have complied with the 2022 PM standards, the EVAP phase-in percentages and have met the cold NMHC fleet average standards.

All companies remain in compliance with the Regulations.