

§ 1060.521

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[73 FR 59298, Oct. 8, 2008, as amended at 75 FR 23027, Apr. 30, 2010]

§ 1060.521 How do I test fuel caps for permeation emissions?

If you measure a fuel tank’s permeation emissions with a nonpermeable covering in place of the fuel cap under §1060.520(b)(5)(ii)(B), you must separately measure permeation emissions from a fuel cap. You may show that your fuel tank and fuel cap meet emission standards by certifying them separately or by combining the separate measurements into a single emission rate based on the relative surface areas of the fuel tank and fuel cap. However, you may not combine these emission measurements if you test the fuel cap at a nominal temperature of 28 °C and you test the fuel tank at 40 °C. Measure the fuel cap’s permeation emissions as follows:

(a) Select a fuel cap expected to have permeation emissions at least as high as the highest-emitting fuel cap that you expect to be used with fuel tanks from the emission family. Include a gasket that represents production models. If the fuel cap includes vent paths, seal these vents as follows:

(1) If the vent path is through grooves in the gasket, you may use an-

other gasket with no vent grooves if it is otherwise the same as a production gasket.

(2) If the vent path is through the cap, seal any vents for testing.

(b) Attach the fuel cap to a fuel tank with a capacity of at least one liter made of metal or some other impermeable material.

(c) Use the procedures specified in §1060.520 to measure permeation emissions. Calculate emission rates using the smallest inside cross sectional area of the opening on which the cap is mounted as the fuel cap’s surface area.

§ 1060.525 How do I test fuel systems for diurnal emissions?

Use the procedures of this section to determine whether your fuel tanks meet diurnal emission standards as specified in §1060.105.

(a) Except as specified in paragraph (c) of this section, use the following procedure to measure diurnal emissions:

(1) Diurnal measurements are based on a representative temperature cycle. For marine fuel tanks, the temperature cycle specifies fuel temperatures rather than ambient temperatures. The applicable temperature cycle is indicated in the following table:

TABLE 1 TO § 1060.525—DIURNAL TEMPERATURE PROFILES FOR FUEL TANKS

Time (hours)	Ambient Temperature Profile for Land-based Fuel Tanks (°C)	General Fuel Temperature Profile for Installed Marine Fuel Tanks (°C)	Fuel Temperature Profile for Marine Fuel Tanks Installed in Nontrailerable Boats (°C)
0	22.2	25.6	27.6
1	22.5	25.7	27.6
2	24.2	26.5	27.9
3	26.8	27.9	28.5
4	29.6	29.2	29.0
5	31.9	30.4	29.5
6	33.9	31.4	29.9
7	35.1	32.0	30.1
8	35.4	32.2	30.2
9	35.6	32.2	30.2
10	35.3	32.1	30.2
11	34.5	31.7	30.0
12	33.2	31.0	29.7
13	31.4	30.2	29.4
14	29.7	29.3	29.1
15	28.2	28.6	28.8
16	27.2	28.0	28.5
17	26.1	27.5	28.3
18	25.1	27.0	28.1
19	24.3	26.6	28.0
20	23.7	26.3	27.9
21	23.3	26.1	27.8
22	22.9	25.9	27.7
23	22.6	25.7	27.6

TABLE 1 TO § 1060.525—DIURNAL TEMPERATURE PROFILES FOR FUEL TANKS—Continued

Time (hours)	Ambient Temperature Profile for Land-based Fuel Tanks (°C)	General Fuel Temperature Profile for Installed Marine Fuel Tanks (°C)	Fuel Temperature Profile for Marine Fuel Tanks Installed in Nontrailerable Boats (°C)
24	22.2	25.6	27.6

(2) Fill the fuel tank to 40 percent of nominal capacity with the gasoline specified in 40 CFR 1065.710 for general testing.

(3) Install a vapor line from any vent ports that would not be sealed in the final in-use configuration. Use a length of vapor line representing the largest inside diameter and shortest length that would be expected with the range of in-use installations for the emission family.

(4) Stabilize the fuel tank at the starting temperature of the applicable temperature profile from paragraph (a)(1) of this section. For sealed fuel systems, replace the fuel cap once the fuel reaches equilibrium at the appropriate starting temperature.

(5) If the fuel tank is equipped with a carbon canister, load the canister with butane or gasoline vapors to its *canister working capacity* as specified in §1060.240(e)(2)(i) and attach it to the fuel tank in a way that represents a typical in-use configuration.

(6) Place the fuel tank with the carbon canister and vent line in a SHED meeting the specifications of 40 CFR 86.107-96(a)(1). Follow the applicable temperature trace from paragraph (a)(1) of this section for one 24-hour period. You need not measure emissions during this stabilization step.

(7) As soon as possible after the stabilization in paragraph (a)(6) of this section, purge the SHED and follow the applicable temperature trace from paragraph (a)(1) of this section for three consecutive 24-hour periods. Start measuring emissions when you start the temperature profile. The end of the first, second, and third emission sampling periods must occur 1440 ± 6 , 2880 ± 6 , and 4320 ± 6 minutes, respectively, after starting the measurement procedure. Use the highest of the three emission levels to determine whether

your fuel tank meets the diurnal emission standard.

(8) For emission control technologies that rely on a sealed fuel system, you may omit the stabilization step in paragraph (a)(6) of this section and the last two 24-hour periods of emission measurements in paragraph (a)(7) of this section. For purposes of this paragraph (a), sealed fuel systems include those that rely on pressure-relief valves, limiting flow orifices, bladder fuel tanks, and volume-compensating air bags.

(b) You may subtract your fuel tank's permeation emissions from the measured diurnal emissions if the fuel tank is preconditioned with diurnal test fuel as described in §1060.520(b) or if you use good engineering judgment to otherwise establish that the fuel tank has stabilized permeation emissions. Measure permeation emissions for subtraction as specified in §1060.520(c) and (d) before measuring diurnal emissions, except that the permeation measurement must be done with diurnal test fuel at $28 \pm 2^\circ\text{C}$. Use appropriate units and corrections to subtract the permeation emissions from the fuel tank during the diurnal emission test. You may not subtract a greater mass of emissions under this paragraph (b) than the fuel tank would emit based on meeting the applicable emission standard for permeation.

Subpart G—Special Compliance Provisions

§ 1060.601 How do the prohibitions of 40 CFR 1068.101 apply with respect to the requirements of this part?

(a) As described in §1060.1, fuel tanks and fuel lines that are used with or intended to be used with new nonroad engines or equipment are subject to evaporative emission standards under this