

Document number and name	40 CFR part 90 reference
Standard Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption. ASTM D2622-92:	Appendix A to subpart D, Table 3.
Standard Test Method for Sulfur in Petroleum Products by X-ray Spectrometry. ASTM D2699-92:	Appendix A to subpart D, Table 3.
Standard Test Method for Knock Characteristics of Motor Fuels by the Research Method. ASTM D2700-92:	Appendix A to subpart D, Table 3.
Standard Test Method for Knock Characteristics of Motor and Aviation Fuels by the Motor Method. ASTM D3231-89:	Appendix A to subpart D, Table 3.
Standard Test Method for Phosphorus in Gasoline ..... ASTM D3606-92:	Appendix A to subpart D, Table 3.
Standard Test Method for Determination of Benzene and Toluene in Finished Motor and Aviation Gasoline by Gas Chromatography. ASTM D5191-93a:	Appendix A to subpart D, Table 3.
Standard Test Method for Vapor Pressure of Petroleum Products (Mini Method). ASTM E29-93a:	Appendix A to subpart D, Table 3.
Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications.	90.116; 90.509.

(2) *SAE material.* The following table sets forth material from the Society of Automotive Engineers which has been incorporated by reference. The first column lists the number and name of the material. The second column lists the section(s) of this part, other than §90.7, in which the matter is ref-

erenced. The second column is presented for information only and may not be all inclusive. Copies of these materials may be obtained from Society of Automotive Engineers International, 400 Commonwealth Dr., Warrendale, PA 15096-0001.

Document number and name	40 CFR part 90 reference
SAE J1930 September 1991, Electrical/Electronic Systems Diagnostic Terms, Definitions, Abbreviations and Acronyms .....	90.114
SAE Paper 770141, Optimization of a Flame Ionization Detector for Determination of Hydrocarbon in Diluted Automotive Exhausts, Glenn D. Reschke, 1977 .....	90.316

**Subpart B—Emission Standards and Certification Provisions**

**§ 90.101 Applicability.**

The requirements of subpart B are applicable to all nonroad engines and vehicles subject to the provisions of subpart A of part 90.

**§ 90.102 Definitions.**

The definitions in subpart A of part 90 apply to this subpart. All terms not defined herein or in subpart A have the meaning given them in the Act. The following definitions also apply to this subpart.

*Attitudinal control* means the operator regulates either the horizontal or vertical position of the equipment, or both.

*Carry* means the operator completely bears the weight of the equipment, including the engine.

*Support* means that the operator holds the equipment in position so as to prevent it from falling, slipping or sinking. It is not necessary for the entire weight of the equipment to be borne by the operator.

**§ 90.103 Exhaust emission standards.**

(a) Exhaust emissions for new Phase 1 and Phase 2 nonroad spark ignition engines at or below 19 kilowatts (kW), shall not exceed the following levels. Throughout this part, NMHC+NO<sub>x</sub> standards are applicable only to natural gas fueled engines at the option of the manufacturer, in lieu of HC+NO<sub>x</sub> standards.

TABLE 1—PHASE 1 EXHAUST EMISSION STANDARDS  
[Grams per kilowatt-hour]

Engine displacement class	Hydrocarbons+oxides of nitrogen (HC+NO <sub>x</sub> )	Hydrocarbons	Carbon monoxide	Oxides of nitrogen (NO <sub>x</sub> )
I .....	16.1	.....	519	.....
II .....	13.4	.....	519	.....
III .....	.....	295	805	5.36
IV .....	.....	241	805	5.36
V .....	.....	161	603	5.36

TABLE 2—PHASE 2 CLASS I-A, CLASS I-B, AND CLASS I ENGINE EXHAUST EMISSION STANDARDS  
[grams per kilowatt-hour]

Engine class	HC+NO <sub>x</sub>	NMHC+NO <sub>x</sub>	CO	Effective date
I .....	16.1	14.8	610	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.
I-A .....	50	.....	610	2001 Model Year.
I-B .....	40	37	610	2001 Model Year.

