

Air Pollutant Emission Performance for the 2021 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 2021 MY fleet of vehicles. A total of 23 companies submitted end of MY reports comprising a total of 1 574 725 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 2021 MY combined fleet of light-duty vehicles and light-duty trucks 1 is 0.0577434 grams/mile compared to the standards of 0.058 grams/mile. The average NMOG+NO_x value for the Canadian 2021 MY combined fleet of light-duty trucks 2, heavy-light duty trucks and medium-duty passenger vehicles is 0.0629428 grams/mile compared to the standard of 0.065 grams/mile. The average NMOG+NO_x value for the Canadian 2021 MY fleet of Class 2B vehicles is 0.20215 grams/mile compared to the standard of 0.203 grams/mile. The average NMOG+NO_x value for the Canadian 2021 MY fleet of Class 3 vehicles is 0.27091 grams/mile compared to the standard of 0.298 grams/mile.

The overall NMOG+NO_x fleet averages demonstrate continued industry improvements in emission performance since 2004.

All companies have complied with the 2021 PM and 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 2021 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), 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. 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.

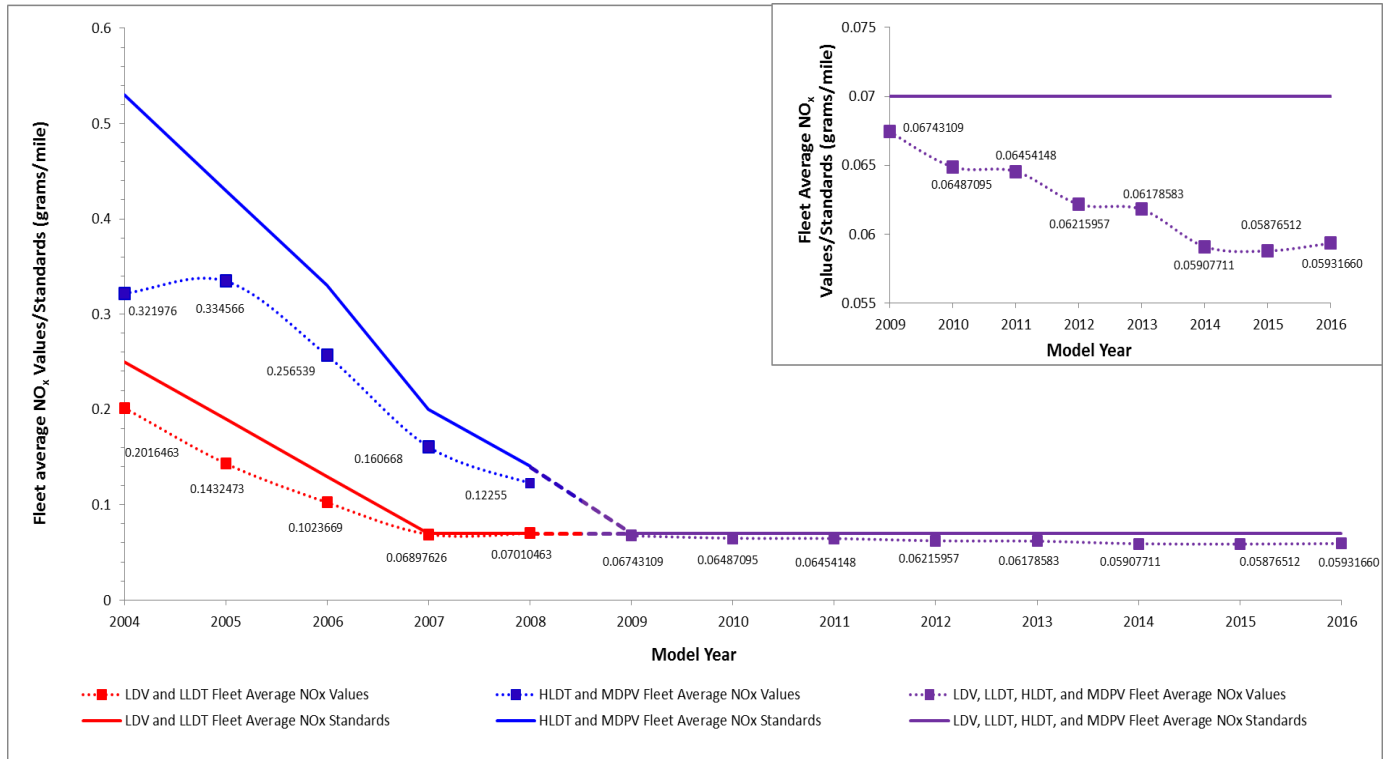
¹ Light-duty vehicles are generally passenger cars.

