# DRIVE CLEAN GUIDE

EMISSION STANDARDS, EMISSION TEST METHODS,
AND TECHNICAL INFORMATION RELATING TO
ONTARIO REGULATION 361/98 AS AMENDED

DRIVE CLEAN OFFICE

MINISTRY OF THE ENVIRONMENT

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# INTRODUCTION

Drive Clean was introduced in 1999 to reduce smog-causing emissions from cars, trucks and buses.

Drive Clean requirements are set out in Ontario Regulation 361/98 (Motor Vehicles), as amended, made under the authority of the *Environmental Protection Act*. In this document, O. Reg. 361/98, as amended, is referred to as the "Regulation."

The Drive Clean Guide is incorporated by reference into Ontario Regulation 361/98 and sets out the test procedures and emission standards prescribed by the Regulation.

The specific methods for measuring vehicle emissions, as well as the standards vehicles must meet to pass a Drive Clean test, are set out in this Guide.

The Ministry of the Environment's on-road enforcement component, known as the Vehicle Emissions and Enforcement Unit (VEEU), makes use of this guide for the procedures and standards applicable to its enforcement program.

Regulations under the *Highway Traffic Act* specify which vehicles must pass an emissions test for registration renewal, for transferring ownership of a used vehicle, or for other transactions requiring a Safety Standards Certificate. These provisions are found in Regulation 628, R.R.O. 1990, as amended, and they address such items as model years affected, test frequency and included geographic areas. In Regulation 628, Registered Gross Weight determines the test notification and frequency. In this document, Regulation 628 is referred to as the "HTA Regulation".

The Drive Clean logos for Light Vehicles and Heavy Vehicles (in English and in French), the phrase "for the air we breathe" and the phrase "respirons en toute tranquillité" are official marks of the Province of Ontario pursuant to the provisions of the Trade-marks Act (Canada). The official marks cannot be used for any purpose, whether commercial or non-commercial, without the prior written consent of the Province.

# 1. DEFINITIONS

The Regulation contains definitions of relevant terms. The following are definitions of terms used in this Guide:

| Term | Definition |
|---|---|
| **CO** | Carbon Monoxide |
| **DLC** | Data Link Connector – socket located on a vehicle that allows external diagnostic systems to communicate with a vehicle's computer |
| **DTC** | Diagnostic Trouble Code - codes used by a vehicle's computer to identify vehicle problems |
| **ETW** | Equivalent Test Weight - the weight in pounds specified by the manufacturer as the representative vehicle weight for emissions testing by the ASM 2525 dynamometer test |
| **Director** | Person designated under the *Environmental Protection Act* by the Minister of the |

| | |
|---|---|
| | Environment to make decisions and perform other functions with respect to a regulation |
| **GVWR** | Gross vehicle weight rating - the value specified by the vehicle manufacturer as the loaded weight of a single vehicle |
| **HC** | Hydrocarbons |
| **Heavy Vehicle** | A motor vehicle with a GVWR of more than 4,500 kilograms |
| **Light Truck** | a motor vehicle that is not a passenger vehicle and that is a truck, utility vehicle or van and whose GVWR does not exceed 4,500 kg |
| **Light Vehicle** | A motor vehicle with a GVWR of 4,500 kilograms or less |
| **MIL** | Malfunction Indicator Light - a visual light on a vehicle's dashboard that indicates when there is a problem with a vehicle's emissions system; sometimes referred to as the "Check Engine" light |
| **NOx** | Nitrogen oxides. |
| **On-Board Diagnostic System (OBD)** | A diagnostic system designed to identify motor or emissions control system problems and regulate motor or emission control system operations. |
| **RGW** | Registered gross weight - as determined at the time of obtaining a permit for the vehicle, and has the same meaning as described in Regulation 628, R.R.O. 1990. |
| **SOP** | Standard Operating Procedure - pertaining to the "Light Duty Vehicle Standard Operating Procedures for Ontario's Drive Clean Facilities" or the "Heavy Duty Vehicle Standard Operating Procedures for Ontario's Drive Clean Facilities" |
| **USEPA** | United States Environmental Protection Agency |

## TABLE 2a - ON-BOARD DIAGNOSTICS SYSTEM ADVISORY TEST FOR THE PURPOSE OF SUBSECTION 2(8) OF O. REG. 361/98: LIGHT AND HEAVY VEHICLES

| Model year and GVWR | Test | Compliance |
|---|---|---|
| 1998 & later, light vehicle | Turn ignition on, look for response from MIL | MIL must illuminate<br>- Advisory Only |
| | Start engine, look for response from MIL | MIL stays illuminated temporarily but must not stay illuminated<br>- Advisory Only |

NOTES:
1. A MIL is designed to illuminate when the ignition is turned on to show that the light is working, but to extinguish a few seconds after the engine is started.
2. The OBD system test for heavy vehicles will be specified in a future amendment to the Guide.

# 8. TWO SPEED IDLE TEST GASOLINE FUELLED LIGHT VEHICLES (AND OTHER FUELS EXCEPT DIESEL)

The following Two Speed Idle Test is to be used in the program up until December 31, 2012, for vehicles unable to be tested using the dynamometer as described in Section 9.

The following Two Speed Idle Test is to be used in the program effective January 1, 2013, for vehicles unable to be tested using the OBD system test as described in Section 9.0.1. This

will include vehicles with the model years 1988-1997, vehicles not OBD enabled or vehicles not compatible with the performance of the OBD test procedure referred to in Section 9.0.1 of the Regulation. Appendix D of the Drive Clean SOP will list the majority of vehicles the ministry has identified as not being compatible with the OBD test.

Maximum emissions standards for the preconditioned Two Speed Idle Test are provided in Table 8.

The procedure to be used is the preconditioned Two Speed Idle Test set out in the USEPA publication *EPA-AA-TSS-I/M-90-3 January 1991 – Recommended I/M Short Test Procedures for the 1990's: Six Alternatives.*

A test may be used that the Director considers equivalent.

### TABLE 8: MAXIMUM EMISSION STANDARDS

**Two Speed Idle Test***
**Gasoline Fuelled Light Vehicles (And Other Fuels Except Diesel)**

| Model year and GVWR | HC (ppm) by volume | CO (%) by volume | Visible emissions (seconds in any one-minute period) |
|---|---|---|---|
| **For vehicles up to 3855 kg GVWR:** | | | |
| 1998 & later | 150 | 0.7 | 5 |
| 1988-97 | 200 | 1 | 5 |
| 1981-1987 | 300 | 1.5 | 5 |
| 1980 and earlier | 600 | 5 | 5 |
| **For vehicles over 3855 kg GVWR but not over 4,500 kg GVWR:** | | | |
| 1998 & later | 200 | 1 | 5 |
| 1988-97 | 220 | 1.2 | 5 |
| 1980-87 | 300 | 3 | 5 |
| 1975-79 | 400 | 4 | 5 |
| 1970-74 | 800 | 6.5 | 5 |
| 1969 and earlier | 1000 | 8 | 5 |

* Emission standards for both idle test and 2500 RPM test

# 9. GASOLINE FUELLED LIGHT VEHICLES (AND OTHER FUELS EXCEPT DIESEL)

The following dynamometer test is to be used in the program until December 31, 2012: ASM 2525 Dynamometer Test.

## Key to the Tables

TABLE 9: KEY below indicates where to find the appropriate maximum emission standards from the “look up” tables which follow for the ASM 2525 Dynamometer Test. These emission

standards are installed in the software associated with the dynamometer test equipment, to be referenced automatically by the computer system, not manually.

For light passenger vehicles and two classes of light trucks (distinguished by GVWR), a column number is specified for each group of model years and each of the three emissions of interest (hydrocarbons, carbon monoxide, and oxides of nitrogen). The column number is used to identify the emission standards in the table specified under each of the three emission headings. The applicable emission standard is found in the indicated column, opposite the ETW, specified by the manufacturer, for the motor vehicle in question.

For example, a light passenger vehicle of model year 1993 and ETW of 2125 lb has a maximum emission of carbon monoxide specified in Table 9-CO as 0.51%. For 2001 and 2002, the Regulation requires the use of the multiplier 1.30, which changes the result to 0.66%. (Note the use of the multiplier 1.15 for 2003 and 2004).

## ASM 2525 Dynamometer Test

If a motor vehicle is tested for compliance with the maximum emission standards appearing in TABLES 9: HC, 9: CO, and 9: NOX, using the TABLE 9: KEY below, the procedure to be used is the ASM 2525 Dynamometer Test (acceleration simulation mode test) as set out in the USEPA publication *EPA-AA-RSPD-96-2 – Acceleration Simulation Mode Test Procedures, Emission Standards, Quality Control Requirements, and Equipment Specifications, Technical Guidance, Attachment B, July 1996.*

If a motor vehicle is tested for compliance with the maximum emission standards appearing in Table 8 following the ASM 2525 Dynamometer Test, the procedure to be used is the Two Speed Idle test in the previous Section 8, with the exception that only the curb idle speed is used (single speed idle - accelerator at rest).

A test may be used that the Director considers equivalent.

# TABLE 9: KEY

## KEY TO TABLES 9-HC, 9-CO, 9-NOX for Gasoline Fuelled Light Vehicles (and other fuels except diesel)

| Light vehicles (non diesel) | | | |
|---|---|---|---|
| Model years | Hydrocarbons Table 9-HC | Carbon monoxide Table 9-CO | Nitrogen Oxides Table 9-NOX |
| 1996+ | 1 | 21 | 41 |
| 1992-1995 | 1 | 21 | 41 |
| 1988-1991 | 1 | 21 | 42 |
| 1984-1987 | 2 | 22 | 44 |
| 1981-1983 | 2 | 22 | 45 |
| 1980 and earlier | 10 | 30 | 51 |
| Light Trucks 1 (less than or equal to 6,000 pounds (2722 kg) GVWR - non diesel) | | | |
| Model years | Hydrocarbons Table 9-HC | Carbon monoxide Table 9-CO | Nitrogen Oxides Table 9-NOX |
| 1996+ | 1 | 21 | 42 |
| 1992-1995 | 1 | 21 | 43 |
| 1988-1991 | 2 | 22 | 44 |
| 1984-1987 | 3 | 23 | 45 |
| 1981-1983 | 3 | 24 | 46 |
| 1980 and earlier | 10 | 30 | 51 |
| Light Trucks 2 (greater than 6,000 pounds (2722 kg) but less than or equal to 9,921 pounds (4,500 kg) (GVWR – non diesel) | | | |
| Model years | Hydrocarbons Table 9-HC | Carbon monoxide Table 9-CO | Nitrogen Oxides Table 9-NOX |
| 1996+ | 2 | 22 | 46 |
| 1992-1995 | 2 | 22 | 47 |
| 1988-1991 | 3 | 23 | 48 |
| 1984-1987 | 4 | 24 | 49 |
| 1981--1983 | 6 | 25 | 49 |
| 1980 and earlier | 10 | 30 | 51 |

# TABLE 9: HC

## HYDROCARBONS (ppm - hexane equivalent)

Dynamometer Test for Gasoline Fuelled Light Vehicles (and other fuels except diesel)
Use values in Columns 1 to 13.

| ETW (lb) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1750** | 105 | 166 | 192 | 217 | 242 | 280 | 293 | 305 | 344 | 534 | 585 | 637 | 845 |
| **1875** | 99 | 158 | 182 | 205 | 228 | 265 | 276 | 288 | 324 | 502 | 552 | 600 | 795 |
| **2000** | 95 | 149 | 172 | 194 | 216 | 250 | 261 | 272 | 306 | 474 | 520 | 566 | 750 |
| **2125** | 89 | 142 | 163 | 184 | 205 | 237 | 247 | 258 | 289 | 448 | 491 | 535 | 708 |
| **2250** | 85 | 135 | 155 | 175 | 195 | 225 | 235 | 245 | 275 | 424 | 465 | 506 | 671 |
| **2375** | 82 | 128 | 148 | 166 | 185 | 213 | 223 | 232 | 261 | 402 | 441 | 480 | 636 |
| **2500** | 78 | 123 | 141 | 158 | 177 | 203 | 212 | 222 | 248 | 382 | 418 | 456 | 605 |
| **2625** | 75 | 118 | 135 | 152 | 168 | 194 | 202 | 211 | 236 | 363 | 398 | 434 | 575 |
| **2750** | 72 | 113 | 129 | 145 | 162 | 185 | 194 | 202 | 226 | 347 | 381 | 415 | 549 |
| **2875** | 68 | 108 | 124 | 139 | 155 | 178 | 185 | 193 | 216 | 332 | 364 | 396 | 525 |
| **3000** | 66 | 105 | 119 | 134 | 149 | 171 | 178 | 185 | 208 | 318 | 348 | 379 | 503 |
| **3125** | 64 | 102 | 115 | 129 | 143 | 165 | 172 | 178 | 200 | 305 | 335 | 365 | 483 |
| **3250** | 62 | 98 | 112 | 125 | 138 | 158 | 165 | 172 | 192 | 294 | 322 | 351 | 465 |
| **3375** | 60 | 95 | 108 | 121 | 134 | 153 | 160 | 166 | 185 | 283 | 311 | 338 | 448 |
| **3500** | 58 | 92 | 105 | 117 | 130 | 148 | 155 | 161 | 180 | 273 | 300 | 326 | 433 |
| **3625** | 57 | 90 | 102 | 114 | 126 | 144 | 150 | 156 | 174 | 265 | 290 | 316 | 418 |
| **3750** | 55 | 88 | 99 | 111 | 122 | 140 | 145 | 152 | 169 | 256 | 281 | 306 | 405 |
| **3875** | 54 | 85 | 96 | 108 | 119 | 136 | 142 | 147 | 164 | 248 | 273 | 297 | 394 |
| **4000** | 52 | 83 | 94 | 105 | 116 | 132 | 138 | 143 | 160 | 242 | 265 | 288 | 382 |
| **4125** | 52 | 82 | 92 | 102 | 113 | 129 | 135 | 139 | 155 | 235 | 258 | 281 | 372 |
| **4250** | 50 | 79 | 90 | 100 | 110 | 126 | 131 | 136 | 152 | 228 | 251 | 273 | 362 |
| **4375** | 49 | 78 | 88 | 98 | 108 | 123 | 128 | 133 | 148 | 223 | 245 | 266 | 353 |
| **4500** | 48 | 76 | 86 | 95 | 105 | 120 | 125 | 130 | 145 | 217 | 238 | 259 | 344 |
| **4625** | 47 | 75 | 84 | 94 | 103 | 117 | 122 | 127 | 141 | 212 | 232 | 253 | 335 |
| **4750** | 46 | 73 | 82 | 92 | 101 | 115 | 119 | 124 | 138 | 207 | 227 | 247 | 327 |
| **4875** | 45 | 72 | 81 | 90 | 98 | 112 | 117 | 121 | 135 | 202 | 222 | 241 | 319 |
| **5000** | 45 | 71 | 79 | 88 | 97 | 110 | 114 | 118 | 132 | 197 | 216 | 235 | 312 |
| **5125** | 44 | 69 | 78 | 86 | 95 | 107 | 112 | 115 | 128 | 192 | 211 | 229 | 304 |
| **5250** | 43 | 68 | 76 | 85 | 92 | 105 | 109 | 113 | 125 | 188 | 205 | 224 | 297 |
| **5375** | 42 | 66 | 75 | 82 | 91 | 102 | 107 | 111 | 122 | 183 | 201 | 218 | 289 |
| **5500** | 42 | 65 | 73 | 81 | 88 | 100 | 105 | 108 | 120 | 178 | 196 | 213 | 282 |
| **5625** | 41 | 64 | 72 | 79 | 87 | 98 | 102 | 106 | 117 | 174 | 191 | 208 | 276 |
| **5750** | 40 | 63 | 70 | 78 | 85 | 96 | 100 | 104 | 115 | 170 | 187 | 203 | 269 |
| **5875** | 39 | 62 | 69 | 76 | 83 | 94 | 98 | 102 | 112 | 166 | 182 | 198 | 263 |
| **6000** | 38 | 61 | 68 | 75 | 82 | 92 | 95 | 99 | 110 | 162 | 178 | 194 | 257 |
| **6125** | 38 | 60 | 66 | 73 | 80 | 91 | 94 | 97 | 108 | 158 | 175 | 190 | 252 |
| **6250** | 37 | 58 | 65 | 72 | 78 | 88 | 92 | 95 | 105 | 155 | 171 | 186 | 246 |
| **6375** | 37 | 58 | 65 | 71 | 78 | 87 | 91 | 94 | 104 | 152 | 168 | 182 | 242 |
| **6500** | 36 | 57 | 64 | 70 | 76 | 86 | 89 | 92 | 102 | 150 | 165 | 179 | 238 |
| **6625** | 35 | 57 | 63 | 69 | 75 | 85 | 88 | 92 | 101 | 148 | 162 | 177 | 234 |
| **6750** | 35 | 56 | 62 | 68 | 75 | 84 | 87 | 90 | 99 | 146 | 161 | 175 | 232 |
| **6875** | 35 | 56 | 62 | 68 | 75 | 84 | 87 | 90 | 99 | 145 | 159 | 173 | 230 |
| **7000** | 35 | 55 | 62 | 68 | 74 | 83 | 86 | 89 | 98 | 145 | 159 | 173 | 229 |
| **7125** | 35 | 55 | 62 | 68 | 74 | 83 | 86 | 89 | 98 | 145 | 158 | 173 | 229 |
| **7250** | 35 | 55 | 62 | 68 | 74 | 83 | 86 | 89 | 98 | 145 | 158 | 173 | 229 |
| **7375** | 35 | 55 | 62 | 68 | 74 | 83 | 86 | 89 | 98 | 145 | 158 | 173 | 229 |
| **≥ 7500** | 35 | 55 | 62 | 68 | 74 | 83 | 86 | 89 | 98 | 145 | 158 | 173 | 229 |

# TABLE 9: CO

## CARBON MONOXIDE (percent carbon monoxide)

Dynamometer Test for Gasoline Fuelled Light Vehicles (and other fuels except diesel)
Use values in Columns 21 to 34.

| ETW(lb) | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1750** | 0.59 | 0.94 | 1.41 | 1.87 | 2.10 | 2.80 | 3.03 | 3.26 | 3.73 | 4.19 | 4.66 | 5.58 | 5.72 | 7.62 |
| **1875** | 0.56 | 0.89 | 1.32 | 1.76 | 1.98 | 2.64 | 2.85 | 3.08 | 3.52 | 3.95 | 4.38 | 5.26 | 5.42 | 7.62 |
| **2000** | 0.53 | 0.84 | 1.25 | 1.67 | 1.87 | 2.49 | 2.70 | 2.90 | 3.32 | 3.73 | 4.14 | 4.96 | 5.14 | 7.62 |
| **2125** | 0.51 | 0.80 | 1.18 | 1.58 | 1.77 | 2.35 | 2.55 | 2.75 | 3.14 | 3.52 | 3.92 | 4.69 | 4.88 | 7.43 |
| **2250** | 0.48 | 0.76 | 1.13 | 1.49 | 1.68 | 2.23 | 2.42 | 2.60 | 2.97 | 3.34 | 3.71 | 4.45 | 4.62 | 7.03 |
| **2375** | 0.45 | 0.72 | 1.07 | 1.42 | 1.59 | 2.12 | 2.29 | 2.47 | 2.82 | 3.17 | 3.52 | 4.22 | 4.38 | 6.67 |
| **2500** | 0.44 | 0.69 | 1.02 | 1.35 | 1.52 | 2.02 | 2.18 | 2.35 | 2.68 | 3.01 | 3.35 | 4.01 | 4.16 | 6.35 |
| **2625** | 0.42 | 0.66 | 0.98 | 1.29 | 1.45 | 1.92 | 2.08 | 2.24 | 2.55 | 2.87 | 3.18 | 3.82 | 3.96 | 6.04 |
| **2750** | 0.40 | 0.63 | 0.93 | 1.23 | 1.38 | 1.84 | 1.98 | 2.14 | 2.44 | 2.74 | 3.04 | 3.64 | 3.78 | 5.77 |
| **2875** | 0.38 | 0.61 | 0.89 | 1.18 | 1.32 | 1.76 | 1.90 | 2.05 | 2.33 | 2.62 | 2.91 | 3.48 | 3.62 | 5.52 |
| **3000** | 0.37 | 0.58 | 0.86 | 1.14 | 1.28 | 1.68 | 1.82 | 1.96 | 2.24 | 2.52 | 2.78 | 3.34 | 3.47 | 5.28 |
| **3125** | 0.35 | 0.56 | 0.83 | 1.09 | 1.22 | 1.62 | 1.75 | 1.88 | 2.15 | 2.42 | 2.68 | 3.21 | 3.33 | 5.08 |
| **3250** | 0.35 | 0.55 | 0.80 | 1.05 | 1.18 | 1.56 | 1.69 | 1.82 | 2.07 | 2.32 | 2.58 | 3.08 | 3.21 | 4.88 |
| **3375** | 0.33 | 0.53 | 0.77 | 1.02 | 1.14 | 1.51 | 1.63 | 1.75 | 2.00 | 2.24 | 2.48 | 2.98 | 3.09 | 4.72 |
| **3500** | 0.32 | 0.52 | 0.75 | 0.98 | 1.10 | 1.45 | 1.58 | 1.69 | 1.93 | 2.17 | 2.40 | 2.88 | 2.98 | 4.55 |
| **3625** | 0.32 | 0.50 | 0.72 | 0.95 | 1.07 | 1.42 | 1.52 | 1.64 | 1.87 | 2.10 | 2.32 | 2.78 | 2.89 | 4.41 |
| **3750** | 0.31 | 0.48 | 0.71 | 0.92 | 1.04 | 1.37 | 1.48 | 1.59 | 1.82 | 2.03 | 2.25 | 2.70 | 2.80 | 4.27 |
| **3875** | 0.30 | 0.47 | 0.68 | 0.90 | 1.01 | 1.33 | 1.44 | 1.55 | 1.76 | 1.98 | 2.19 | 2.62 | 2.72 | 4.15 |
| **4000** | 0.29 | 0.46 | 0.67 | 0.88 | 0.98 | 1.29 | 1.40 | 1.50 | 1.71 | 1.92 | 2.13 | 2.55 | 2.65 | 4.03 |
| **4125** | 0.28 | 0.45 | 0.65 | 0.85 | 0.95 | 1.26 | 1.36 | 1.46 | 1.66 | 1.87 | 2.07 | 2.48 | 2.57 | 3.92 |
| **4250** | 0.28 | 0.44 | 0.64 | 0.83 | 0.93 | 1.23 | 1.32 | 1.42 | 1.62 | 1.82 | 2.02 | 2.41 | 2.50 | 3.82 |
| **4375** | 0.27 | 0.43 | 0.62 | 0.82 | 0.91 | 1.20 | 1.29 | 1.39 | 1.58 | 1.78 | 1.96 | 2.35 | 2.44 | 3.72 |
| **4500** | 0.27 | 0.42 | 0.61 | 0.79 | 0.89 | 1.17 | 1.26 | 1.35 | 1.55 | 1.73 | 1.92 | 2.29 | 2.38 | 3.62 |
| **4625** | 0.26 | 0.42 | 0.59 | 0.78 | 0.87 | 1.14 | 1.23 | 1.32 | 1.51 | 1.68 | 1.87 | 2.23 | 2.32 | 3.54 |
| **4750** | 0.25 | 0.41 | 0.58 | 0.76 | 0.85 | 1.12 | 1.21 | 1.29 | 1.47 | 1.65 | 1.82 | 2.18 | 2.27 | 3.45 |
| **4875** | 0.25 | 0.40 | 0.57 | 0.75 | 0.83 | 1.09 | 1.18 | 1.26 | 1.44 | 1.61 | 1.78 | 2.13 | 2.21 | 3.37 |
| **5000** | 0.25 | 0.39 | 0.56 | 0.73 | 0.81 | 1.06 | 1.15 | 1.23 | 1.40 | 1.57 | 1.74 | 2.08 | 2.16 | 3.29 |
| **5125** | 0.24 | 0.38 | 0.55 | 0.71 | 0.79 | 1.04 | 1.12 | 1.21 | 1.37 | 1.54 | 1.70 | 2.03 | 2.11 | 3.22 |
| **5250** | 0.24 | 0.38 | 0.54 | 0.69 | 0.78 | 1.02 | 1.10 | 1.18 | 1.34 | 1.50 | 1.66 | 1.98 | 2.06 | 3.14 |
| **5375** | 0.23 | 0.37 | 0.52 | 0.68 | 0.76 | 0.99 | 1.07 | 1.15 | 1.31 | 1.46 | 1.62 | 1.93 | 2.01 | 3.06 |
| **5500** | 0.23 | 0.36 | 0.52 | 0.67 | 0.75 | 0.97 | 1.05 | 1.12 | 1.28 | 1.43 | 1.58 | 1.89 | 1.96 | 2.99 |
| **5625** | 0.22 | 0.35 | 0.50 | 0.65 | 0.72 | 0.95 | 1.02 | 1.10 | 1.25 | 1.40 | 1.55 | 1.85 | 1.92 | 2.92 |
| **5750** | 0.22 | 0.35 | 0.49 | 0.64 | 0.71 | 0.93 | 1.00 | 1.08 | 1.22 | 1.37 | 1.51 | 1.80 | 1.87 | 2.85 |
| **5875** | 0.22 | 0.34 | 0.48 | 0.62 | 0.70 | 0.91 | 0.98 | 1.05 | 1.19 | 1.34 | 1.48 | 1.76 | 1.83 | 2.78 |
| **6000** | 0.22 | 0.34 | 0.48 | 0.62 | 0.68 | 0.89 | 0.96 | 1.03 | 1.17 | 1.31 | 1.45 | 1.72 | 1.79 | 2.72 |
| **6125** | 0.21 | 0.33 | 0.47 | 0.60 | 0.67 | 0.87 | 0.94 | 1.01 | 1.15 | 1.28 | 1.42 | 1.68 | 1.75 | 2.67 |
| **6250** | 0.21 | 0.32 | 0.46 | 0.59 | 0.65 | 0.85 | 0.92 | 0.98 | 1.12 | 1.25 | 1.38 | 1.65 | 1.72 | 2.62 |
| **6375** | 0.20 | 0.32 | 0.45 | 0.58 | 0.65 | 0.84 | 0.91 | 0.97 | 1.10 | 1.23 | 1.36 | 1.62 | 1.68 | 2.57 |
| **6500** | 0.20 | 0.32 | 0.45 | 0.57 | 0.64 | 0.83 | 0.89 | 0.95 | 1.08 | 1.21 | 1.34 | 1.59 | 1.65 | 2.52 |
| **6625** | 0.20 | 0.32 | 0.44 | 0.56 | 0.63 | 0.82 | 0.88 | 0.95 | 1.07 | 1.19 | 1.32 | 1.57 | 1.63 | 2.48 |
| **6750** | 0.20 | 0.32 | 0.44 | 0.56 | 0.62 | 0.81 | 0.87 | 0.93 | 1.05 | 1.18 | 1.31 | 1.55 | 1.62 | 2.46 |
| **6875** | 0.19 | 0.31 | 0.43 | 0.55 | 0.62 | 0.80 | 0.86 | 0.92 | 1.05 | 1.17 | 1.29 | 1.54 | 1.60 | 2.44 |
| **7000** | 0.19 | 0.31 | 0.43 | 0.55 | 0.62 | 0.80 | 0.86 | 0.92 | 1.05 | 1.17 | 1.29 | 1.54 | 1.60 | 2.44 |
| **7125** | 0.19 | 0.31 | 0.43 | 0.55 | 0.62 | 0.80 | 0.86 | 0.92 | 1.05 | 1.17 | 1.29 | 1.54 | 1.60 | 2.44 |
| **7250** | 0.19 | 0.31 | 0.43 | 0.55 | 0.62 | 0.80 | 0.86 | 0.92 | 1.05 | 1.17 | 1.29 | 1.54 | 1.60 | 2.44 |
| **7375** | 0.19 | 0.31 | 0.43 | 0.55 | 0.62 | 0.80 | 0.86 | 0.92 | 1.05 | 1.17 | 1.29 | 1.54 | 1.60 | 2.44 |
| **≥ 7500** | 0.19 | 0.31 | 0.43 | 0.55 | 0.62 | 0.8 | 0.86 | 0.92 | 1.05 | 1.17 | 1.29 | 1.54 | 1.6 | 2.44 |

# TABLE 9: NOX

## NITROGEN OXIDES (ppm nitric oxide)

Dynamometer Test for Gasoline Fuelled Light Vehicles (and other fuels except diesel)
Use values in Columns 41 to 51.

| ETW (lb) | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1750 | 842 | 1263 | 1626 | 1990 | 2354 | 2717 | 3081 | 3808 | 3815 | 3831 | 3838 |
| 1875 | 793 | 1190 | 1532 | 1873 | 2215 | 2556 | 2898 | 3581 | 3645 | 3774 | 3838 |
| 2000 | 748 | 1123 | 1444 | 1765 | 2087 | 2408 | 2729 | 3372 | 3488 | 3722 | 3838 |
| 2125 | 708 | 1062 | 1365 | 1667 | 1970 | 2273 | 2575 | 3182 | 3345 | 3674 | 3838 |
| 2250 | 670 | 1005 | 1291 | 1577 | 1863 | 2149 | 2435 | 3007 | 3215 | 3631 | 3838 |
| 2375 | 636 | 954 | 1225 | 1495 | 1765 | 2035 | 2306 | 2847 | 3095 | 3591 | 3838 |
| 2500 | 605 | 907 | 1163 | 1419 | 1676 | 1932 | 2188 | 2702 | 2985 | 3554 | 3838 |
| 2625 | 576 | 864 | 1108 | 1351 | 1595 | 1838 | 2082 | 2568 | 2886 | 3521 | 3838 |
| 2750 | 550 | 825 | 1057 | 1288 | 1520 | 1752 | 1984 | 2447 | 2753 | 3365 | 3671 |
| 2875 | 526 | 789 | 1010 | 1232 | 1452 | 1673 | 1895 | 2336 | 2628 | 3212 | 3505 |
| 3000 | 505 | 757 | 968 | 1179 | 1391 | 1602 | 1813 | 2235 | 2515 | 3074 | 3353 |
| 3125 | 485 | 727 | 929 | 1132 | 1334 | 1536 | 1738 | 2144 | 2412 | 2948 | 3215 |
| 3250 | 467 | 700 | 895 | 1088 | 1282 | 1477 | 1671 | 2059 | 2317 | 2832 | 3089 |
| 3375 | 450 | 675 | 862 | 1048 | 1235 | 1422 | 1609 | 1982 | 2230 | 2726 | 2974 |
| 3500 | 435 | 652 | 832 | 1012 | 1192 | 1372 | 1552 | 1912 | 2151 | 2629 | 2868 |
| 3625 | 421 | 632 | 805 | 979 | 1152 | 1326 | 1500 | 1847 | 2078 | 2540 | 2771 |
| 3750 | 408 | 612 | 780 | 948 | 1116 | 1284 | 1452 | 1787 | 2011 | 2458 | 2681 |
| 3875 | 396 | 595 | 757 | 919 | 1082 | 1245 | 1407 | 1732 | 1948 | 2382 | 2598 |
| 4000 | 385 | 578 | 735 | 893 | 1050 | 1208 | 1365 | 1680 | 1890 | 2310 | 2520 |
| 4125 | 375 | 562 | 715 | 868 | 1021 | 1174 | 1326 | 1632 | 1836 | 2244 | 2448 |
| 4250 | 365 | 548 | 696 | 845 | 993 | 1142 | 1290 | 1587 | 1785 | 2182 | 2380 |
| 4375 | 356 | 534 | 678 | 822 | 967 | 1111 | 1255 | 1544 | 1737 | 2122 | 2315 |
| 4500 | 347 | 521 | 661 | 802 | 942 | 1082 | 1222 | 1502 | 1691 | 2066 | 2254 |
| 4625 | 338 | 508 | 645 | 781 | 918 | 1054 | 1191 | 1464 | 1646 | 2012 | 2195 |
| 4750 | 331 | 496 | 629 | 762 | 895 | 1028 | 1160 | 1426 | 1604 | 1961 | 2138 |
| 4875 | 323 | 485 | 614 | 743 | 872 | 1002 | 1131 | 1389 | 1563 | 1910 | 2084 |
| 5000 | 315 | 473 | 598 | 725 | 851 | 976 | 1102 | 1354 | 1523 | 1862 | 2031 |
| 5125 | 308 | 462 | 585 | 707 | 829 | 952 | 1075 | 1319 | 1485 | 1815 | 1979 |
| 5250 | 301 | 451 | 570 | 689 | 808 | 928 | 1048 | 1286 | 1447 | 1768 | 1928 |
| 5375 | 294 | 441 | 556 | 672 | 788 | 905 | 1021 | 1253 | 1410 | 1723 | 1879 |
| 5500 | 287 | 430 | 543 | 656 | 769 | 882 | 995 | 1221 | 1374 | 1679 | 1832 |
| 5625 | 280 | 420 | 530 | 640 | 750 | 860 | 970 | 1190 | 1338 | 1636 | 1785 |
| 5750 | 274 | 411 | 518 | 625 | 732 | 838 | 946 | 1160 | 1305 | 1595 | 1740 |
| 5875 | 268 | 402 | 505 | 610 | 714 | 818 | 922 | 1132 | 1272 | 1555 | 1697 |
| 6000 | 262 | 392 | 494 | 595 | 697 | 799 | 901 | 1104 | 1242 | 1518 | 1655 |
| 6125 | 256 | 384 | 483 | 582 | 682 | 781 | 880 | 1078 | 1213 | 1482 | 1617 |
| 6250 | 251 | 376 | 473 | 570 | 667 | 764 | 861 | 1055 | 1186 | 1449 | 1582 |
| 6375 | 246 | 369 | 465 | 559 | 654 | 748 | 843 | 1033 | 1162 | 1420 | 1549 |
| 6500 | 242 | 364 | 456 | 549 | 642 | 735 | 828 | 1014 | 1141 | 1395 | 1521 |
| 6625 | 239 | 358 | 450 | 542 | 633 | 724 | 815 | 998 | 1123 | 1373 | 1498 |
| 6750 | 236 | 355 | 445 | 535 | 625 | 716 | 806 | 987 | 1110 | 1357 | 1480 |
| 6875 | 235 | 352 | 442 | 532 | 621 | 711 | 800 | 979 | 1102 | 1346 | 1468 |
| 7000 | 235 | 352 | 441 | 530 | 619 | 708 | 798 | 976 | 1098 | 1342 | 1465 |
| 7125 | 235 | 352 | 441 | 530 | 619 | 708 | 798 | 976 | 1098 | 1342 | 1465 |
| 7250 | 235 | 352 | 441 | 530 | 619 | 708 | 798 | 976 | 1098 | 1342 | 1465 |
| 7375 | 235 | 352 | 441 | 530 | 619 | 708 | 798 | 976 | 1098 | 1342 | 1465 |
| ≥7500 | 235 | 352 | 441 | 530 | 619 | 708 | 798 | 976 | 1098 | 1342 | 1465 |

### Additional Maximum Emission Standard (Evaporative System)

Test procedures for the following "Fuel Cap Integrity Standard" is contained in the USEPA publication *EPA-AA-RSPD-IM-96-1 June 1996 – High-Tech I/M Test Procedures, Emission Standards, Quality Control Requirements, and Equipment Specifications: IM240 and Functional Evaporative System Tests, Revised Technical Guidance Draft, June 1996.*

### Fuel Cap Integrity Standard

The vehicle's fuel cap must exhibit a pressure loss of less than six inches of water when a fuel cap integrity test is performed on the vehicle's evaporative system or must exhibit a flow rate of 60 cubic centimetres per minute or less of air at 30 inches of water column.

A test may be used that the Director considers equivalent.

## 9.0.1 ON-BOARD DIAGNOSTICS SYSTEM TEST: (ALL LIGHT VEHICLES OF MODEL YEAR 1998 AND NEWER)

Until December 31, 2012, a light vehicle that is compliant with OBD test standards is deemed to be in compliance with tailpipe testing standards. If a light vehicle is not compliant with OBD test standards, the light vehicle may be tailpipe tested, with the test results of the tailpipe test being used to issue an emissions inspection report.

Effective January 1, 2013, a light vehicle must be compliant with OBD test standards. Light vehicles not OBD enabled and vehicles not compatible with the performance of the OBD test procedure referred to in Section 9.0.1 of the Regulation will be tested using the Two Speed Idle Test as prescribed in Section 8 of the Regulation or the Test for Diesel Fuelled Light Vehicles as prescribed in Section 11 of the Regulation (diesel only).

A light vehicle is required to be tested for compliance with the OBD test standards using at a minimum, the OBD test elements described below in Table 9.0.1A.

### TABLE 9.0.1A: OBD Test

| Vehicle Model Year and Type | OBD Test Elements |
|---|---|
| 1998 & later, OBD enabled light vehicle | Connect test unit to vehicle DLC. |
| | Download the vehicle data and Readiness Status to test unit. |
| | Download the vehicle MIL Command Status to test unit. |
| | Download the vehicle DTC list to test unit. |
| | Disconnect test unit from vehicle DLC. |
| | Test unit will determine compliance with OBD test standards prescribed in TABLE 9.0.1B. |

Notes:

1. An inaccessible, missing or damaged DLC, or presence of an OBD pass-through device will result in the vehicle being rejected from the OBD test until the DLC is in such a condition that it is able to allow the OBD test.
2. A deviation on the vehicle's electronic signature from the expected values will result in the vehicle being rejected from the OBD test until the deviation in the vehicle's electronic signature is resolved in such a way that the OBD test can be completed successfully.

A vehicle is deemed to be compliant with the OBD Test Standards if it meets the criteria detailed below in Table 9.0.1B.

### TABLE 9.0.1B: OBD Test Standards

| Vehicle Model Year and Type | Pass Criteria | Fail Criteria |
|---|---|---|
| 1998 – 2000 OBD enabled light vehicle | No Fail criteria detected. | Vehicle OBD computer is unable to communicate with OBD emissions test unit.<br>3 or more supported readiness monitors not set to "Ready".<br>MIL is commanded "ON" with DTC(s).<br>For a vehicle submitted for re-testing after an initial fail and repairs, the monitor(s) that were associated with initial failure must be set to "Ready". |
| 2001 & later OBD enabled light vehicle | No Fail criteria detected. | Vehicle OBD computer is unable to communicate with OBD emissions test unit.<br>2 or more supported readiness monitors not set to "Ready".<br>MIL is commanded "ON" with DTC(s).<br>For a vehicle submitted for re-testing after an initial fail and repairs, the monitor(s) that were associated with initial failure must be set to "Ready". |

## 9.1. REPAIR COST LIMIT FOR LIGHT VEHICLES

The Regulation specifies provisions and conditions for a repair cost limit (RCL) for light vehicles in non-compliance with prescribed standards. In cases where the cost of emission system repairs required to bring a vehicle into compliance would exceed the RCL, this provision allows the owner to spend on repair costs up to the RCL and allows a Drive Clean facility to issue a conditional emissions inspection report for the vehicle. If the vehicle meets the RCL conditions, the facility may issue a conditional emissions inspection report. The conditional emissions inspection report may be used to meet the vehicle registration renewal requirements in the HTA Regulation.

# 10. TWO SPEED IDLE TEST GASOLINE FUELLED HEAVY VEHICLES (AND OTHER FUELS EXCEPT DIESEL)

This section applies only to heavy vehicles with a GVWR greater than 4,500 kg, but is otherwise equivalent to Section 8 of this Guide.

Maximum emission standards for the preconditioned Two Speed Idle Test are provided in Table 10.

The procedure to be used is the preconditioned Two Speed Idle Test procedure set out in the USEPA publication *EPA-AA-TSS-I/M-90-3 January 1991 – Recommended I/M Short Test Procedures for the 1990's: Six Alternatives.*

A test may be used that the Director considers equivalent.

### TABLE 10: MAXIMUM EMISSION STANDARDS TWO SPEED IDLE TEST

**Gasoline Fuelled Heavy Vehicles**

| Model year | **HC (ppm) by volume** | **CO (%) by volume** | **Visible emissions (seconds in any one-minute period)** |
|---|---|---|---|
| 1998 & later | 200 | 1 | 5 |
| 1988-97 | 220 | 1.2 | 5 |
| 1980-87 | 300 | 3 | 5 |
| 1975-79 | 400 | 4 | 5 |
| 1970-74 | 800 | 6.5 | 5 |
| 1969 and earlier | 1000 | 8 | 5 |

## 11. OPACITY TEST FOR DIESEL FUELLED LIGHT VEHICLES

Effective January 1, 2013, the opacity tests for diesel fuelled light vehicles are to be used for diesel vehicles unable to be tested using the OBD system test, as described in Section 9.0.1. This will include vehicles with the model years 1988-1997, vehicles not OBD enabled, vehicles not compatible with the performance of the OBD test procedure and vehicles that would render the performance of the tests referred to in Section 9.0.1 of the Regulation unsafe. Appendix D of the Drive Clean SOP identifies the vehicles that the ministry has identified as not being compatible with the OBD test or vehicles that may render the performance of the OBD test unsafe.

The following two opacity tests are to be used for diesel fuelled light vehicle.

1. Light Diesel Loaded Mode Dynamometer Test

The test is conducted on a loaded mode dynamometer at 40 km/hour with the same roll speed, engine speed and acceleration error limits as the ASM 2525 dynamometer test.
The vehicle is placed on the chassis dynamometer and operated at 40 km/h with a dynamometer load (HP) equal to the number of engine cylinders plus 8.0. An exhaust sample probe is inserted into the vehicle tailpipe and an exhaust stream sample is drawn into an approved Ontario Diesel Test Unit to measure the smoke density. The smoke density measurement is compared to the applicable limit to determine the emissions pass/fail result.

2. Light Diesel Fast Idle Test

The test is conducted on vehicles that cannot be dynamometer tested. An exhaust sample probe is inserted into the vehicle tailpipe and an exhaust sample is drawn into an approved Ontario Diesel Test Unit to measure the smoke density. The engine is accelerated to 2000 +/- 200 RPM and held within that speed range during the emissions sample period. The smoke density measurement is compared to the applicable limit to determine the emissions pass/fail result.

The Fast Idle Test will be used only for a diesel fuelled light vehicle that cannot be tested on a dynamometer.

A test may be used that the Director considers equivalent.

### Maximum Emission Standards

- The maximum emission standard for a diesel fuelled light vehicle of a model year set out in Column 1 of Table 11 is the maximum opacity of the exhaust emissions shown opposite that model year in Column 2 in the portion of the Table appropriate to the test used.

- Opacity is evaluated in terms of smoke density and expressed as “K m-1” (K is a relative scale in units per metre). The larger the K value, the greater the opacity of the emissions. Using smoke density units eliminates the need to accurately determine tailpipe inside diameter and the resulting conversion to opacity percentage. Smoke density will be measured by an approved Ontario Diesel Test Unit employing an optical chamber to determine smoke density (k-value) of the exhaust sample in the range 0 to 10 m -1.

## TABLE 11: MAXIMUM EMISSION STANDARDS

### Opacity test
### Diesel Fuelled Light Vehicles

| Model Year | Greater Toronto Area, urban and commuter areas, and Expanded Program Area [maximum opacity] |
|---|---|
| 1 | 2 |
| Light Diesel Loaded Mode Dynamometer Test | |
| Before 1982 | 3.0 |
| 1982 to 1987 | 2.0 |
| 1988 – 1998 | 1.8 |
| After 1998 | 1.5 |
| Light Diesel Fast Idle Test | |
| Before 1982 | 2.5 |
| 1982 – 1987 | 1.6 |
| 1988 – 1998 | 1.4 |
| After 1998 | 1.2 |

# 12. OPACITY TEST DIESEL FUELLED HEAVY VEHICLES

This section applies to diesel-fuelled heavy vehicles.

In a period of time indicated in Column 1 of Table 12, the maximum emission standard for a motor vehicle of a model year and type indicated in Columns 2 and 3 of the Table is prescribed as the percentage opacity of the exhaust emissions specified opposite in Column 4 when the motor vehicle is tested using one of the following tests:

a. the opacity test for diesel fuelled heavy vehicles, according to SAE J1667 Snap Acceleration Smoke Test Procedure For Heavy Diesel Powered Vehicles, issued by the Society of Automotive Engineers, Inc. 1996-02;

b. a test that the Director considers equivalent to the test mentioned in clause (a); or

c. the Roadside Opacity Test, described below, provided that,

    i. the Roadside Opacity Test may be used only by a Provincial Officer designated under the Environmental Protection Act, and

    ii. the Roadside Opacity Test is not acceptable for the purpose of s. 8.2 of the HTA Regulation.

## Definition - School Bus

For purposes of this section, “school bus” has the same meaning as in the Highway Traffic Act. [see Highway Traffic Act, s. 175(1)]:

"school bus" means a bus that,

a. is painted chrome yellow, and

b. displays on the front and rear thereof the words "School Bus" and on the rear thereof the words "Do Not Pass When Signals Flashing". ("Autobus Scolaire")

## Heavy Duty Diesel Fuelled Vehicles - 20 Percent Opacity Or Less

Any diesel fuelled heavy vehicle that achieves 20% opacity or less when tested in accordance with this section, may be exempt from emissions testing requirements in eligible years as defined by the HTA Regulation. This program is designed by the Ministry of the Environment as an incentive for heavy duty diesel fuelled vehicles to achieve emission results that exceed the minimum requirement.

# TABLE 12: MAXIMUM EMISSION STANDARDS

## Opacity Test
## Diesel Fuelled Heavy Vehicles

| Model year | Vehicle Type | Opacity |
|---|---|---|
| 1990 and older | School Bus | 30% |
| | Other | 40% |
| 1991 and newer | School Bus | 30% |
| | Other | 30% |

## Roadside Opacity Test
## Diesel Fuelled Heavy Vehicles

| | |
|---|---|
| **1.0** | **Purpose** |
| | This document provides a procedure to conduct roadside testing of Diesel Fuelled Heavy Vehicles [GVWR greater than 4,500 kg (9,921 lbs)] to assess compliance with section 12 of the Regulation. |
| **2.0** | **Limitations** |
| 2.1 | This procedure shall only be used by Provincial Officers designated under the Environmental Protection Act. |
| 2.2 | This procedure requires the use of a sampling type smokemeter, also called a partial flow smokemeter, which appears in the following list: |
| | • Wager Portable Smoke Meter Model 6700;<br>• Wager Portable Smoke Meter Model 7500;<br>• Red Mountain Engineering Smoke Check 1667;<br>• Bosch RTT 100 Diesel Smoke Opacimeter. |
| 2.3 | Ambient Air Test Conditions: |
| 2.3.1 | No testing shall occur when visible humidity (for example fog, rain and snow) is present where exhaust samples are drawn or the smoke plume is measured. |
| 2.3.2 | No testing shall occur when the ambient air temperature at the test location is below 2° C (36° F) or above 30° C (86° F) unless correction factors to compensate for relative humidity, barometric pressure, or ambient temperature are applied. |
| **3.0** | **Smokemeter Calibration Verification** |
| 3.1 | The smokemeter calibration shall be verified at the beginning of each testing day unless the unit is self-calibrating, in which case the following steps in this section are not necessary. |

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| 3.2 | Prior to any zero or full scale checks, the meter shall be warmed up and stabilized according to the manufacturer's recommendations. |
| 3.3 | Prompt smokemeter to carry out a calibration verification. |
| 3.4 | With the smokemeter in opacity readout mode and with no blockage of the smokemeter light beam, check the readout to display 0.0% ± 1.0% opacity. |
| 3.5 | The calibration of the smokemeter shall be verified by using the smokemeter manufacturer's supplied neutral density filter(s). When prompted by the smokemeter, insert the filter into the sensor head ensuring it is placed between the sensor light source and detector. The opacity reading of the smokemeter should be the filter opacity percentage ± 1 %. If the smokemeter does not read within ± 1 % of the filter, do not carry out any testing. Clean and re-install the neutral density filter and recheck the calibration or refer to the User Manual to troubleshoot the source of the problem. |
| 3.6 | Record the result. |
| **4.0** | **Pre-test Safety Check and Vehicle Preparation** |
| 4.1 | Ensure that the vehicle operator keeps the engine running. If the engine is inadvertently shut off, the engine should be immediately restarted and the operator should be instructed to move the vehicle as quickly as possible in the vehicle's lowest gear for at least 25 feet, in order to activate the engine air/fuel ratio controls on some engines. |
| 4.2 | Confirm that the vehicle is diesel fuelled and has a GVWR greater than 4,500 kg (9,921 lbs). |
| 4.3 | Chock the vehicle wheels. |
| 4.4 | Visually inspect the vehicle exhaust system for any leaks; if a severe leak prevents the exhaust from exiting at the end of the stack, test at the point of leakage (unless this point is immediately downstream of a bend in the pipe). If testing is impractical, have the vehicle repaired and retested. |
| 4.5 | Confirm the engine is warmed up by observing the vehicle water and/or oil gauges or by confirming that the vehicle has been operated under load for at least 15 minutes. |
| 4.6 | Verify that the operator has set the engine idle speed to low idle. |
| 4.7 | Verify the speed-limiting capability of the engine governor using the following procedure: |
| 4.7.1 | If the vehicle is equipped with a manual transmission, the transmission must be placed in neutral and the clutch must be disengaged. If the vehicle is equipped with an automatic transmission, the transmission must be placed in the park position, if available. Otherwise, it should be placed in the neutral position. |
| 4.7.2 | Check with the vehicle operator to determine that the vehicle's governor is operating |

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| | correctly. If the governor is not working correctly the vehicle should be repaired and retested. |
| 4.7.3 | With the engine at low idle, instruct the driver to slowly depress the engine accelerator and allow the engine speed to gradually increase toward its maximum governed high idle speed. As the engine speed increases, carefully note any visual or audible indications that the engine or vehicle may be of questionable soundness.<br>If there are no indications of problems, allow the engine speed to increase to the point that it is possible to verify that the speed-limiting capability of the governor is functioning.<br>Should there be an indication that the speed-limiting capability of the governor is not functioning (engine speed continues to increase), or that potential engine damage or unsafe conditions for personnel or equipment may occur, the accelerator should immediately be released, and the test aborted.<br>If the engine speed continues to increase uncontrollably, immediately shut off the engine fuel supply.<br>In the case of governor failure or malfunction, the vehicle should be repaired and retested. |
| 4.8 | All accessories including the vehicle air conditioning must be turned off. |
| 4.9 | If the engine is equipped with an engine brake, it must be deactivated. |
| 4.10 | The parking brake and trailer brakes must be turned off and the brakes must not be applied. |
| 4.11 | All devices installed on the engine or vehicle that alter the normal acceleration characteristics of the engine and have the effect of temporarily lowering snap-acceleration results or preventing the test from being successfully completed shall be deactivated prior to testing. |
| **5.0** | **Test Procedure** |
| | With the vehicle conditioned as in 4.0: |
| 5.1 | Prior to conducting the opacity test on a vehicle equipped with multiple exhaust outlets, determine which exhaust outlet exhibits the highest smoke level by visually comparing the exhaust smoke from each outlet during one or more repetitions of the snap-acceleration test cycle. If there is no discernible difference in the exhaust smoke exiting each outlet, conduct the testing using the most convenient outlet. If there is a difference in the exhaust smoke from the multiple outlets, conduct the test using the exhaust outlet that visually appears to have the highest smoke level. |
| 5.2 | Determine either of the following: |
| 5.2.1 | Measure the outside diameter of the portion of the vehicle exhaust pipe which visually appears to have the smallest outside diameter (No engine compartment inspection is required). The outside diameter of the exhaust pipe must be rounded down to the |

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| | nearest whole inch or metric equivalent. If the exhaust pipe's outside diameter is determined to be greater than 127 mm (5 inches) the exhaust pipe outside diameter shall be determined to be 127 mm (5 inches), |
| **Or** | |
| 5.2.2 | The rated horsepower of the engine from the tune-up label affixed to the engine. |
| 5.3 | Initiate the smokemeter test sequence. |
| 5.4 | Enter required information into smokemeter as prompted. Instruct smokemeter that clean out snaps will be performed. |
| 5.5 | Prior to attaching or inserting the sensor head into the exhaust stack, have the smokemeter perform zero and full scale checks when prompted. |
| 5.6 | Place sensor into the exhaust stack. |
| 5.7 | Per smokemeter prompts, have vehicle operator conduct at least 3 preliminary snap-acceleration test cycles using the sequence described in 6.0. |
| 5.8 | Within 2 minutes of the execution of the 3 preliminary snap-acceleration cycles per smokemeter prompts, conduct the 3 official snap-acceleration test cycles using the sequence described in 6.0. |
| **6.0** | **Vehicle Operator Instruction - Snap-Acceleration Test Cycle** |
| 6.1 | The vehicle operator shall move the accelerator to fully open as rapidly as possible. |
| 6.2 | The operator shall hold the accelerator in the fully open position for 1 to 4 seconds after the engine has achieved its maximum governed speed. |
| 6.3 | Upon completion of the 1 to 4 seconds at maximum governed speed, the operator shall release the accelerator and allow the engine to return to low idle speed. |
| 6.4 | Once the engine has reached its low idle speed, the operator shall allow the engine to remain idle for a minimum of 5 seconds, but no longer than 45 seconds, before initiating the next snap-acceleration test cycle. |
| **7.0** | **Test Validation** |
| 7.1 | Upon completion of the 3 official snap-acceleration test cycles, remove the sensor head from the stack and, if prompted by the smokemeter, conduct the post-test zero procedure. |
| 7.2 | Ensure that the difference between the highest and lowest of the 3 official snap-acceleration test results is 5 opacity percentage points or less. |
| 7.2.1 | If the test was valid print out a copy of the test results and save the data. |
| 7.2.2 | If the test was invalid, repeat the test procedure. (If improper or inconsistent |

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| | application of the accelerator is suspected, re-instruct the vehicle operator as to the proper execution of the snap-acceleration test cycle or refer to the smokemeters User Manual for troubleshooting invalid tests.) |
| 7.3 | The test result for comparison with the maximum emissions standards in section 12 of the Drive Clean Guide is the average opacity of the 3 official snap-acceleration tests. |

# 13. SUBMISSION OF VEHICLE FOR TESTING

The following form has been approved by the Minister of the Environment for purposes of s. 13 of the Regulation.

*Form*

**Environmental Protection Act**
**NOTICE TO SUBMIT MOTOR VEHICLE**

TAKE NOTICE that under the Environmental Protection Act and the regulations thereunder,

Name: _____

Address: _____

Driver Licence Number: _____

is required to submit the motor vehicle bearing

Ontario Registration Plate Number _____ (year) _____

to the inspection site at _____

on _____
(month) (day) (year)

between the hours of _____ and _____ for testing and inspection.

Dated at _____ this _____ day of _____ 20__

_____
Provincial Officer or Police Officer