TABLE 3—PHASE 2 CLASS II ENGINE EXHAUST EMISSION STANDARDS BY MODEL YEAR  
[grams per kilowatt-hour]

Engine Class	Emission requirement	Model Year				
		2001	2002	2003	2004	2005 and later
II .....	HC +NO <sub>x</sub>	18.0	16.6	15.0	13.6	12.1
	NMHC+NO <sub>x</sub>	16.7	15.3	14.0	12.7	11.3
	CO	610	610	610	610	610

TABLE 4—PHASE 2 HANDHELD EXHAUST EMISSION STANDARDS BY MODEL YEAR  
[grams per kilowatt-hour]

Engine class	Emission requirement	Model year					
		2002	2003	2004	2005	2006	2007 and later
Class III .....	HC+NO <sub>x</sub> .....	238	175	113	50	50	50
	CO .....	805	805	805	805	805	805
Class IV .....	HC+NO <sub>x</sub> .....	196	148	99	50	50	50
	CO .....	805	805	805	805	805	805
Class V .....	HC+NO <sub>x</sub> .....	.....	.....	143	119	96	72
	CO .....	.....	.....	603	603	603	603

(1) Each engine displacement class has a unique set of exhaust emission standards. Boundaries for each class are indicated in §90.116(b).

(2) Emission standards for classes III, IV, V may be used only if an engine meets at least one of the following requirements:

(i) The engine must be used in a piece of equipment that is carried by the operator throughout the performance of its intended function(s);

(ii) The engine must be used in a piece of equipment that must operate

multipositionally, such as upside down or sideways, to complete its intended function(s);

(iii) The engine must be used in a piece of equipment for which the combined engine and equipment dry weight is under 14 kilograms, no more than two wheels are present on the equipment, and at least one of the following attributes is also present:

(A) The operator must alternately provide support or carry the equipment throughout the performance of its intended function(s); (B) The operator

must provide support or attitudinal control for the equipment throughout the performance of its intended function(s); and

(C) The engine must be used in a generator or pump;

(iv) The engine must be used to power one-person augers, with a combined engine and equipment dry weight under 20 kilograms;

(v) The engine must be used in a recreational application, with a combined total vehicle dry weight under 20 kilograms;

(vi) Where a piece of equipment otherwise meeting the requirements of paragraph (a)(2)(iii) or (a)(2)(iv) of this section exceeds the applicable weight limit, emission standards for class III, IV or V, as applicable, may still apply if the equipment exceeds the weight limit by no more than the extent necessary to allow for the incremental weight of a four stroke engine or the incremental weight of a two stroke engine having enhanced emission control acceptable to the Administrator. Any manufacturer utilizing this provision to exceed the subject weight limitations shall maintain and make available to the Administrator upon request, documentation to substantiate that the exceedance of either weight limitation is a direct result of application of a four stroke or enhanced two stroke engine having the same, less or very similar power to two stroke engines that could otherwise be used to power the equipment and remain within the weight limitations.

(3) Notwithstanding paragraph (a)(2) of this section, two stroke engines used to power lawnmowers or other nonhandheld equipment may meet Phase 1 Class III, IV or V standards and requirements, as appropriate, through model year 2002 subject to the provisions of §90.107(e), (f) and (h). Such engines shall not be included in any computations of Phase 2 averaging, banking, or trading credits or eligible production.

(4) Notwithstanding paragraph (a)(2) of this section, two-stroke engines used to power snowthrowers may meet class III, IV, or V standards.

(5) Notwithstanding paragraph (a)(2) of this section, engines used exclusively to power products which are

used exclusively in wintertime, such as snowthrowers and ice augers, at the option of the engine manufacturer, need not certify to or comply with standards regulating emissions of HC, NO<sub>x</sub>, HC+NO<sub>x</sub> or NMHC+NO<sub>x</sub>, as applicable. If the manufacturer exercises the option to certify to standards regulating such emissions, such engines must meet such standards. If the engine is to be used in any equipment or vehicle other than an exclusively wintertime product such as a snowthrower or ice auger, it must be certified to the applicable standard regulating emissions of HC, NO<sub>x</sub>, HC+NO<sub>x</sub> or NMHC+NO<sub>x</sub> as applicable.