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: NO_x 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 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 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 evaporative emission (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 2 reporting for the 2021 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, 1 small volume manufacturer has submitted a 2021 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 company 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
Koenigsegg Automotive	Koenigsegg	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 2021 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	2	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 2021 MY, all 2 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 0.07 grams/mile.

A total of 1 company submitted a report containing Tier 2 vehicles for the 2021 MY.

The company average NO_x values were at or below 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 2021 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 2021 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 2021 MY credits
Koenigsegg Automotive	2	0.07	0

4. Tier 3 reporting for the 2021 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 2021 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 outlines 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: 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	23
FCA Canada Inc.	Chrysler, Dodge, Jeep, Fiat, Alfa Romeo, RAM	32
Ferrari North America, Inc.	Ferrari	4
Ford Motor Company of Canada, Ltd.	Ford, Lincoln	53
General Motors of Canada Company	Buick, Cadillac, Chevrolet, GMC	40
Honda Canada Inc.	Acura, Honda	19
Hyundai Auto Canada Corp.	Hyundai	30
Jaguar Land Rover Canada, ULC	Jaguar, Land Rover	12
Kia Canada Inc.	Kia	21
Maserati North America, Inc.	Maserati	2
Mazda Canada Inc.	Mazda	6
McLaren Automotive Ltd.	McLaren	2
Mercedes-Benz Canada Inc.	Mercedes, Smart	28
Mitsubishi Motor Sales of Canada	Mitsubishi	3
Nissan Canada Inc.	Infiniti, Nissan	17
Porsche Cars Canada, Ltd.	Porsche	13
Subaru Canada, Inc.	Subaru	5
Tesla Motors Canada Inc.	Tesla	7
Toyota Canada Inc.	Lexus, Scion, Toyota	32
Volkswagen Group Canada	Audi, Bentley, Bugatti, Lamborghini, Volkswagen	35
Volvo Cars of Canada Corp.	Volvo	5

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	0	0.000
Tier 3 Bin 570	0.570	19	0.001
Tier 3 Bin 400	0.400	489	0.032
Tier 3 Bin 395	0.395	8	0.001
Tier 3 Bin 340	0.340	90	0.001
Tier 3 Bin 270	0.270	35051	2.269
Tier 3 Bin 250	0.250	5040	0.326
Tier 3 Bin 230	0.230	906	0.059
Tier 3 Bin 200	0.200	31047	2.009
Tier 3 Bin 170	0.170	114	0.007
Tier 3 Bin 160	0.160	10928	0.707
Tier 3 Bin 150	0.150	3455	0.224
Tier 3 Bin 125	0.125	191262	12.379
Tier 3 Bin 110 ¹	0.110	0	0.00
Tier 3 Bin 85 ¹	0.085	0	0.00
Tier 3 Bin 70	0.070	541563	35.045
Tier 3 Bin 50	0.050	288321	18.661
Tier 3 Bin 30	0.030	381761	24.709
Tier 3 Bin 20	0.020	172	0.011
Tier 3 Bin 0	0.000	54926	3.555
Total number of Tier 3 vehicles in 2021 MY fleet			1 545 052

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, 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 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 and subsequent model years	0.050

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

Table 12, 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, 150k

Table 13 presents the summary of the company average NMOG+NO_x FTP values for their LDV/LDT1 150k fleets.

Table 13: 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 2021 MY credits⁷	Credit balance
Aston Martin Lagonda Ltd.	38	0.125	0	0
BMW Group Canada	14 450	0.044540	194	2508
FCA Canada Inc.	6012	0.1199	-372	-1 945
Ferrari North America, Inc.	313	0.109	0	0
Ford Motor Company of Canada, Ltd.	12 132	0.052298	69	-442
General Motors of Canada Company	31 374	0.048937	284	-611
Honda Canada Inc.	91 630	0.076686	0	0
Hyundai Auto Canada Corp.	83 659	0.062191	0	0
Jaguar Land Rover Canada, ULC	268	0.0464	3	110
Kia Canada Inc.	61 253	0.067977	0	0
Maserati North America, Inc.	120	0.129	0	0
Mazda Canada Inc.	36 557	0.060667	-97	1 952
McLaren Automotive Ltd.	84	0.110	0	0
Mercedes-Benz Canada Inc.	8 446	0.06648	-72	539
Mitsubishi Motor Sales of Canada	7 760	0.07000	-93	-9
Nissan Canada Inc.	57 645	0.049935	465	3 129
Porsche Cars Canada, Ltd.	2 380	0.06273	0	0
Subaru Canada, Inc.	39 440	0.058386	0	0
Tesla Motors Canada Inc.	33 864	0.00000	1 964	5 157

⁷ Negative totals represent a deficit.

Toyota Canada Inc.	73 056	0.057553	33	2 728
Volkswagen Group Canada	26 446	0.041317	441	5 441
Volvo Cars of Canada Corp.	1 807	0.02184	65	97

Table 14 presents the summary of the company average NMOG+NO_x SFTP values for their LDV/LDT1 150k 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, 150K fleet

Company	Total number of vehicles in fleet	Fleet average NMOG+NO _x value (grams/mile)	Total 2021 MY credits	Credit balance
Aston Martin Lagonda Ltd.	38	0.077	0	0
BMW Group Canada	14 450	0.058760	264	2 899
FCA Canada Inc.	6012	0.1117	-209	408
Ferrari North America, Inc.	313	0.070	0	0
Ford Motor Company of Canada, Ltd.	12 132	0.055904	256	2 084
General Motors of Canada Company	31 374	0.062403	458	2 732
Honda Canada Inc.	91 630	0.084636	0	0
Hyundai Auto Canada Corp.	83 659	0.062566	0	0
Jaguar Land Rover Canada, ULC	268	0.0998	0	0
Kia Canada Inc.	61 253	0.068417	0	0
Maserati North America, Inc.	120	0.145	0	0
Mazda Canada Inc.	36557	0.065825	409	5 147
McLaren Automotive Ltd.	84	0.072	0	0
Mercedes-Benz Canada Inc.	8 446	0.067105	84	2 217
Mitsubishi Motor Sales of Canada	7 760	0.07000	54	196
Nissan Canada Inc.	57 645	0.060116	973	5 148
Porsche Cars Canada, Ltd.	2 380	0.06619	0	0
Subaru Canada, Inc.	39 440	0.057485	0	0

Tesla Motors Canada Inc.	33 864	0.00000	2 608	6 600
Toyota Canada Inc.	73 056	0.056411	1 504	7 754
Volkswagen Group Canada	26 446	0.050067	712	8 586
Volvo Cars of Canada Corp.	1 807	0.04179	64	85

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

Table 15 provides a summary of the company average NMOG+NO_x FTP values for their LDT2/HLDT/MDPV fleets.

Table 15: 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 2021 MY credits	Credit balance
Aston Martin Lagonda Ltd.	94	0.125		0
BMW Group Canada	15 221	0.077790	-195	-551
FCA Canada Inc.	161 304	0.0775876	-2 030	-9168
Ford Motor Company of Canada, Ltd.	177 017	0.0570903	1 400	-2
General Motors of Canada Company	159 753	0.0739468	-1 429	-5 135
Honda Canada Inc.	12 536	0.063777	0	0
Hyundai Auto Canada Corp.	20 421	0.052577	0	0
Jaguar Land Rover Canada, ULC	7 873	0.05745	59	995
Kia Canada Inc.	13 709	0.070000	0	0
Maserati North America, Inc.	362	0.128	0	0
Mazda Canada Inc.	39 945	0.042700	891	2 601
Mercedes-Benz Canada Inc.	25 324	0.065634	-16	290
Mitsubishi Motor Sales of Canada	300	0.0300	11	636
Nissan Canada Inc.	29 598	0.035464	899	6 389
Porsche Cars Canada, Ltd.	6 663	0.07444	0	0
Subaru Canada, Inc.	19 750	0.072701	0	0

Toyota Canada Inc.	157 500	0.0547737	1 611	2 847
Volkswagen Group Canada	53 762	0.054407	570	2 066
Volvo Cars of Canada Corp.	8 638	0.04534	170	428

Table 16 provides a summary of the company average NMOG+NO_x SFTP values for their LDT2/HLDT/MDPV fleets.

Table 16: 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 2021 MY credits	Credit Balance
Aston Martin Lagonda Ltd.	94	0.0770	0	0
BMW Group Canada	15 221	0.084570	-115	473
FCA Canada Inc.	161 304	0.0710682	957	1 012
Ford Motor Company of Canada, Ltd.	177 017	0.0689074	1 433	4 320
General Motors of Canada Company	159 753	0.0905801	-2 169	-3 283
Honda Canada Inc.	12 536	0.083406	0	0
Hyundai Auto Canada Corp.	20 421	0.052577	0	0
Jaguar Land Rover Canada, ULC	7 873	0.01001	0	0
Kia Canada Inc.	13 709	0.077841	0	0
Maserati North America, Inc.	362	0.147	0	0
Mazda Canada Inc.	39 945	0.065401	1 351	3 983
Mercedes-Benz Canada Inc.	25 324	0.062159	376	2 913
Mitsubishi Motor Sales of Canada	300	0.0500	8	244
Nissan Canada Inc.	29 598	0.038080	1 152	3 464
Porsche Cars Canada, Ltd.	6 663	0.08161	0	0
Subaru Canada, Inc.	19 750	0.062107	0	0
Toyota Canada Inc.	157 500	0.0637778	2 082	7 705
Volkswagen Group Canada	53 762	0.065520	617	4 032
Volvo Cars of Canada Corp.	8 638	0.08060	-31	72

4.1.3 Class 2B vehicles

Table 17 presents the summary of the company average NMOG+NO_x FTP values for their Class 2B vehicle fleets.

Table 17: 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 2021 MY credits	Credit balance
FCA Canada Inc.	8 392	0.1894	114	1 522
Ford Motor Company of Canada, Ltd.	17 775	0.20000	53	1 797
General Motors of Canada Company	9 984	0.2182	-152	-729
Mercedes-Benz Canada Inc.	3 603	0.1991	14	515
Nissan Canada Inc.	323	0.188	5	125

4.1.4 Class 3 vehicles

Table 18 presents the summary of the company average NMOG+NO_x FTP values for their Class 3 fleets.

Table 18: 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 2021 MY credits	Credit balance
FCA Canada Inc.	3 049	0.2893	27	978
Ford Motor Company of Canada, Ltd.	11 505	0.27092	312	-1 117
General Motors of Canada Company	21 005	0.27000	588	2 905
Mercedes-Benz Canada Inc.	906	0.230	62	388

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.

4.1.5 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.

4.1.6 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.

4.1.7. Overall performance of Canadian fleets

Figure 2 shows the overall Canadian NMOG+NO_x fleet averages from the 2015 to 2021 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

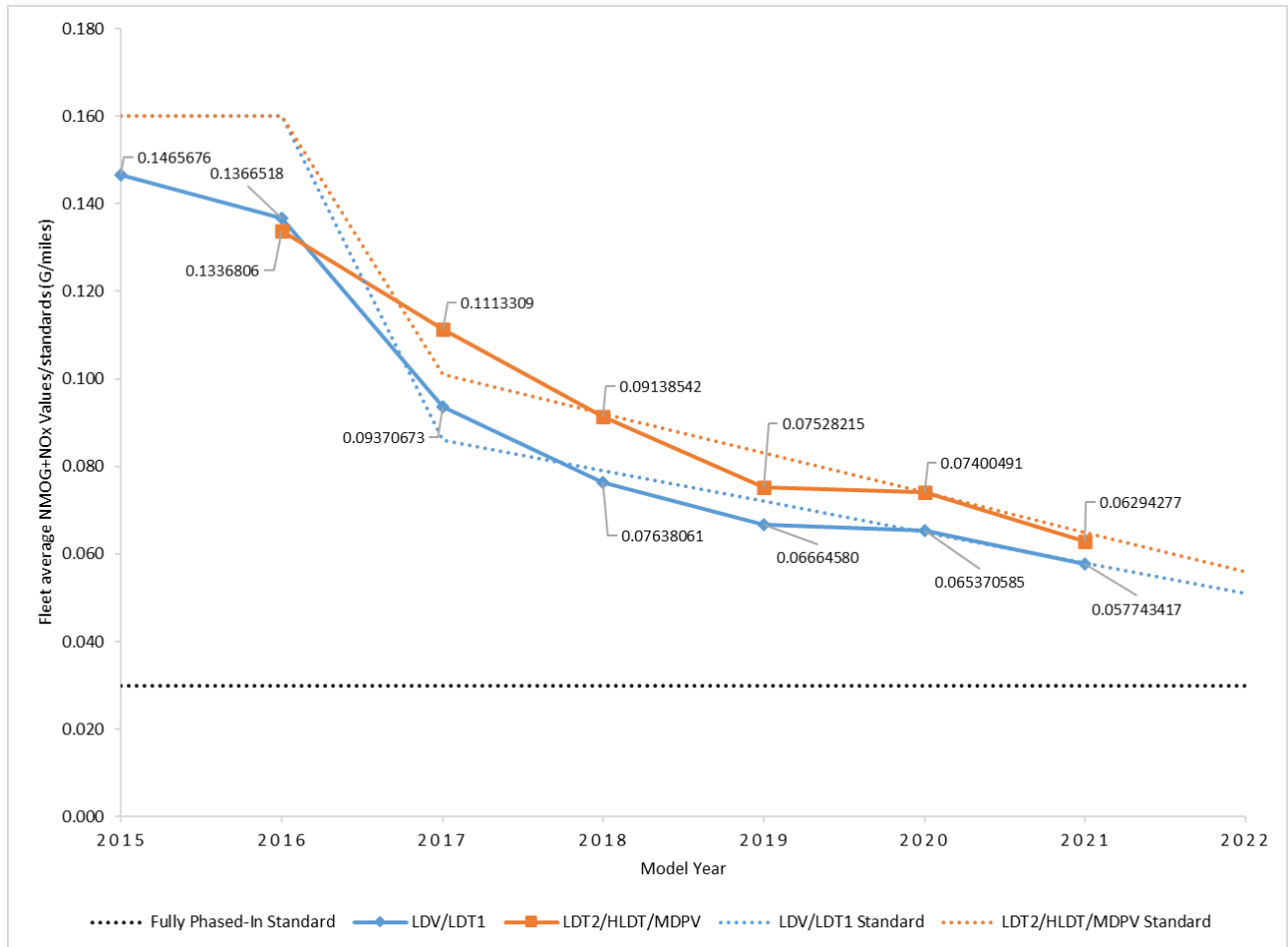
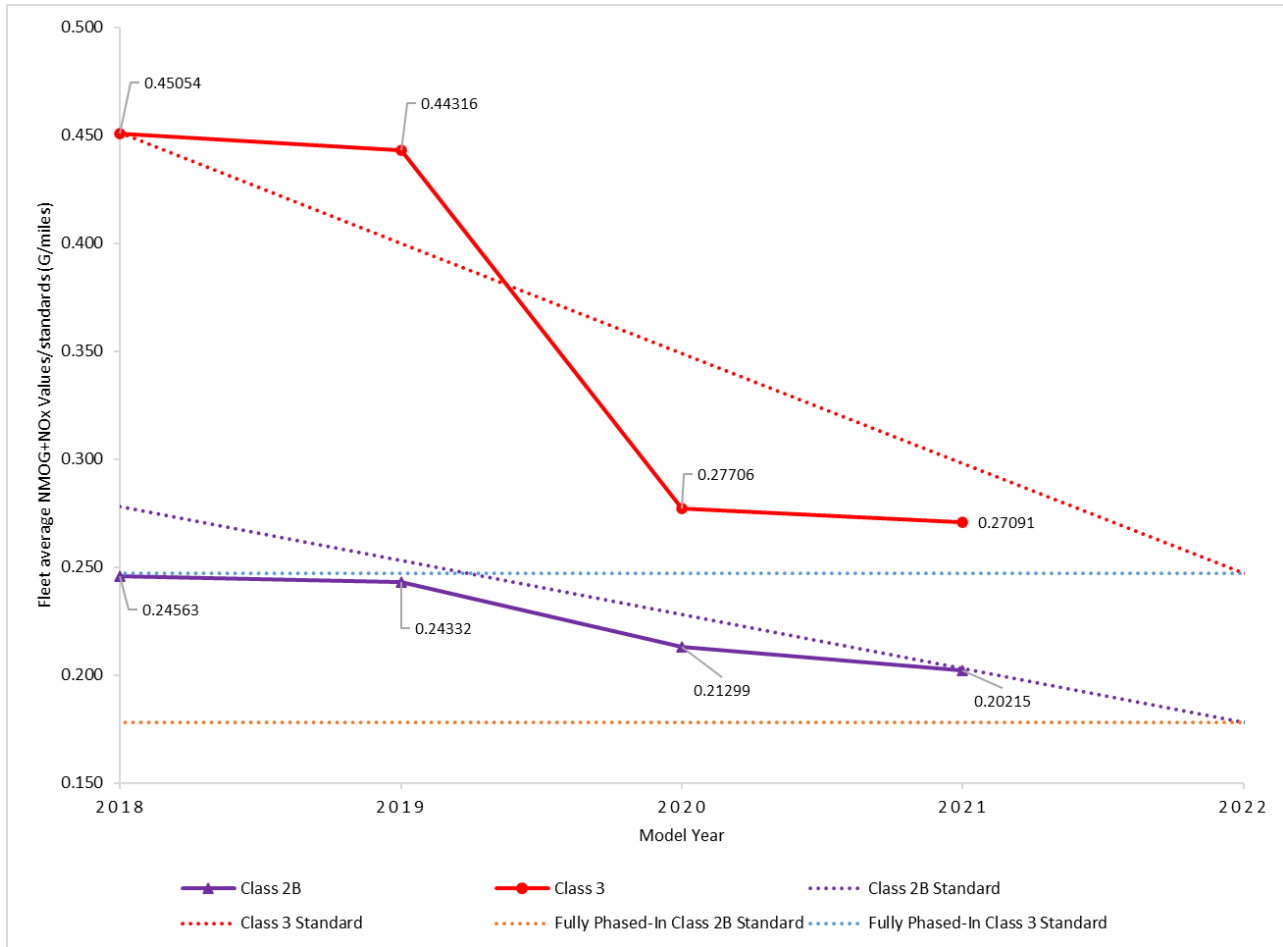


Figure 3 shows the overall Canadian NMOG+NO_x fleet averages from the 2018 to 2021 MY for the Class 2B and Class 3 fleets.

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



4.2. Fleet average cold NMHC emission performance

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

Table 19 presents the fleet average cold temperature NMHC exhaust emission standards.

Table 19: 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

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

Table 20 presents the summary of company average cold NMHC values for their LDV/LLDT fleets.

Table 20: 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 2021 MY Credits	Credit balance
Aston Martin Lagonda Ltd.	38	0.3	0	0
BMW Group Canada	22 142	0.3	0	0
FCA Canada Inc.	54 472	0.3	0	0
Ferrari North America, Inc.	313	0.3	0	0
Ford Motor Company of Canada, Ltd.	65 515	0.3	0	0
General Motors of Canada Company	63 087	0.3	0	0
Honda Canada Inc.	103 537	0.3	0	0
Hyundai Auto Canada Corp.	94 859	0.3	0	0
Jaguar Land Rover Canada, ULC	3 786	0.3	0	0
Kia Canada Inc.	72 832	0.3	0	0
Maserati North America, Inc.	120	0.3	0	0
Mazda Canada Inc.	76 502	0.2	7 650	26 963
McLaren Automotive Ltd.	84	0.3	0	0
Mercedes-Benz Canada Inc.	21 397	0.2	2 140	4 819
Mitsubishi Motor Sales of Canada	8 060	0.3	0	0
Nissan Canada Inc.	855 376	0.3	0	0
Porsche Cars Canada, Ltd.	5 996	0.3	0	0
Subaru Canada, Inc.	59 190	0.3	0	0
Toyota Canada Inc.	198 716	0.3	0	0
Volkswagen Group Canada	64 945	0.3	0	0
Volvo Cars of Canada Corp.	7 046	0.3	0	0

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

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

Table 21: 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 2021 MY credits	Credit Balance
Aston Martin Lagonda Ltd.	94	0.3	0	0
BMW Group Canada	7 529	0.5	0	4 486
FCA Canada Inc.	109 539	0.4	10 954	66 020
Ford Motor Company of Canada, Ltd.	117 866	0.4	11 787	63 597
General Motors of Canada Company	107 171	0.4	10 717	57 633
Honda Canada Inc.	629	0.3	0	0
Hyundai Auto Canada Corp.	1 091	0.3	0	0
Jaguar Land Rover Canada, ULC	3 724	0.3	745	2 663
Maserati North America, Inc.	362	0.3	0	0
Mercedes-Benz Canada Inc.	12 373	0.3	2 475	7 632
Nissan Canada Inc.	1 428	0.5	0	0
Porsche Cars Canada, Ltd.	2 450	0.3	0	0
Toyota Canada Inc.	31 840	0.4	3 184	3 184
Volkswagen Group Canada	13 151	0.4	1 315	7 039
Volvo Cars of Canada Corp.	2 522	0.3	504	1 006

4.3. Fleet average EVAP emission performance

This section describes the manufacturers EVAP fleet average performance.

Table 22 presents the fleet average EVAP emission standards.

Table 22: 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

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

Table 23 shows the summary of company average EVAP values for their LDV/LDT1 fleets.

Table 23: 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 2021 MY credits	Credit Balance
BMW Group Canada	13 835	0.3	0	0
FCA Canada Inc.	5 236	0.3	0	0
Ferrari North America, Inc.	134	0.3	0	0
Ford Motor Company of Canada, Ltd.	3 600	0.3	0	0
General Motors of Canada Company	21 800	0.3	0	0
Honda Canada Inc.	84 506	0.3	0	0
Hyundai Auto Canada Corp.	70 307	0.3	0	0
Jaguar Land Rover Canada, ULC	201	0.3	0	0
Kia Canada Inc.	53 241	0.3	0	0
Mazda Canada Inc.	30 662	0.3	0	0
Mercedes-Benz Canada Inc.	8 446	0.3	0	0
Mitsubishi Motor Sales of Canada	7 760	0.3	0	0
Nissan Canada Inc.	57 145	0.3	0	0
Porsche Cars Canada, Ltd.	1 333	0.3	0	0
Subaru Canada, Inc.	36 565	0.3	0	0
Toyota Canada Inc.	73 056	0.3	0	0
Volkswagen Group Canada	20 374	0.3	0	0
Volvo Cars of Canada Corp.	930	0.3	0	0

4.3.2. Light-duty trucks 2

Table 24 presents the summary of company average EVAP values for their LDT2 fleets.

Table 24: 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 2021 MY credits	Credit Balance
BMW Group Canada	7 692	0.3	769	1 476
FCA Canada Inc.	47 830	0.4	0	0
Ford Motor Company of Canada, Ltd.	56 661	0.4	0	0
General Motors of Canada Company	33 274	0.4	0	0
Honda Canada Inc.	11 907	0.4	0	0
Hyundai Auto Canada Corp.	19 330	0.4	0	0
Jaguar Land Rover Canada, ULC	3 518	0.3	0	0
Kia Canada Inc.	13 709	0.4	0	0
Mazda Canada Inc.	27 262	0.3	2 726	10 768
Mercedes-Benz Canada Inc.	12 951	0.3	1 295	2 773
Mitsubishi Motor Sales of Canada	300	0.3	30	2 706
Nissan Canada Inc.	28 170	0.4	0	0
Subaru Canada, Inc.	19 750	0.3	0	0
Toyota Canada Inc.	125 660	0.4	0	0
Volkswagen Group Canada	38499	0.4	0	0
Volvo Cars of Canada Corp.	6 116	0.4	0	0

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

Table 25 presents the summary of company average EVAP values for their HLTD/MDPV fleets.

Table 25: 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 2021 MY credits	Credit Balance
BMW Group Canada	7 529	0.5	0	0
FCA Canada Inc.	107 403	0.5	0	0
Ford Motor Company of Canada, Ltd.	117 191	0.5	0	0
General Motors of Canada Company	107 171	0.5	0	0
Honda Canada Inc.	629	0.5	0	0
Jaguar Land Rover Canada, ULC	2 396	0.5	0	0
Mercedes-Benz Canada Inc.	12 373	0.5	0	0
Nissan Canada Inc.	1 428	0.5	0	0
Porsche Cars Canada, Ltd.	2 540	0.5	0	0
Toyota Canada Inc.	13 148	0.5	0	140
Volkswagen Group Canada	13 151	0.4	1 315	2 792
Volvo Cars of Canada Corp.	2 522	0.4	0	0

4.3.4. Class 2B and Class 3 vehicles

Table 26 presents the summary of company average EVAP values for their Class 2B and Class 3 fleets.

Table 26: 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 2021 MY credits	Credit Balance
FCA Canada Inc.	5 379	0.6	0	0
Ford Motor Company of Canada, Ltd.	19 459	0.6	0	0
General Motors of Canada Company	12 977	0.6	0	0
Mercedes-Benz Canada Inc.	64	0.5	6	6

4.3.5 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.

4.4. PM and EVAP phase-in performance

For the 2021 MY, 100% of a company's fleet of light-duty vehicles, light-duty trucks and medium-duty passenger vehicles 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 2021 MY results represent the fifth 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 1 574 725 vehicles manufactured in Canada or imported into Canada for the purpose of first retail sale.

The average NMOG+NO_x value for the Canadian 2021 MY combined fleet of light-duty vehicles and light-duty trucks 1 is 0.0577434 grams/mile compared to the standards of 0.058 grams/mile. The average NMOG+NO_x value for the Canadian 2021 MY combined fleet of light-duty trucks 2, heavy-light duty trucks and medium-duty passenger vehicles is 0.0629428 grams/mile compared to the standard of 0.065 grams/mile. The average NMOG+NO_x value for the Canadian 2021 MY fleet of Class 2B vehicles is 0.20215 grams/mile compared to the standard of 0.203 grams/mile. The average NMOG+NO_x value for the Canadian 2021 MY fleet of Class 3 vehicles is 0.27091 grams/mile compared to the standard of 0.298 grams/mile.

The overall NMOG+NO_x fleet averages demonstrate continued industry improvements in emission performance since 2004.

All companies have complied with the 2021 PM and EVAP phase-in percentages and have met the cold NMHC fleet average standards.

All companies remain in compliance with the Regulations.