

Nonroad Spark-Ignition Engines 19 Kilowatts and Below: Exhaust Emission Standards

| | Phase | Class ^a | Year | HC (g/kW-hr) | HC + NO _x ^b (g/kW-hr) | NMHC + NO _x ^c (g/kW-hr) | NO _x (g/kW-hr) | CO (g/kW-hr) | Useful Life (hours) | | | Warranty Period (years) | |
|----------------------|-------|--|-------|-------------------------|--|--|---|--------------------------|--|-------------------------------|----------------------|----------------------------|----------------|
| Federal ^d | 1 | I | 1997+ | - | 16.1 | - | - | 519 | Engines must meet the Phase 1 standards as new engines, but are not required to meet these standards throughout their useful life. | | | 2 | |
| | | II | 1997+ | - | 13.4 | - | - | 519 | | | | | |
| | | III | 1997+ | 295 | - | - | 5.36 | 805 | | | | | |
| | | IV | 1997+ | 241 | - | - | 5.36 | 805 | | | | | |
| | | V | 1998+ | 161 | - | - | 5.36 | 603 | | | | | |
| | 2 | I | I | 2003+ ^e | - | 16.1 [ABT] | 14.8 [ABT] | - | 610 | 125 / 250 / 500 ^f | | | 2 ^g |
| | | | I-A | 2001+ | - | 50 [ABT] | - | - | | 50 / 125 / 300 ^f | | | |
| | | | I-B | 2001+ | - | 40 [ABT] | 37 [ABT] | - | | 125 / 250 / 500 ^f | | | |
| | | II | | 2001 | - | 18.0 [ABT] | 16.7 [ABT] | - | 610 | 250 / 500 / 1000 ^f | | | |
| | | | | 2002 | - | 16.6 [ABT] | 15.3 [ABT] | - | | | | | |
| | | | | 2003 | - | 15.0 [ABT] | 14.0 [ABT] | - | | | | | |
| | | | | 2004 | - | 13.6 [ABT] | 12.7 [ABT] | - | | | | | |
| | | | | 2005+ | - | 12.1 [ABT] | 11.3 [ABT] | - | | | | | |
| | | III | | 2002 | - | 238.0 [ABT] | - | - | 805 | 50 / 125 / 300 ^f | | | |
| | | | | 2003 | - | 175.0 [ABT] | - | - | | | | | |
| | | | | 2004 | - | 113.0 [ABT] | - | - | | | | | |
| | | | | 2005+ | - | 50.0 [ABT] | - | - | | | | | |
| | | IV | | 2002 | - | 196.0 [ABT] | - | - | 805 | 50 / 125 / 300 ^f | | | |
| | | | | 2003 | - | 148.0 [ABT] | - | - | | | | | |
| | | | | 2004 | - | 99.0 [ABT] | - | - | | | | | |
| | | | 2005+ | - | 50.0 [ABT] | - | - | | | | | | |
| | V | | 2004 | - | 143.0 [ABT] | - | - | 603 | 50 / 125 / 300 ^f | | | | |
| | | | 2005 | - | 119.0 [ABT] | - | - | | | | | | |
| | | 2006 | - | 96.0 [ABT] | - | - | | | | | | | |
| | | 2007+ | - | 72.0 [ABT] | - | - | | | | | | | |
| 3 | I | 2012 | - | 10.0 ^h [ABT] | - | - | 610 (5.0 for marine generator engines) | Residential ⁱ | Extended Life Residential ⁱ | Commercial ⁱ | 2 years ^g | | |
| | | | | | | | | 125 | 250 | 500 | | | |
| | II | 2011 | - | 8.0 ^h [ABT] | - | - | 610 (5.0 for marine generator engines) | 250 | 500 | 1,000 | | | |
| | III-V | The Phase 3 exhaust standards are the same as the long-term Phase 2 exhaust standards noted above. | | | | | | | | | | | |

Notes on following page.

Notes:

a The engine classes are determined by engine displacement:

| Phase | Nonhandheld | | | | Handheld | | |
|---------|---------------------|-------------------------|------------------------|-------------------|-------------------|--------------------------|-----------------|
| Phase 1 | Class I kW < 225 cc | | Class II ≥ 225 cc | | Class III < 20 cc | 20 cc ≤ Class IV < 50 cc | Class V ≥ 50 cc |
| Phase 2 | Class I-A < 66 cc | 66 ≤ Class I-B < 100 cc | 100 ≤ Class I < 225 cc | Class II ≥ 225 cc | | | |
| Phase 3 | Class I < 225 cc | | Class II ≥ 225 cc | | | | |

Any engines certified to the nonhandheld emission standards in 40 Code of Federal Regulations (CFR) 1054.105 may be used in either handheld or nonhandheld equipment. Engines greater than 80 cubic centimeters (cc) certified to the handheld emission standards in 40 CFR 1054.103 may not be used in nonhandheld equipment. Engines less than or equal to 80 cc are considered handheld engines, but may be installed in either handheld or nonhandheld equipment.

b Non-methan hydrocarbon (NMHC) plus nitrogen oxides (NOx) standards are applicable only to natural gas fueled engines at the option of the manufacturer, in lieu of HC+NOx standards.

c The NMHC+NOx standard is an optional standard for natural gas-fueled engines only.

d The engines that are covered by or exempt from these standards are defined in 40 CFR 90.1 and 1054.1. Engines less than or equal to 30 kilowatts (kW) and that have a total displacement of 1,000 cc or less may certify to the Class II engine standards for the appropriate model year. The test procedures are the small spark-ignition (SI) engine federal steady-state test procedures. They consist of a 6-mode test for nonhandheld engines and a 2-mode test for handheld engines.

e The effective date is August 1, 2007; in addition, any Class I engine family initially produced on or after August 1, 2003 must meet the Phase 2 Class I standards before they may be introduced into commerce.

f Manufacturers certify for the useful life category which most closely approximates the expected useful life of the equipment into which the engines will be installed. Engines with gross power output greater than 19 kW that have an engine displacement less than or equal to 1 liter that optionally certify under 40 CFR Part 90 must certify to a useful life period of 1,000 hours.

g For Phase 2 and Phase 3 handheld engines, EPA may establish a shorter warranty period for handheld engines subject to severe service in seasonal equipment if EPA determines that these engines are likely to operate for a number of hours greater than the applicable useful life within 24 months.

h The Phase 3 numerical emission standards for HC must be met based on the following types of hydrocarbon emissions for engines powered by the following fuels: (1) total hydrocarbon equivalent for alcohol; (2) non-methane hydrocarbon for natural gas; and (3) total hydrocarbons for other fuels.

i The useful life period is the number of engine operating hours listed in the table that most closely matches the expected median in-use life of the engines as described in 40 CFR 1054.107. The minimum useful life period for engines with maximum engine power above 19kW is 1,000 hours. For nonhandheld engines, a longer useful life may be selected in 100 hour increments not to exceed 3,000 hours for Class I engines or 5,000 hours for Class II engines.

Code of Federal Regulations (CFR) Citations:

- 40 CFR 90.103 = Phases 1 & 2 exhaust emission standards
- 40 CFR 90.105 = Phase 2 useful life
- 40 CFR 90.1103 = Phases 1 & 2 warranty period
- 40 CFR 90 Subpart C = ABT programs
- 40 CFR 1054.103 + 1054.105 = Phase 3 exhaust emission standards
- 40 CFR 1054.107 = Phase 3 useful life
- 40 CFR 1054.120 = Phase 3 warranty requirements