(i) 17.0 g/kW-hr when maximum test speed is less than 130 rpm.

(ii) $45.0 \times N^{-0.20}$ when maximum test speed is at or above 130 but below 2000 rpm, where N is the maximum test speed of the engine in revolutions per minute. Round the calculated standard to the nearest 0.1 g/kW-hr.

(ii) 9.8 g/kW-hr when maximum test speed is 2000 rpm or more.

(2) *Tier 2 primary standards.* Exhaust emissions from Category 1 engines at or above 37 kW and all Category 2 engines may not exceed the values shown in the following table:

TABLE 2 TO APPENDIX I—PRIMARY TIER 2 EMISSION STANDARDS FOR COMMERCIAL AND RECREATIONAL MARINE ENGINES AT OR ABOVE 37 KW (G/KW-HR)

Engine size liters/cylinder	Maximum engine power	Category	Model year	NO_X + THC g/kW-hr	CO g/kW-hr	PM g/kW-hr
disp. < 0.9	power ≥37 kW	Category 1 Commercial	2005	7.5	5.0	0.40
		Category 1 Recreational	2007	7.5	5.0	0.40
0.9 ≤ disp. < 1.2	All	Category 1 Commercial	2004	7.2	5.0	0.30
		Category 1 Recreational	2006	7.2	5.0	0.30
1.2 ≤ disp. < 2.5	All	Category 1 Commercial	2004	7.2	5.0	0.20
		Category 1 Recreational	2006	7.2	5.0	0.20
2.5 ≤ disp. < 5.0	All	Category 1 Commercial	2007	7.2	5.0	0.20
		Category 1 Recreational	2009	7.2	5.0	0.20
5.0 ≤ disp. < 15.0	All	Category 2	2007	7.8	5.0	0.27
15.0 ≤ disp. < 20.0	power < 3300 kW	Category 2	2007	8.7	5.0	0.50
	power ≥3300 kW	Category 2	2007	9.8	5.0	0.50
20.0 ≤ disp. < 25.0	All	Category 2	2007	9.8	5.0	0.50
25.0 ≤ disp. < 30.0	All	Category 2	2007	11	5.0	0.5

(3) *Tier 2 supplemental standards.* The not-to-exceed emission standards specified in 40 CFR 94.8(e) apply for all engines subject to the Tier 2 standards described in paragraph (b)(2) of this appendix.

[73 FR 37243, June 30, 2008, as amended at 75 FR 23012, Apr. 30, 2010]

APPENDIX II TO PART 1042—STEADY-STATE DUTY CYCLES

(a) The following duty cycles apply as specified in §1042.505(b)(1):

(1) The following duty cycle applies for discrete-mode testing:

E3 mode No.	Engine speed [1]	Percent of maximum test power	Weighting factors
1	Maximum test speed	100	0.2
2	91%	75	0.5
3	80%	50	0.15
4	63%	25	0.15

[1] Speed terms are defined in 40 CFR part 1065. Percent speed values are relative to maximum test speed.

(2) The following duty cycle applies for ramped-modal testing:

RMC mode	Time in mode (seconds)	Engine speed [1, 3]	Power (percent) [2, 3]
1a Steady-state	229	Maximum test speed	100%.
1b Transition	20	Linear transition	Linear transition in torque.
2a Steady-state	166	63%	25%.
2b Transition	20	Linear transition	Linear transition in torque.
3a Steady-state	570	91%	75%.
3b Transition	20	Linear transition	Linear transition in torque.
4a Steady-state	175	80%	50%.

[1] Speed terms are defined in 40 CFR part 1065. Percent speed is relative to maximum test speed.
[2] The percent power is relative to the maximum test power.
[3] Advance from one mode to the next within a 20-second transition phase. During the transition phase, command a linear progression from the torque setting of the current mode to the torque setting of the next mode, and simultaneously command a similar linear progression for engine speed if there is a change in speed setting.

(b) The following duty cycles apply as specified in §1042.505(b)(2):

(1) The following duty cycle applies for discrete-mode testing:

E5 mode No.	Engine speed [1]	Percent of maximum test power	Weighting factors
1	Maximum test speed	100	0.08
2	91%	75	0.13
3	80%	50	0.17
4	63%	25	0.32
5	Warm idle	0	0.3

[1] Speed terms are defined in 40 CFR part 1065. Percent speed values are relative to maximum test speed.

(2) The following duty cycle applies for ramped-modal testing:

RMC mode	Time in mode (seconds)	Engine speed [1, 3]	Power (percent) [2, 3]
1a Steady-state	167	Warm idle	0.
1b Transition	20	Linear transition	Linear transition in torque.
2a Steady-state	85	Maximum test speed	100%.
2b Transition	20	Linear transition	Linear transition in torque.
3a Steady-state	354	63%	25%.
3b Transition	20	Linear transition	Linear transition in torque.
4a Steady-state	141	91%	75%.
4b Transition	20	Linear transition	Linear transition in torque.
5a Steady-state	182	80%	50%.
5b Transition	20	Linear transition	Linear transition in torque.
6 Steady-state	171	Warm idle	0.

[1] Speed terms are defined in 40 CFR part 1065. Percent speed is relative to maximum test speed.
[2] The percent power is relative to the maximum test power.
[3] Advance from one mode to the next within a 20-second transition phase. During the transition phase, command a linear progression from the torque setting of the current mode to the torque setting of the next mode, and simultaneously command a similar linear progression for engine speed if there is a change in speed setting.

(c) The following duty cycles apply as specified in §1042.505(b)(3):

(1) The following duty cycle applies for discrete-mode testing:

E2 mode No.	Engine speed [1]	Torque (percent) [2]	Weighting factors
1	Engine Governed	100	0.2
2	Engine Governed	75	0.5
3	Engine Governed	50	0.15
4	Engine Governed	25	0.15

[1] Speed terms are defined in 40 CFR part 1065.
[2] The percent torque is relative to the maximum test torque as defined in 40 CFR part 1065.

(2) The following duty cycle applies for ramped-modal testing:

RMC mode	Time in mode (seconds)	Engine speed	Torque (percent) [1 2]
1a Steady-state	229	Engine Governed	100.
1b Transition	20	Engine Governed	Linear transition.
2a Steady-state	166	Engine Governed	25.
2b Transition	20	Engine Governed	Linear transition.
3a Steady-state	570	Engine Governed	75.
3b Transition	20	Engine Governed	Linear transition.
4a Steady-state	175	Engine Governed	50.

[1] The percent torque is relative to the maximum test torque as defined in 40 CFR part 1065.
[2] Advance from one mode to the next within a 20-second transition phase. During the transition phase, command a linear progression from the torque setting of the current mode to the torque setting of the next mode.

[73 FR 37243, June 30, 2008, as amended at 75 FR 68461, Nov. 8, 2010]

APPENDIX III TO PART 1042—NOT-TO-EXCEED ZONES

(a) The following definitions apply for this Appendix III:

(1) *Percent power* means the percentage of the maximum power achieved at Maximum Test Speed (or at Maximum Test Torque for constant-speed engines).

(2) *Percent speed* means the percentage of Maximum Test Speed.

(b) Figure 1 of this Appendix illustrates the default NTE zone for commercial marine engines certified using the duty cycle specified