(6) In lieu of certifying to the applicable Phase 2 standards, small volume engine manufacturers as defined in this part may, at their option, certify their engine families as Phase 1 engines until the 2010 model year for nonhandheld engine families excluding Class I-A and Class I-B engine families, until the 2008 model year for Class III and Class IV engine families, and until the 2010 model year for Class V engine families. Such engines shall not exceed the applicable Phase 1 standards and are excluded from the averaging, banking and trading program and any related credit calculations. Beginning with the 2010 model year for nonhandheld engine families, the 2008 model year for Class III and Class IV engine families, and the 2010 model year for Class V engine families, these engines must meet the applicable Phase 2 standards.

(7) In lieu of certifying to the applicable Phase 2 standards, manufacturers of small volume engine families, as defined in this part may, at their option, certify their small volume engine families as Phase 1 engines until the 2010 model year for nonhandheld engine families excluding Class I-A and Class I-B engine families, until the 2008 model year for Class III and Class IV engine families, and until the 2010 model year for Class V engine families. Such engines shall not exceed the applicable Phase 1 standards and are excluded from the averaging, banking and trading program and any related credit calculations. Beginning with the 2010 model year for nonhandheld engine families, the 2008 model year for Class

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III and Class IV engine families, and the 2010 model year for Class V engine families, these engines must meet the applicable Phase 2 standards.

(8) Notwithstanding the standards shown in Table 3 of this section, the HC+NO<sub>x</sub> (NMHC+NO<sub>x</sub>) standard for Phase 2 Class II side valve engine families with annual production of 1000 or less shall be 24.0 g/kW-hr (22.0 g/kW-hr) for model years 2010 and later. Engines produced subject to this provision may not exceed this standard and are excluded from the averaging, banking and trading program and any related credit calculations.

(b) Exhaust emissions will be measured using the procedures set forth in subpart E of this part.

[60 FR 34598, July 3, 1995, as amended at 61 FR 58300, Nov. 13, 1996; 62 FR 42643, Aug. 7, 1997; 64 FR 15236, Mar. 30, 1999; 65 FR 24305, Apr. 25, 2000; 67 FR 68340, Nov. 8, 2002]

**§ 90.104 Compliance with emission standards.**

Paragraphs (a) through (c) of this section apply to Phase 1 engines only. Paragraphs (d) through (h) of this section apply only to Phase 2 engines.

(a) If all test engines representing an engine family have emissions less than or equal to each emission standard in a given engine displacement class, that family complies with that class of emission standards.

(b) If any test engine representing an engine family has emissions greater than any one emission standard in a given engine displacement class, that family will be deemed not in compliance with that class of emission standards.

(c) If catalysts are used in an engine family, the engine manufacturer must affirm that catalyst durability has been confirmed on the basis of the evaluation procedure that is specified in subpart E of this part.

(d) The exhaust emission standards (FELs, where applicable) for Phase 2

engines set forth in this part apply to the emissions of the engines for their full useful lives as determined pursuant to § 90.105.

(e) For all Phase 2 engines, if all test engines representing an engine family have emissions, when properly tested according to procedures in this part, less than or equal to each Phase 2 emission standard (FEL, where applicable) in a given engine class and given model year, when multiplicatively adjusted by the deterioration factor determined in this section, that family complies with that class of emission standards for purposes of certification. If any test engine representing an engine family has emissions adjusted multiplicatively by the deterioration factor determined in this section, greater than any one emission standard (FEL, where applicable) for a given displacement class, that family does not comply with that class of emission standards.

(f) Each engine manufacturer must comply with all provisions of the averaging, banking and trading program outlined in subpart C of this part for each engine family participating in that program.

(g)(1) Small volume engine manufacturers and small volume engine families may, at their option, take deterioration factors for HC+NO<sub>x</sub> (NMHC+NO<sub>x</sub>) and CO from Table 1 or Table 2 of this paragraph (g), or they may calculate deterioration factors for HC+NO<sub>x</sub> (NMHC+NO<sub>x</sub>) and CO according to the process described in paragraph (h) of this section. For technologies that are not addressed in Table 1 or Table 2 of this paragraph (g), the manufacturer may ask the Administrator to assign a deterioration factor prior to the time of certification. The provisions of this paragraph (g) do not apply to Class I-A and Class I-B engines.

(2) Table 1 follows: